

**TOWN OF ERIE**

Community Development Department – Planning Division
 645 Holbrook Street – PO Box 750 – Erie, CO 80516
 Tel: 303.926.2770 – Fax: 303.926.2706 – Web: www.erieco.gov

LAND USE APPLICATION

Please fill in this form completely. Incomplete applications will not be processed.

STAFF USE ONLY

FILE NAME:

FILE NO:

DATE SUBMITTED:

FEES PAID:

PROJECT/BUSINESS NAME: Chartered Ranchwood

PROJECT ADDRESS: Wraps the NW Corner of Erie Parkway and County Line Road

PROJECT DESCRIPTION: 28.65 Acres consisting of 220 Multi-Family Residential Units and 6 commercial pad sites.

LEGAL DESCRIPTION (attach legal description if Metes & Bounds)Subdivision Name: Tract B, Ranchwood Minor SubdivisionFiling #: _____ Lot #: _____ Block #: _____ Section: 24 Township: 1 N Range: 69W**OWNER** (attach separate sheets if multiple)Name/Company: Legacy BankContact Person: Michael ChalonerAddress: 2801 W. Memorial RoadCity/State/Zip: Oklahoma City, OK 73134Phone: 405 748-2045

Fax: _____

E-mail: MikeC@legacybank.com**AUTHORIZED REPRESENTATIVE**Company/Firm: Chartered Development Corp/Granite CContact Person: Ward RitterAddress: 2555 49th Street, Suite 3City/State/Zip: Boulder, CO 80301Phone: 303-545-2554

Fax: _____

E-mail: ward@charterdhomes.com**MINERAL RIGHTS OWNER** (attach separate sheets if multiple)Name/Company: See attached list

Address: _____

City/State/Zip: _____

MINERAL LEASE HOLDER (attach separate sheets if multiple)Name/Company: EncanaAddress: 370 17th Street, Suite 1700City/State/Zip: Denver, CO 80202**LAND-USE & SUMMARY INFORMATION**Present Zoning: CMUProposed Zoning: MR and CCGross Acreage: 28.65 acresGross Site Density (du/ac): 9.9 du/ac# Lots/Units Proposed: 220

Gross Floor Area: _____

SERVICE PROVIDERSElectric: United Power

Metro District: _____

Water (if other than Town): TownGas: XcelFire District: Mountain View Fire Protection DistrictSewer (if other than Town): Town**PAGE TWO MUST BE SIGNED AND NOTARIZED**

DEVELOPMENT REVIEW FEES			
ANNEXATION		SUBDIVISION	
☐ Major (10+ acres)	\$ 4000.00	☒ Sketch Plan	\$ 1000.00 + 10.00 per lot
☐ Minor (less than 10 acres)	\$ 2000.00	☐ Preliminary Plat	\$ 2000.00 + 40.00 per lot
☐ Deannexation	\$ 1000.00	☐ Final Plat	\$ 2000.00 + 20.00 per lot
COMPREHENSIVE PLAN AMENDMENT		☐ Minor Subdivision Plat	\$ 2000.00
☐ Major	\$ 3000.00	☐ Minor Amendment Plat	\$ 1000.00 + 10.00 per lot
☐ Minor	\$ 1200.00	☐ Road Vacation (constructed)	\$ 1000.00
ZONING/REZONING		☐ Road Vacation (paper)	\$ 100.00
☐ Rezoning	\$ 1700.00 + 10.00 per acre	SITE PLAN	
☐ PUD Rezoning	\$ 1700.00 + 10.00 per acre	☐ Residential	\$ 1400.00 + 10.00 per unit
☐ PUD Amendment	\$ 1700.00 + 10.00 per acre	☐ Non-Resi. (>10,000 sq. ft.)	\$ 2200.00
☐ Major PD Amendment	\$ 3700.00 + 10.00 per acre	☐ Non-Resi. (>2,000 sq. ft.)	\$ 1000.00
☐ Minor PD Amendment	\$ 500.00	☐ Non-Resi. (<2,000 sq. ft.)	\$ 200.00
SPECIAL REVIEW USE		☐ Amendment (major)	\$ 1100.00
☐ Major	\$ 1000.00	☐ Amendment (minor)	\$ 350.00
☐ Minor	\$ 400.00	VARIANCE	\$ 600.00
☐ Oil & Gas	\$ 1200.00	SERVICE PLAN	\$ 10,000.00

All fees **include** both Town of Erie Planning & Engineering review. These fees **do not include** referral agency review fees, outside consultant review fees, or review fees incurred by consultants acting on behalf of staff. See Town of Erie Municipal Code, Title 2-10-5 for all COMMUNITY DEVELOPMENT FEES.

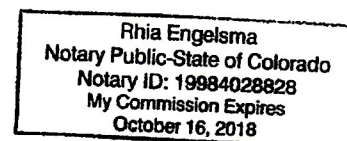
The undersigned is fully aware of the request/proposal being made and the actions being initiated on the referenced property. The undersigned understand that the application must be found to be complete by the Town of Erie before the request can officially be accepted and the development review process initiated. The undersigned is aware that the applicant is fully responsible for all reasonable costs associated with the review of the application/request being made to the Town of Erie. Pursuant to Chapter 7 (Section 7.2.B.5) of the Unified Development Code (UDC) of the Town of Erie, applicants shall pay all costs billed by the Town for legal, engineering and planning costs incurred by staff, including consultants acting on behalf of staff, necessary for project review. By this acknowledgement, the undersigned hereby certify that the above information is true and correct.

Owner: Ward Ritter, President
Legacy Bank
 Owner: [Signature]
 Applicant: [Signature] President

Date: 05/31/2018
 Date: _____
 Date: 5/30/18

STATE OF COLORADO)
) ss.
 County of Boulder)
 The foregoing instrument was acknowledged before
 me this 30 day of May, 2018,
 by Ward Ritter.

My commission expires: 10-16-18.
 Witness my hand and official seal.



Rhia Engelsma
 Notary Public

ACKNOWLEDGEMENT

STATE OF OKLAHOMA)
) SS.
COUNTY OF OKLAHOMA)

Before me, a Notary Public in and for said county and state on this 31st day of May, 2018, personally appeared Michael Chaloner, known to me to be the identical person who executed the within and foregoing instrument as President of Legacy Bank, an Oklahoma state banking corporation, who acknowledged to me that he executed the same as his free and voluntary act and deed and as the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth.

Given under my hand and seal the day and year last above written.

Kacie Jo Soulsby
Notary Public



LETTER OF AUTHORIZATION FOR TRACT B,
RANCHWOOD MINOR SUBDIVISION, ERIE, CO.

May 29, 2018

I, Charles R. Travis, Co-Personal Representative for the Estate of Ellen R. Lumry, Deceased, authorize Chartered Development Corporation to submit a preliminary sketch plan for Tract B, Ranchwood Minor Subdivision, including associated documents related to the location of existing well pad, the Right of Way and necessary improvements associated with proposed Jasper Road and the Jasper Road connection to County Line Road.

Estate of Ellen R. Lumry, Deceased

BY: Charles R. Travis PR.

PRINTED NAME: Charles R. Travis

TITLE: Co-Personal Representative

STATE OF Colorado)
) SS
COUNTY OF Boalder)

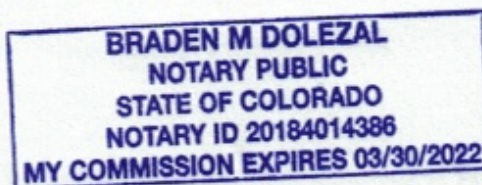
The foregoing instrument was acknowledged before me this 31st day of May, 2018, by Charles R. Travis, as Co-Personal Representative of the Estate of Ellen R. Lumry.

My commission expires: 03/30/2022

WITNESS my hand and official seal.

Braden M Dolezal

Notary Public



(SEAL)

**LETTER OF AUTHORIZATION FOR TRACT B, RANCHWOOD
MINOR SUBDIVISION**

May 29, 2018

I Michael Chaloner, president of Legacy Bank, authorize Chartered Development Corporation and/or Granite Capital Group, Inc. to submit Tract B, Ranchwood Minor Subdivision, Sketch Plan, and associated documents on our behalf to the Town of Erie, CO.

BY: 
PRINTED NAME: MICHAEL S CHALONER
TITLE: President - Legacy Bank

STATE OF Oklahoma)
) SS
COUNTY OF Oklahoma)

The foregoing instrument was acknowledged before me this 31st day of May, 2018, by Michael Chaloner, as President

My commission expires: 06/08/2019

WITNESS my hand and official seal.


Notary Public





1529 Market St
Suite 200
Denver, CO 80202
303•875•7131
bonner.gilmore@enertiagc.com

January 18, 2019

Mr. Chris LaRue, AICP
Senior Planner
Planning and Development
Town of Erie
645 Holbrook Street
Erie, CO 80516

RE: Ranchwood Minor Subdivision Written Narrative

Dear Mr. LaRue:

General project concept and purpose of the request:

The site is the Ranchwood Minor Subdivision, wrapping the northwest corner of Erie Parkway and County Line Road. The site is currently zoned Community Mixed Use (CMU), and surrounds 19.5 acres of property on the corner zoned Business (B) which is owned by Regency Centers.

The proposal is to designate 22.2 acres of the 28.65 acre property as Medium Density Residential (MR), providing a diversity of housing types within the site plan and the Town of Erie. The majority includes a unique multi-family product designed to look like individual single family homes, which we call Manor Homes. The Manor Homes include four units within each manor home building; all with attached direct access one or two car garages. This Manor Home building is the same one used in the highly successfully Vista Ridge Filing No. 12 – Montex South Development. Each Manor Home building will include in townhome or flat configuration, 1 - three bedroom, 2 - two bedrooms, and a one bedroom unit per building. The Manor Home buildings are to be located on the west side of the proposed Ranchwood Drive which divides the site from the adjacent Regency Centers property. On the northerly center portion of the site (east of Ranchwood Drive, south of Jasper Road, and north of Regency Centers) will be a second type of multi-family housing. These will be garden apartments that will provide an additional segment of diversity to the housing in the Town of Erie. This portion of the development will feature four - 3 story walk up buildings with one and two bedroom flats. Each of the 4 multi-family buildings will contain 24 units in addition to a number of detached garage buildings with spaces available to the residents along with open parking.

In addition to the residential component, up to 6 - commercial pads are proposed, 4 - fronting County Line Road and 2 - fronting Erie Parkway. The request is to designate those lots as Community Commercial (CC), but not plat them at this time, thus allowing for flexibility of size and use for future commercial users. An existing agreement recorded against the property between the original land owner and Regency Centers severely restricts the types of retail type uses on the subject property. Those restrictions specifically prohibit: drug stores or a pharmacy, grocery store, gas station, convenience store, tavern, nightclub, adult book store, massage parlor, liquor store, bank, among others.

Compliance with Uniform Development Code:

- The maximum density, building heights, encroachments, patio/terraces and additional provisions comply with Medium Density Residential (MR) Dimensional and Density Standards. Per previous conversations with the town, the garage side of the Manor Home Buildings are separated by 24' where the buildings "pop out" and 40' wide driveway from garage door face to garage door face which will be identified in the PUD. This is 10' more than was provided in the Montex South Development at Vista Ridge. With the PUD we are proposing side yard setbacks to the private streets of 10' and 0' setbacks to landscape buffers. We are also proposing a 15' front setback along the west side of Ranchwood Drive instead of 20'. A 60' roadway easement (reception #2808279) was previously recorded for Ranchwood Drive which allowed for a 20' setback to a local roadway. The town has requested Ranchwood Drive be increased to a Multi-Family Collector Street with a 80' ROW instead of the 60' ROW required for a local road. To accommodate this additional 5' of ROW dedication on our side of Ranchwood Drive, the setback along the west side of Ranchwood Drive has been reduced to 15'. This is consistent with the 15' setback that was provided with Vista Ridge Filing No. 12. A 20' building setback is provided to the Garden Apartment Buildings on the east side of Ranchwood Drive. All other residential setbacks comply with the UDC.
- A 30-foot landscape buffer tract has been provided along County Line Road and Erie Parkway. A 0' commercial building and parking setback is requested from the 30' landscape buffers which will be defined in the PUD.
- The local streets comply with the Local Streets Standard Drawing Number ST6 located in the Town of Erie Standards and Specifications for Design and Construction of Public Improvements. 5' detached sidewalks are provided as required for multi-family projects in the UDC. Ranchwood Drive has been shown as a Multi-family Collector Street with an ultimate 80' ROW which complies with Standard Drawing Number ST3.
- All no outlet private drives and alleys are less than 150'. Roadway radii have been designed to accommodate emergency access. A temporary turnaround has been provided at the road west of the commercial pad sites along County Line Road. Ultimately, this road may connect with Jasper Road when the adjacent property is developed.
- Two residents are anticipated per unit equaling 440 residents. The required park area is determined as 8.5 acres per 1000 residents. 440 residents results in a required park area of 3.74 acres. 1.69 acres have been provided via Tracts 1 and 9. The remaining 2.05 acres of park requirement will be satisfied by cash-in-lieu.
- The required open space is calculated as 17 acres of open space per 1000 residents. Based on 440 residents a total of 7.48 acres of open spaces is required. Open space area not currently counted within the development and is intended to be satisfied by cash-in-lieu.
- The parking required is 7.5 resident parking spaces plus 1.33 guest parking spaces per manor home. There are 31 manor homes which results in 274 required parking spaces for the manor homes. Each manor home has six garage parking spaces totaling 186 spaces. An additional 199, driveway, on-private street and off-street surface parking spaces have been provided around the manor homes totaling 385 parking spaces provided, exceeding the required parking by 111 spaces. The additional spaces have been dispersed throughout the site for resident's convenience.

- The four apartment buildings east of Ranchwood Drive each have 12 one bedroom units and 12 two bedroom units. 1.5 parking spaces is required for each 1-bedroom unit and 2.0 spaces are required for each 2-bedroom unit. 1 guest spaces per each 3 units are also required. This results in a parking requirement of 50 parking spaces per apartment building for a total requirement of 200 parking spaces. 203 parking spaces have been provided as surface and garage parking. The proposed plan has a minimum of 50 parking spaces within 200 feet of each building entrance.
- Per the UDC, parking spaces required shall be located within 200 feet of the primary building entrance. This requirement is met through on-street and off-street parking.
- One housing type is required for sites less than 40 acres: 2 are provided.
- Buildings are oriented towards the internal streets, interior courtyards and the future commercial area.
- Additional multi-family architectural standards are met.

Site Data:

Total land area to be subdivided: 28.65 acres

Total number of lots, and if residential, the proposed density: There are 31 manor homes with 4 units each and 4 apartment buildings with 24 units each totaling 124 manor home units and 96 apartment units. The rezoning proposes 22.2 acres for Medium Density residential resulting in a proposed density of 9.9 du/ac.

Non-residential, the total square footage of floor area proposed: TBD

Total land area to be preserved as open space: TBD

Brief description regarding the phasing of the proposed subdivision: Initial construction will include the building of Ranchwood Drive from Erie Parkway to the Leyner Ditch. Also, the Leyner Ditch will be piped from the west property boundary, under Ranchwood Drive and to the Regency Property (Tract A). The piping of the ditch is necessary due to the depth of the existing channel and safety of the residents. In addition, piping of the channel will create additional usable open area for trails, recreating and gathering as well as connect to the future commercial planned pipe to the east through the Regency parcel. The existing trail to the west will continue through the site generally along the ditch alignment to be picked up again at the Regency Property. The manor homes portion of the development will be developed in two phases – one south (Phase 1) of the Leyner ditch and the other (Phase 2) north of the ditch. Phase 2 construction will include the extension/completion of Ranchwood Drive north to the Jasper Road extension. Jasper Road's alignment is proposed, in cooperation with the adjacent property owner to the north, to meet Staff's request to align with Maxwell Ave at County Line Road. The apartment building portion of the project (Phase 3) is anticipated to be constructed as a single phase.

The 2 commercial pads along Erie Parkway and adjacent to Phase 1 of the Manor Homes will be constructed in conjunction with the Phase 1 residential. The commercial pads along County Line Road are intended to be constructed with the apartment building portion of the development (Phase 3).

Brief description regarding the availability and adequacy of existing infrastructure and other necessary services including schools, fire protection, water/sewer service and utility providers: Existing water infrastructure is located in County Line Road to the east and at Jasper Road & Hoffman Drive to the west of the site. Sanitary sewer is available at the northwest corner of County Line Road and Erie Parkway. A new detention pond will be provided for the

development and will discharge to the County Line Road roadside ditch which carries flows north to the ultimate release. There is a 48" storm sewer near the north property line of Tract C which drains to Erie Commons – Reach 1. Dry utilities such as power, gas and telephone are all at the property's border. The development is located in the Mountain View Fire District (MVFD). An AutoTURN analysis has been performed on the site to ensure emergency vehicles can safely access the site. The applicant will meet with MVFD to ensure all safety fire protection and safety concerns are met. The development is located in the St. Vrain Valley School District. Coordination with the school district will follow the Sketch Plan Submittal.

Brief description regarding the location, function and ownership/maintenance of public and private open space, parks, trails, common areas, common buildings: Pocket parks are provided in Tracts 1 and 9. Common areas are provided in Tracts 3, 4, 8 and 10. The intent of these parks and common areas is to meet the needs of the future residents—a broad spectrum of people – younger singles and marrieds without children, single head of households with children, empty nesters, and families with children – both younger and older. Amenities may include an off leash dog area, seating, barbeque grills, shade structures, lawn and enhanced landscape areas. These areas will be privately owned and maintained by ownership and/or an HOA. Detention and stormwater quality will occur southeast of the proposed Garden Apartments within Tract 10. Sidewalks and pedestrian connectivity are provided throughout the site. The 8' wide trail adjacent to the Leyner Cottonwood Number 1 Ditch west of the site will be extended to Tract A, east of the site. This will provide a regional trail connection to the proposed commercial center. In addition to the parks, common areas will be provided and will be landscaped and privately owned and maintained. No common buildings are proposed.

Brief description regarding the substance of any existing or proposed covenants, special conditions, grants of easements, or other restrictions applying to the proposed subdivision: Proposed covenants to govern common area/parkway landscaping and maintenance of the commercial areas will be created and be consistent with PUD's in this marketplace and will govern private streets, architectural control, landscape maintenance, snow removal and common areas.

Sincerely,



Bonner Gilmore
Managing Partner

THREE PARTY AGREEMENT
[Leon Wurl Parkway & County Line Road, Erie, Colorado]

This THREE PARTY AGREEMENT (this "Agreement") is made as of August 11th, 2006 (the "Effective Date"), by and among Charles Robert Travis, Personal Representative of the Estate of Ellen R. Lumry, Deceased ("Lumry") of 335 Inca Parkway, Boulder, CO 80303-3517, CW Holding Co, LC, an Oklahoma limited liability company ("CWH") of 3720 East 2nd Street, Edmond, OK 73034, and Regency Realty Group, Inc, a Florida corporation ("Regency") of 1873 South Bellaire Street, Suite 600, Denver, CO 80222.

RECITALS

A. Lumry and Regency are parties to that certain Amended and Restated Contract, dated as of March 18, 2005 (as amended, the "Regency Contract"), pursuant to which Lumry agreed to sell and Regency agreed to buy that certain real property located in Erie, Colorado containing approximately 19.4 acres (the "Regency Property") as more particularly described on Exhibit A attached hereto and incorporated herein for all purposes.

B. Lumry and CWH are parties to that certain Contract to Buy and Sell Real Estate, dated as of or about even date herewith (the "CWH Contract"), pursuant to which CWH is preparing to purchase from Lumry that certain real property located in Erie, Colorado containing approximately 27.93 acres (being the "Lumry's Remaining Property" as defined in the Regency Contract, and the "CWH Property" as referenced in this Agreement) as more particularly described on Exhibit B attached hereto and incorporated herein for all purposes.

C. The rights of Regency and obligations of Lumry pursuant to the Regency Contract, are as set forth in the Regency Contract, and in particular in Section 19 of the Regency Contract, except as may specifically be changed by this Agreement.

D. CWH agrees to assume and perform certain obligations of Lumry under the Regency Contract insofar as they pertain to the CWH Property, and to agree to perform certain other obligations under this Agreement agreed to by CWH herein (whether or not contemplated in the Regency Contract). CWH acknowledges that it has received and reviewed a copy of the Regency Contract and is aware of the obligations of Lumry thereunder. CWH has agreed to assume and become liable for certain of those obligations as specifically set forth herein, but CWH shall not become liable for any other obligations under the Regency Contract unless specifically assumed by CWH herein. Regency's execution of this Agreement shall constitute Regency's consent to the sale of the CWH Property to CWH upon the terms and conditions set forth herein. Nothing herein shall release Lumry from any of its obligations under the Regency Contract (even those that are assumed by CWH), except as expressly provided in this Agreement.

E. Capitalized terms used herein and not otherwise defined herein shall have the meaning given in the Regency Contract. Nothing herein is meant to modify or amend the existing terms of the Regency Contract, except to the extent expressly so stated herein.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lumry, CWH and Regency hereby agree as follows:

1. Assumption of Lumry's Obligations. CWH hereby assumes and agrees to perform certain obligations of Lumry under the Regency Contract as such obligations are specifically set forth

herein; however, except as otherwise noted hereunder or otherwise agreed to by CWH, CWH is not assuming any other Lumry obligations to Regency under the Regency Contract. CWH agrees that certain obligations it assumes shall be covenants running with the land and shall encumber the CWH Property and shall be binding upon CWH's successors and assigns. Nothing herein shall relieve Lumry from primary responsibility for Lumry's obligations under the Regency Contract, notwithstanding CWH's assumption of certain of those obligations. The parties further agree as follows:

1.1 Escrow Amounts Lumry and CWH have agreed that out of the sale proceeds from the sale of the CWH Property from Lumry to CWH, the following amounts will be escrowed with Land Title Guarantee Company, 3033 East 1st Avenue, Suite 600, Denver, CO (the "Title Company") to satisfy the obligation requiring escrow under Section 19 of the Regency Contract:

a) Surface Rights One Hundred Fifty Thousand and No/100 Dollars (\$150,000) in satisfaction of the Threshold Amount set forth in Section 5 of the Regency Contract.

b) Survey Two Thousand and No/100 Dollars (\$2,000) in satisfaction of the terms of Section 7 of the Regency Contract.

The foregoing escrow funds (the "Escrow Funds") shall be escrowed with the Title Company at the closing of the sale of the CWH Property from Lumry to CWH or to any permitted assignee of CWH (the "CWH Closing") pursuant to an escrow agreement to be entered into by and between Lumry, Regency and the Title Company (the "Escrow Agreement"), which Escrow Agreement shall provide for the use of the Escrow Funds as contemplated by the Regency Contract and shall otherwise be in a form reasonably acceptable to Lumry, Regency and the Title Company. Should there be remaining Escrow Funds after the completion of the escrow obligations in accordance with the Regency Contract, said remaining Escrow Funds shall be delivered to Lumry. The existence and amount of the Escrow Funds shall not limit Lumry's obligations under the Regency Contract and shall not limit CWH's obligations hereunder; if the obligations related to the Escrow funds exceed the amount of available Escrow Funds, Lumry shall remain obligated for same.

Due to the fact that each party will be responsible for its own final plat, as discussed in Section 1.6 below, Regency will not require that CWH or Lumry escrow funds in connection with Lumry's platting obligation per the terms of Section 10 of the Regency Contract.

1.2 Additional 50 Feet Pursuant to Section 4 of the Regency Contract, Regency has the option to purchase up to an additional fifty (50) feet immediately North of and adjacent to the North property line of the "Center Property" (as defined in the Regency Contract) and an additional fifty (50) feet immediately West of and adjacent to the West property line of the "Center Property" as depicted on Exhibit C of the Regency Contract (the "50 Foot Tracts") Regency hereby waives the right to purchase the 50 Foot Tracts under the Regency Contract.

1.3 Surface Rights / Seller Threshold Section 5 of the Regency Contract provides that should the agreement with Encana (as described in Section 5 of the Regency Contract and further described in Section 1.4 below) require the payment of money to Encana (the "Encana Payment"), said Encana Payment will be split between Lumry and Regency in a ratio of 50% to 50%, payable at the closing of Regency's acquisition of the Regency Property. Section 5 of the Regency Contract further provides that Lumry's portion of the Encana Payment will not exceed the Seller Threshold (as defined in Section 5 of the Regency Contract and established in a separate agreement between Regency and Lumry) unless Lumry agrees to pay such excess. The parties agree that the Seller Threshold is One Hundred Fifty Thousand and No/100 Dollars (\$150,000), and is covered in the escrow amount set forth in Section 1.1 (a) above. Under Section 5 of the Regency Contract, Regency is likewise obligated to pay a portion of any Encana Payment. Lumry, Regency and CWH hereby agree that if an agreement with

Encana (as approved by Regency) is entered into and the Encana Payment is to be made prior to Regency's closing on the Regency Property, then Lumry shall pay the entire Encana Payment to Encana, and if at that time the Regency Contract and this Agreement remain in full force and effect, then Regency will place in escrow with the Title Company an amount equal to Regency's portion of the Encana Payment (the "Regency-Encana Escrow Funds"). The Regency-Encana Escrow Funds shall remain in escrow until such time as either (i) Regency closes on its acquisition of the Regency Property, whereupon the Regency-Encana Escrow Funds (or so much thereof as are necessary to reimburse Lumry) shall be released and delivered to Lumry as reimbursement to Lumry for making Regency's portion of the Encana Payment (provided that Lumry has in fact made such payment to Encana), or (ii) the Regency Contract or this Agreement terminates without Regency having closed on its acquisition of the Regency Property, whereupon the Regency-Encana Escrow Funds shall be immediately returned to Regency (in which event Regency shall have no obligation to reimburse Lumry). The above-contemplated-escrow agreement shall be in a form reasonably acceptable to Lumry, Regency and the Title Company. In no event shall Regency be obligated for any part of the Encana Payment unless Regency closes on its acquisition of the Regency Property. To the extent the provisions of this Section 1.3 are inconsistent with the provisions of Section 5 of the Regency Contract, the provisions of this Section 1.3 shall govern, and in that event Section 5 of the Regency Contract is hereby amended to be consistent with this Section 1.3; provided, however, should this Agreement terminate for any reason, the provisions of Section 5 of the Regency Contract shall remain unchanged and unaffected by this Section 1.3.

1.4 Surface Rights / Alternative Well Site Pursuant to Section 5 of the Regency Contract, Lumry and Regency agree to work together in good faith to acquire the surface entry rights and/or a surface waiver from Encana Energy Resources, Inc., and from any other pertinent entity or person from whom such surface rights and/or waiver is needed (collectively, "Encana"), covering all of Lumry's Total Property (defined below), except for the Alternative Well Site Property (defined below). The CWH Property, together with the Regency Property and other property owned by Lumry lying immediately north of and adjacent to the north boundary of future Jasper Road dedication (the "North Property"), is hereinafter referred to collectively as "Lumry's Total Property", and all such properties are depicted on Exhibit C attached hereto (the "Lumry's Total Property" being the same as the "Seller's Total Property" as defined in the Regency Contract). CWH hereby agrees to join with Lumry and Regency to work together in good faith to acquire the surface entry rights and/or a surface waiver from Encana as contemplated in Section 5 of the Regency Contract. The form and substance of such agreement with Encana shall be subject to Regency's and CWH's reasonable approval. In connection with the foregoing, if Encana requires one or more alternative drilling sites, Lumry shall provide such site(s) to Encana, at no cost to Regency or CWH and without obligation or encumbrance (including encroachment of conditional use areas and/or setback obligations) on the Regency Property or the CWH Property, out of the North Property (the "Alternative Well Site Property"). The Alternative Well Site Property is not, and shall not be, located on the Regency Property nor on the CWH Property except to the extent that any non-buildable radius required around the Alternative Well Site Property may encroach upon the CWH Property; provided, however, any non-buildable radius for a new site shall not encroach upon the CWH Property beyond the area of encroachment of the existing non-buildable radius at the time of this Agreement; provided further that any non-buildable radius shall not encroach whatsoever onto the Regency Property. Should the agreement with Encana require the payment of money to Encana for the release of surface rights as they pertain to the Regency Property and/or the CWH Property, said cost shall be split between Regency and Lumry in accordance with the terms of the Regency Contract (as affected by the terms of Section 1.3 above); provided, however, that all other rights of Regency under Section 5 of the Regency Contract shall remain in place.

1.5 Ditch Relocation & Construction Easement. CWH hereby consents to the ditch relocation called for in Section 6 of the Regency Contract and depicted on Exhibit D of the Regency Contract, and CWH agrees that Regency shall have the right, but without any obligation, at Regency's

sole cost and expense, to cause the ditch to be relocated as set forth in Exhibit D attached hereto; subject to approvals by both the Leyner Cottonwood Ditch Company (the "Ditch Company") and the Town of Erie. Subject to CWH's acquisition of the CWH Property, CWH hereby grants to Regency (i) a perpetual, exclusive easement for the purpose of relocating, maintaining, operating and replacing the ditch over and across the area described in Exhibit D attached hereto (as such area may be revised pursuant to agreement with the Ditch Company), and (ii) a temporary construction easement for the purpose of facilitating such relocation, which temporary construction easement shall be over and across the areas described in Exhibit D attached hereto (as such area may be revised pursuant to agreement with the Ditch Company). It is acknowledged that the locations of the above easements as set forth on Exhibit D, respectively, may have to be revised per agreement with the Ditch Company, and in connection therewith CWH and Regency agree to work together in good faith to reach a mutually acceptable agreement with the Ditch Company with regard to the exact location of the easements. CWH agrees, represents and warrants to Regency that the above easements shall not be subject to any liens or other prior rights or interests. Regency agrees, represents and warrants to CWH that at the time of such relocation, if Regency relocates the ditch (rather than the Ditch Company or the Town of Erie actually relocating the ditch), then Regency (i) shall have obtained all permits and consents that may be required or prudent to have been obtained in connection with such work; (ii) covenants and agrees that such temporary construction easement will be used and the work required will be performed in complete compliance with all applicable laws, statutes, ordinances, rules and regulations; (iii) will defend and hold harmless CWH from and against any claims, demands, fines, suits, actions, proceedings, orders or decrees of any nature and form and against any loss of life or personal injury or damage to property arising out of any occurrence in the exercise of the temporary construction easement by Regency due to the activity conducted thereon by Regency, its agents, licensees, employees, and contractors (but such obligation shall not extend to protect CWH to the extent caused by the action or inaction of CWH or its agents, licensees, employees, contractors, successors or assigns); and (iv) at its cost and expense, upon termination of the temporary construction easement will promptly remove construction equipment and materials from the temporary construction easement and will promptly repair and replace and restore the easement to substantially the condition that existed prior to Regency's use thereof, ordinary wear and tear excepted, which shall include the repair and replacement of any driveways, roadways, fences (if applicable), landscaping, utility lines or other structural improvements on the CWH Property which were damaged, removed or destroyed by Regency, its agents, employees, and contractors in exercising the temporary construction easement; provided, however, CWH represents that it does not intend to place any fences, landscaping or structural improvements in the construction easement area unless required to do so by the Town of Erie or other applicable regulatory authority, and if so required CWH will coordinate its activities with Regency and do so in a manner so as to minimize cost and expense to Regency. CWH acknowledges that Lumry has no obligation to relocate or improve the ditch under any circumstances, including the termination of the Regency Contract. At Regency's request, the easements granted herein shall be further evidenced by a separate written easement agreement by and between CWH and Regency, in a form reasonably acceptable to CWH and Regency, to be filed of record as an encumbrance against the CWH Property for the benefit of Regency at or prior to the CWH Closing. CWH and Regency shall work together in good faith to agree upon the form of said easement agreement prior to the CWH Closing. Further, if the Ditch Company requires that either of the easements contemplated herein be granted directly to it, CWH agrees to do so. In the event CWH should not close on the purchase of the CWH Property, then Lumry agrees that Lumry shall grant the easement and other rights contemplated by this Section 1.5 for the benefit of Regency. In the event Regency assigns its interest in the Regency Contract or sells its interest in the Regency Property, then the assignee/successor shall assume Regency's obligations under this paragraph, including the obligations set forth in subparagraphs (i) through (iv) above. To the extent the provisions of this Section 1.5 are inconsistent with the provisions of the Section 6 or any other provision of the Regency Contract, the provisions of this Section 1.5 shall govern (and the Regency Contract is hereby so amended).

1.6 Plat Approval The Plat Approval is addressed in Section 10 of the Regency Contract. Lumry, Regency and CWH hereby agree to meet with the Town of Erie authorities to present one (1) minor subdivision plat covering the Lumry's Total Property and creating separate tracts for the Regency Property, the CWH Property and North Property, respectively, for the Town of Erie's approval in order to fast-track the platting process. Lumry, Regency and CWH agree to work together, each acting in good faith, to obtain approval of said minor subdivision plat, and agree to engage Flatirons Engineering for this purpose, with the cost thereof being split equally among Lumry, Regency and CWH. Each party agrees to copy the other parties on any drafts, letters or other items submitted to the Town of Erie that relate to the minor subdivision plat or otherwise would have an impact on said other parties' property. Upon approval of the minor subdivision plat, each party shall thereafter be entitled to pursue its own final plat covering its own property, provided that each final plat must be consistent with the Ditch Relocation as depicted on Exhibit D attached hereto and the Access Points and Access Easements and other requirements as depicted on Exhibit E attached hereto (the "Final Plat Requirements"). Upon request, each party who pursues its own final plat shall provide to the other parties copies of any drafts, letters or other items submitted to the Town of Erie that relate to said plat in order to allow said other parties to confirm compliance with the requirements of this Section 1.6. If for any reason the Ditch Relocation, Access Points or Access Easements or any other Final Plat Requirements for the benefit of Regency are not included within Regency's final plat as approved by the Town of Erie, then Lumry and/or CWH, as applicable, shall convey such rights, easements and rights-of-way to Regency by separate instrument, to the extent the Town consents to the modification of the Plat, or in so far as modification is not required by the Town.

Each party agrees to pay the cost of all basic platting fees, including surveyor costs to prepare the plat, consulting fees, submittal and review fees and other routine costs and expenses associated with the submission and approval its own final plat ("Basic Platting Fees"). Any other costs or obligations that might be imposed by the Town of Erie as a condition for approval of any party's final plat, such as impact fees, water conveyances, property dedications and other costs, expenses and obligations that are not Basic Platting Fees (collectively, "Additional Platting Costs and Obligations"), including any such costs or obligations that may be imposed on one party's land in connection with the approval of a final plat of another party's land, shall be borne by the owner of the land most closely associated with such fees. If any portion of any Additional Platting Costs and Obligations cannot be allocated to a particular property, then such Additional Platting Costs and Obligations shall be split among the affected property owners pro rata based on the number of acres owned by each party versus the total number of acres affected. The foregoing notwithstanding, no party shall be required to agree to a bus stop on its property in connection with the approval of another party's plat.

Certain roads to be constructed on the CWH Property (and on the property line between the CWH Property and the Regency Property) are as depicted on Exhibit E attached hereto and are addressed in Section 1.7 below. Lumry consents to any agreement between Regency and CWH relating to access, access points, utility easements and ditch right-of-way on the Regency Property and CWH Property. As may be required by Section 10 of the Regency Contract, Lumry will convey such access points, utility easements, and ditch right-of-way to Regency, CWH, and/or the Town of Erie, or the applicable party as the case may be.

Anything herein to the contrary notwithstanding, Regency shall not be obligated for any Additional Platting Costs and Obligations, any reimbursement of Lumry or any other party, or any other cost or expense (except any cost or expense actually incurred by Regency) unless and until the closing of Regency's acquisition of the Regency Property occurs. Anything herein to the contrary notwithstanding, CWH shall not be obligated for any Additional Platting Costs and Obligations, any reimbursement of Lumry or any other party, or any other cost or expense (except any cost or expense actually incurred by CWH) unless and until the closing of CWH's acquisition of the CWH Property occurs. The foregoing

notwithstanding, each party hereto shall be obligated for its portion of the cost of the minor subdivision plat discussed above.

Except as set out above, CWH assumes no other obligation of Lumry under Section 10 of the Regency Contract.

For so long as this Agreement is in force, the provisions of this Section 1.6 shall supercede and control over any contrary provisions of Section 10 of the Regency Contract; however, if this Agreement should terminate, the provisions of Section 10 of the Regency Contract shall remain in full force and effect as if this Agreement had not become effective; provided, however, in no event shall Regency have any further obligation to Lumry for the platting of the North Property or a "Total Property Plat" as defined in Section 10 of the Regency Contract, or for the reimbursement of Lumry for any costs related thereto, and Regency hereby waives any right, express or by implication, to consent to the sale of the North Property for so long as the North Property includes the Alternative Well Site Property, and Section 10 of the Regency Contract is hereby amended accordingly.

1.7 Roadways & Temporary Construction Easements. There is to be constructed along the property line between the CWH Property and the Regency Property a roadway of approximately 65 feet in width, with approximately thirty-two and one-half (32.5) feet on either side of the property line, and being approximately nine hundred fifty (950) feet long and located on the western boundary of the Regency Property and along a portion of the eastern boundary of the CWH Property, as depicted on Exhibit E attached hereto (the "Roadway"). The middle point of said Roadway shall be approximately the boundary line between the two properties, and the Roadway shall be constructed in accordance with the specifications and requirements of the Town of Erie and shall be dedicated to the Town of Erie upon final platting by the First Party (defined below). It is acknowledged that the exact dimensions of the Roadway have yet to be, but must be, approved by the Town of Erie, and thus may vary from what is depicted on Exhibit E. CWH and Regency agree to work together in good faith to reach a mutually acceptable agreement with the Town of Erie regarding the exact dimensions of the Roadway. The parties further agree to work together in good faith to attempt to cause the width of the Roadway to be sixty-five (65) feet or less. CWH and Regency hereby agree to grant the permanent easements or dedicate right-of-way as necessary for the First Party (defined below) to complete full right-of-way dedication by final plat. CWH and Regency also hereby grant to each other reciprocal construction easements as may be reasonably necessary for the construction of said Roadway in accordance with this Section 1.7. The party first to commence development of its property (the "First Party") shall have the obligation to construct the Roadway and in connection therewith shall have the construction easement on the other party's property in order to complete the construction of the Roadway substantially as depicted on Exhibit E attached hereto (subject to adjustment as may be required by the Town of Erie). Prior to commencing construction, the First Party shall deliver written notice of its intent to construct the Roadway to the other party (the "Non-Constructing Party"), whereupon the First Party shall comply with the requirements of Subsections 1.7.1 and 1.7.2 below (the "Pre-Construction Requirements"):

1.7.1 Selection of Contractor. Immediately upon approval of Roadway engineering plans by the Town of Erie, the First Party shall provide the Non-Constructing Party a set of the Town-approved constructions plans. Before commencing construction of the Roadway, the First Party shall solicit and obtain bids from at least three (3) reputable construction contractors who (i) have experience in projects similar to the Roadway, (ii) provide payment and performance bonds, (iii) are able to provide financial information for review, and (iv) maintain, and who are able to provide written evidence of, commercial general liability insurance against claims for injury to person, loss of life and damage to property occurring in connection with the construction, which insurance must be written with a reputable insurance carrier licensed to do business in Colorado, with limits of liability not less than Two Million Dollars (\$2,000,000.00)

combined single limit coverage for injury to person, loss of life and damage to property arising out of any single occurrence (any such contractor being referred to as a "Qualified Contractor"). Upon obtaining such bids, the First Party shall provide copies of such bids, along with accompanying information (i.e., financials; evidence of insurance) to the Non-Constructing Party. The Non-Constructing Party may, at its option, solicit and obtain bids from one (1) or more different Qualified Contractors and provide copies of such bids to the First Party not later than fifteen (15) days after the First Party provides its bids to the Non-Constructing Party. Both parties shall then work together in good faith to mutually determine which bid to accept and which Qualified Contractor to use for construction of the Roadway. If for any reason the parties cannot agree on a Qualified Contractor within ten (10) days after all bids obtained by the First Party and by the Non-Constructing Party (if any), respectively, have been delivered to the other parties as provided herein, then the First Party may select the Qualified Contractor on its own notwithstanding that the Non-Constructing Party may not concur with the selection, provided, however, in that event the First Party shall be required to pay all costs in excess of one hundred five percent (105%) of the amount of the lowest bid obtained by the Non-Constructing Party (if any).

1.7.2 Contract with Contractor Upon selecting a Qualified Contractor (the "Approved Contractor"), the First Party shall enter into a construction contract with the Approved Contractor (which contract shall not be inconsistent with the terms of this Agreement) and shall use commercially reasonable efforts to cause the Approved Contractor to construct the Roadway in accordance with the terms of this Agreement. Additionally, the First Party shall require the Approved Contractor to obtain and carry commercial general liability insurance as described above, insuring and naming the parties hereto as additional insured. Each construction contract to be utilized in connection with the construction of the Roadway shall be in a commercially reasonable form and, at a minimum, shall (i) cause the contractor to warrant its work thereunder to each of the parties hereto for a period of at least two (2) years (or for such longer time period as may correspond with any governmental requirement) and to perform maintenance with respect to such work during such warranty period; (ii) cause the contractor to agree to indemnify each of the parties hereto for all willful misconduct and/or negligent performance of the work by such contractor; and (iii) contain the agreement of the contractor to acknowledge the self-help rights of the Non-Constructing Party below to take over the contract and the administration of the construction of the Roadway in the event the First Party fails to complete same in accordance with this Agreement. In addition, the First Party shall use commercially reasonable efforts to cause the contractor to indemnify the parties hereto with regard to any mechanic's or materialmen's liens filed against any of the property in connection with the construction undertaken thereon. The First Party shall also obtain appropriate payment and performance bonds pertaining to such construction; provided, that the cost of such payment and performance bonds shall be the responsibility, on a ratable basis, of the parties hereto in accordance with cost-sharing ratio set forth below. Copies of all construction contracts, engineered drawings and bids shall be made available to each of the parties hereto.

Upon satisfaction of the Pre-Construction Requirements, the First Party shall commence construction of the Roadway within thirty (30) days thereafter (but in no event later than ninety (90) days after the First Party delivered its written notice of intent to construct the Roadway) and shall use commercially reasonable efforts to complete said construction within one hundred eighty (180) days after commencement, subject to reasonable extensions of time for force majeure.

The parties shall share the cost of the construction of said Roadway in the following manner: (i) the First Party shall pay for the entire construction cost of the Roadway; (ii) thereafter, provided that the First Party has paid in full all costs of constructing the Roadway and obtained all appropriate Town

inspections and approvals and appropriate contractor lien waivers, the Non-Constructing Party shall contribute its share of the construction cost to the Constructing Party upon the earlier to occur of (y) eighteen (18) months after completion of construction of the Roadway, or (z) commencement of the development of the Non-Constructing Party's property. For purposes hereof, each party's share of the construction costs shall be equal to the total cost of construction multiplied by a fraction, the numerator of which shall be the total area (measured in square feet) of the portion of the Roadway situated on said party's property and the denominator of which shall be the total area (measured in square feet) of the total Roadway.

If the First Party fails to commence or complete construction of the Roadway within the above time periods or commences construction but ceases work thereon for more than thirty (30) consecutive days, subject to reasonable extensions of time for force majeure, then the Non-Constructing Party may give the First Party written notice of its intent to take over the construction of the Roadway, and if the First Party has not commenced or completed, as applicable, the construction of the Roadway within thirty (30) days after receipt of said written notice from the Non-Constructing Party, then the Non-Constructing Party may, upon subsequent written notice to the First Party, take over the administration of the construction contract and the construction of the Roadway and shall immediately have the right to use the construction easement on the First Party's property in order to complete the construction of the Roadway. In the event the Non-Constructing Party exercises self-help rights as provided above, the First Party shall reimburse the Non-Constructing Party for (i) the First Party's share of the costs thereof as provided above, plus (ii) all other amounts (other than the Non-Constructing Party's share of the costs as provided above) reasonably expended by the Non-Constructing Party in taking over the construction of the Roadway, together with interest thereon at the then-current market rate for construction financing or at the highest rate allowable by law, whichever is lower, for each day which elapses from the expenditure by the Non-Constructing Party until payment by the First Party, which reimbursement shall be made by the First Party within thirty (30) days after its receipt of any monthly billing together with the appropriate supporting documentation evidencing the amount due. The obligation of the First Party to reimburse the Non-Constructing Party as provided above shall be secured by a lien against the property of the First Party, which lien is hereby granted and shall become enforceable immediately upon the failure of the First Party to pay its obligations when due. Notwithstanding the above, any party who contracts for construction work and incurs a lien on another party's property shall hold the other party harmless and promptly discharge said lien or post cash bond in the amount of the lien.

This construction easement and obligation for contribution shall be a covenant running with the land and shall be binding upon the individual parties' successors and assigns. At the request of either party, the easements granted and covenants made herein shall be further evidenced by a separate written easement agreement by and between CWH and Regency, in a form reasonably acceptable to CWH and Regency, to be filed of record as an encumbrance against each party's property for the benefit of the other at or prior to the CWH Closing. CWH and Regency shall work together in good faith to agree upon the form of said easement agreement prior to the CWH Closing. In the event Regency should not close on the Regency Contract, then Regency shall have no obligation under this paragraph, and Lumry agrees that said obligation shall be borne by Lumry and its successors and assigns as to the Regency Property. In the event CWH should not close the purchase of the CWH Property, then CWH shall have no obligations under this paragraph, and Lumry agrees that said construction easement and the obligation of contribution shall be borne by Lumry and its successors and assigns as to the CWH Property, which obligation shall survive the termination of this Agreement. The foregoing notwithstanding, (i) in the event Regency should not close on the Regency Contract, Lumry's obligation of contribution to CWH shall be limited to \$350,000 with respect to the portion of the Roadway that contains the common boundary between the Regency Property and the CWH Property, and (ii) in the event CWH should not close on the purchase of the CWH Property, Lumry's obligation of contribution to Regency shall be limited to \$350,000 with respect to the portion of the Roadway that contains the common boundary between the Regency Property

and the CWH Property; provided, however, Lumry shall be fully obligated for the cost of any portion of the Roadway that does not contain the common boundary of the Regency Property and the CWH Property and any portion of the road running north to future Jasper Road (to the extent required by the Town of Erie or other governmental entity). Further, the foregoing limitation on Lumry's obligation shall apply only to Lumry and not to any successors and assigns of Lumry with respect to the CWH Property or the Regency Property, respectively (the obligation of any such successors and assigns of Lumry with respect to the CWH Property or the Regency Property, respectively, shall not be limited to \$350,000).

The Regency Contract is hereby amended to incorporate the foregoing obligation on the part of Lumry and its successors and assigns in the event CWH should not close the purchase of the CWH Property

No construction, including, but not limited to, roadways, ditches and temporary construction easements, shall commence by either Regency or CWH unless and until the underlying contract of said party with Lumry has closed; provided, however, once the Regency Contract or the CWH Contract has closed, said party may construct roadway, ditch relocation, etc. on the other party's tract pursuant to the terms and conditions of this Agreement

1.8 Jasper Road Jasper Road shall be developed substantially as set forth on Exhibit E attached hereto. The cost of said Road shall be allocated as set forth in the CWH/Lumry contract and it shall not be an obligation of Regency. The construction easement for Jasper Road shall be set forth in the CWH/Lumry contract.

1.9 Storm Water Lumry and CWH each agrees to release storm water from its property at no more than historic rates. If either Lumry or CWH desires to release storm water at more than historic rates, said party shall bear the cost of any required system upsizing and/or improvements

1.10 Pedestrian Trail It is anticipated that a pedestrian trail may be required by the Town of Erie to traverse a portion of the CWH Property and the Regency Property. CWH and Regency each agree to work together in good faith to cause any such trail to be located along the new ditch right of way contemplated in Section 1.5 above, or as appropriate for re-aligned ditch or as the Town may direct.

1.11 Restrictions on CWH's Property. CWH hereby confirms its agreement with the terms of Section 1.2 of the Regency Contract, and specifically agrees as follows:

i) CWH agrees to enter into an agreement at or prior to the CWH Closing to restrict the CWH Property by document filed of record for the benefit of Regency and in a form reasonably acceptable to Regency and CWH, against the following uses (such use restrictions shall be hereinafter referred to as "Grocery Use Restrictions") :

(1) drug store or for a pharmacy department selling prescription drugs or requiring the services of a registered pharmacist;

(2) food store or food department selling groceries, meats, produce, dairy products, bakery products or other grocery items for off-premises consumption (except that this restriction is not intended to restrict sit down restaurants that also provide carry out service);

(3) sale of gasoline, diesel fuel or other petroleum products for automotive use, except that this restriction is not intended to restrict the sale of petroleum products as an incidental part of a principal business such as an oil and lube facility (by

way of example, Grease Monkey), auto parts store or hardware store (by way of example, Checkers or Ace Hardware);

(4) convenience store; or

(5) business which principally features sexually explicit products or drug paraphernalia, or as an electronic or mechanical games arcade, pool or billiard hall, betting parlor, bingo parlor, massage parlor, pornographic shop, adult book store, nightclub, dance hall, tavern, cocktail lounge or other use inconsistent with a first-class grocery anchored shopping center.

The foregoing Grocery Use Restrictions shall remain in effect for a minimum of ten (10) years as provided for in the Regency Contract

ii) In addition, CWH agrees to enter into an agreement at the closing under the CWH Contract to restrict that certain portion of CWH's Property, as depicted on Exhibit B, by document filed of record for the benefit of Regency and in a form reasonably acceptable to Regency and CWH, against the following uses (such use restrictions shall be hereinafter referred to as "Additional Use Restrictions"):

(1) banks, credit unions, savings and loans and any other similar financial institution that accepts deposits (except that this restriction is not intended to restrict mortgage offices or stock brokerages or ATMs); or

(2) liquor store (except that this restriction is not intended to restrict the sale of liquor products as an incidental part of a principal business such as sit down restaurants).

The foregoing Additional Use Restrictions shall remain in effect for a minimum of twenty (20) years as provided for in the Regency Contract.

Regency and Lumry agree that the following intended uses by CWH shall not be considered in violation of the Grocery Restrictions or the Additional Use Restrictions described above, so long as none of the following uses shall include a retail pharmacy utilizing the services of a licensed pharmacist (other than in connection with an urgent care facility solely for the dispensing of pharmaceutical supplies to on-site urgent care patients):

1) CWH intends to develop the CWH Property for the following uses: (i) independent living center; (ii) assisted living center; (iii) assisted memory care units; (iv) medical office buildings; (v) urgent care facilities; (vi) bariatric facilities; and (vii) the normal operations and services associated with such facilities; ; and

2) The placement and use of ATM machines on the CWH Property.

CWH and Regency shall work together in good faith to agree upon the form of said restriction agreement prior to the CWH Closing.

CWH agrees that the rights and restrictions under this Section 1.11 shall encumber the CWH Property even if Regency does not close.

2. Time of Essence Time is of the essence with respect to the obligations assumed by CWH hereunder. CWH agrees to perform the obligations it has assumed hereunder in a timely manner, including, but not limited to, recording the Grocery Use Restrictions and the Additional Use Restrictions, applicable easements, etc., as of or prior to the CWH Closing. In the event the Regency Contract is closed prior to the CWH acquisition, then Lumry shall record said easements and restrictions against the CWH Property; provided, however, CWH shall have the opportunity to review said documents prior to recording

3. Contracts Lumry, Regency and CWH agree that they shall not amend or modify their respective contracts in any manner that impacts the other's property without a copy of the proposed amendment or modification being provided to all parties for their review and prior approval, which shall not be unreasonably withheld. Lumry, Regency and CWH shall otherwise keep each other reasonably informed as to the status of their respective contracts and promptly provide copies of any and all pertinent correspondence and other documents related thereto to the extent they would affect any party's obligations to any of the other parties. Additionally, without limiting the generality of the foregoing, CWH and Regency shall each provide to the other a copy of all title reports and documents and any survey(s) obtained by CWH or Regency, as the case may be, and pertaining to its property

4. Utilities Present contacts with the Town of Erie indicate that utilities will be separately accessible from each party's property. There should not be a requirement for any utility easements between the tracts. If and to the extent it becomes necessary to grant reciprocal utility easements, the parties agree to work together in good faith with respect to such easements, but neither party shall be obligated to incur any material cost, expense or hardship in connection therewith.

5. Successors and Assigns The parties' rights and obligations under this Agreement shall run with the land and shall be binding on and inure to the benefit of the parties' successors and assigns. CWH shall not assign its rights under the CWH Contract, and upon its acquisition of CWH Property shall not sell, convey, transfer, or assign in any manner its interest in CWH Property, without providing Regency at least ten (10) days' advance written notice thereof and requiring the transferee, assignee or other party to expressly acknowledge or assume, as the case may be, in writing the CWH obligations as they pertain to the tract being transferred and to acknowledge in writing (in recordable form) that the applicable tract is subject to the applicable obligations. Any documents evidencing the foregoing shall be subject to Regency's prior approval, which shall not be unreasonably withheld. In the event of any such approved transfer or assignment, CWH shall not be released from, but shall remain primarily liable for, its obligations under this Agreement (even if assumed by the transferee or assignee). Further, in the event of any transfer or assignment by Regency of the Regency Contract, Regency shall not be released from, but shall remain primarily liable for, its obligations under this Agreement (even if assumed by the transferee or assignee). The foregoing notwithstanding, at such time as the CWH Property is owned by a party other than Lumry or CWH, then CWH shall be released from any further obligations under this Agreement, and at such time as the Regency Property is owned by a party other than Lumry or Regency, then Regency shall be released from any further obligations under this Agreement, it being the intention of the parties hereto that the obligations under this Agreement run with the land and be binding upon the parties respective successors and assigns.

6. Recordation Without limiting the generality of the preceding paragraph, upon or prior to the CWH Closing, CWH (or any permitted assignee of CWH) shall execute a memorandum of this Agreement as it applies to the CWH Property and the obligations assumed by CWH under this Agreement (the "Memorandum") and record such Memorandum in the appropriate public records to further ensure that the CWH Property remains subject to the assumed obligations. The Memorandum shall be subject to Lumry's and Regency's prior review and approval, which shall not be unreasonably withheld. Additionally, should CWH (or any permitted assignee of CWH) at any time fail or refuse to record the

Memorandum, or if Regency should reasonably believe that the recordation of the Memorandum is necessary in order to protect its interests in the CWH Property, then Regency may, on its own, record the Memorandum. Upon or prior to the Regency Closing, Regency (or any assignee of Regency) shall execute a Memorandum of this Agreement as it applies to the Regency Property and the obligations assumed by Regency under this Agreement (the "Regency Memorandum") and record such Regency Memorandum in the appropriate public records to further ensure that the Regency Property remains subject to the Regency obligations. Additionally, should Regency (or any assignee of Regency) at any time fail or refuse to record the Regency Memorandum or if CWH should reasonably believe that the recordation of the Regency Memorandum is necessary in order to protect the CWH interest in the Regency Property, then CWH may, on its own, record the Regency Memorandum.

7. Non-Waiver, Cooperation The obligations of CWH as stated in this Agreement shall not limit or otherwise affect the obligations of Lumry or Regency under the Regency Contract, except as may be expressly provided herein. Both Lumry and Regency shall remain fully liable for all of their obligations under the Regency Contract notwithstanding CWH's assumption of certain of said obligations and/or acquisition of the CWH Property. If and to the extent said obligations overlap, Lumry, Regency and CWH agree to work together in good faith to cause all of said obligations to be performed and satisfied in accordance with the intent of the Regency Contract

8. Termination of Regency Contract or CWH Contract. This Agreement shall terminate if, due to reasons other than the default by Lumry thereunder, the Regency Contract is terminated without Regency closing on the acquisition of the Regency Property or if the CWH Contract is terminated without CWH closing on the acquisition of the CWH Property; provided, however, in the event of a termination of this Agreement due to the termination of the CWH Contract, Lumry shall once again be required to obtain Regency's consent under Section 19 of the Regency Contract, which shall not be unreasonably withheld to the extent provided under Section 19 of the Regency Contract, should Lumry desire to sell all or any portion of the CWH Property and/or assign its rights under the Regency Contract; provided, however, in that event Regency's previous and present waiver of its right to purchase the 50 Foot Tracts shall remain in full force and effect. In the event of a termination of this Agreement due to the termination of the Regency Contract or the CWH Contract, as the case may be, then Regency or CWH, as applicable (whoever's contract was terminated), shall execute and deliver to Lumry an appropriate release of its rights under this Agreement in recordable form. In the event the Regency Contract is terminated and the property under that Contract is not purchased by Regency or its successors and assigns, then the Grocery Restriction and the Additional Use Restriction shall continue to apply to the CWH Property and Lumry and CWH shall each grant the construction easements provided for herein, which shall remain in full force and effect. In the event the CWH Contract is terminated, then Lumry and Regency shall each grant the construction easements provided for herein, which shall remain in full force and effect (subject, however, to the terms of the Regency Contract, as and to the extent amended hereby), and Lumry shall also have the obligations set forth in Section 1.7 above

9. CWH's Knowledge. CWH acknowledges that it has received and reviewed a copy of the Regency Contract and is aware of the rights and obligations of Lumry thereunder and is aware of certain obligations being assumed by CWH under this Agreement.

10. Invalidity, Modification, and Signing. If any provision contained in this Agreement shall for any reason be held to be invalid, illegal, void or unenforceable in any respect, such provisions shall be deemed modified so as to constitute a provision conforming as nearly as possible to such invalid, illegal, void or unenforceable provision while still remaining valid and enforceable; and the remaining terms and provisions contained herein shall not be affected thereby.

11. Survival of Obligations. The parties' respective obligations under this Agreement shall survive CWH's acquisition of the CWH Property and Regency's acquisition of the Regency Property.

12. Continued Effect of Regency Contract: No Release of Lumry. The Regency Contract remains and shall remain in full force and effect and shall not be amended, modified or otherwise affected by this Agreement except to the extent a provision of this Agreement is expressly stated to amend or modify the Regency Contract. Additionally, nothing herein shall release Lumry from any of its obligations under the Regency Contract (even those that are assumed by CWH).

13. No Right to Enforce Regency Contract. CWH is not a third party beneficiary of the Regency Contract and shall have no right to enforce any provision of the Regency Contract against Regency.

14. Notices. All notices or other communications hereunder shall be in writing, shall be dated with the current date, shall be signed by the party extending such notice or other communication and shall be deemed to be duly received (i) on the date given or delivered personally or by courier, overnight delivery, or telecopy; or (ii) three days after the date mailed, if mailed by register or certified mail, return receipt requested, to a party at the address hereinbefore set forth or such other address as a party shall designate by notice to all other parties hereto

15. Waiver. No waiver of any breach or default hereunder shall be considered valid unless in writing and signed by the party giving such waiver, and no such waiver shall be deemed a waiver of any subsequent breach or default of the same or similar nature.

16. Counterparts. This Agreement may be signed and executed in multiple counterparts, each one of which may be signed by one or more parties hereto. When two or more counterparts have been signed by all parties hereto, all of such counterparts taken collectively shall constitute a single agreement. None of the parties hereto shall be bound by the terms hereof until all parties have signed a single document or counterparts hereof.

17. Good Faith. All parties agree to cooperate and act in good faith to accomplish the intent of this Agreement hereunder

18. Default/Remedies. Without limiting any rights and remedies the parties may have under the Regency Contract and/or the CWH Contract, respectively, each party hereto may enforce its rights hereunder by such remedies as are available at law or in equity, including, without limitation, the right to enforce specific performance

19. Further Actions. From time to time as requested by the parties hereto, the other parties shall cause to be executed and delivered all such documents and instruments and shall take, or cause to be taken, such further or other actions as the other parties may reasonably deem necessary or desirable to consummate the transactions contemplated hereby.

20. Amendments. This Agreement may not be amended, modified or terminated except by an instrument signed by all the parties hereto, unless expressly provided herein.

21. Governing Law. This Agreement shall be construed, enforced and governed by the laws of the State of Colorado.

22. Time of Essence - Performance. Time shall be of the essence with respect to performance of the parties hereto of their respective obligations hereunder.

23. Lumry Reimbursement of Regency Attorneys Fees. Lumry will reimburse Regency \$5,000 if and when the CWH contract closes and \$5,000 if and when the Regency Contract closes and Regency has paid its purchase price. Otherwise, Lumry shall have no obligations for anyone's attorney fees. The Regency Contract is hereby amended to include the foregoing obligation of Lumry as a covenant of Lumry under the Regency Contract which shall survive the termination of this Agreement and the termination of the Regency Contract. Regency may enforce said obligation against Lumry by any means available at law or in equity.

[Signature Pages Immediately Follow.]

IN WITNESS WHEREOF, this Agreement has been executed as of the date first written above.

LUMRY:

ESTATE OF ELLEN R. LUMRY

By: Charles Robert Travis
Charles Robert Travis
Personal Representative

STATE OF COLORADO
COUNTY OF BOULDER SS:

The foregoing instrument was acknowledged before me this 22nd day of August, 2006,
by Charles Robert Travis, the Personal Representative of the Estate of Ellen R. Lumry, on behalf of said Estate.

IN WITNESS WHEREOF I have hereunto set my hand and official seal.



Patricia A. Gelich
Notary Public
Commission Expires: 10/17/2006

IN WITNESS WHEREOF, this Agreement has been executed as of the date first written above.

BUYER:

CW HOLDINGS, LC,
an Oklahoma limited liability company

By: _____

Manager

STATE OF Oklahoma

SS:

COUNTY OF Oklahoma

The foregoing instrument was acknowledged before me this 22 day of August, 2006,
by Ran Cosby, the Manager of CW Holdings, LC, on behalf of said company.

IN WITNESS WHEREOF I have hereunto set my hand and official seal.

Valerie Eshleman
Notary Public



IN WITNESS WHEREOF, this Agreement has been executed as of the date first written above.

REGENCY:

REGENCY REALTY GROUP, INC.,
a Florida corporation

By: *Snowden Leftwich*
Name: SNOWDEN LEFTWICH
Title: SR. VICE PRESIDENT

STATE OF Colorado
SS: COUNTY OF Denver

The foregoing instrument was acknowledged before me this 22nd day of August, 2006, by Snowden Leftwich, the Senior Vice President of Regency Realty Group, Inc. a Florida corporation, on behalf of the corporation.

IN WITNESS WHEREOF I have hereunto set my hand and official seal.

Jodie R. Stippich
Notary Public



EXHIBIT A

The Regency Property

A parcel of land located in the Northeast Quarter of Section 24, Township 1 North, Range 69 West of The 6th P M , County of Boulder, State of Colorado, being more particularly described as follows:

Considering the South line of said Northeast quarter of Section 24 as bearing North 89°30'22" West, between and the East quarter corner of said Section 24, being a found #5 rebar with a 2 1/2" aluminum cap, illegible, and the Regency Property quarter corner of said Section 24, being a found #5 rebar with a 2 1/2" brass cap, stamped "Ctr Section 24, LS 5415" with all bearing contained herein being relative thereto:

COMMENCING at said East quarter corner of Section 24, thence North 89°30'22" West, a distance of 30.00 feet; thence North 00°30'30" East, a distance of 70.01 feet to a point on a tract of land described at Reception No 2764453, recorded with the County of Boulder, said point also being the POINT OF BEGINNING; thence along the Northerly line of a tract at Reception No 2764453, said line also being the Northerly right-of-way line of Leon A. Wurl Parkway, North 89°30'22" West, a distance of 890.00 feet; thence North 00°30'30" West, a distance of 950.00 feet; thence South 89°30'22" East, a distance of 890.00 to a point on the Westerly right-of-way line of County Line Road; thence along said Westerly right-of-way line South 00°30'30" East, a distance of 950 000 feet to the POINT OF BEGINNING.

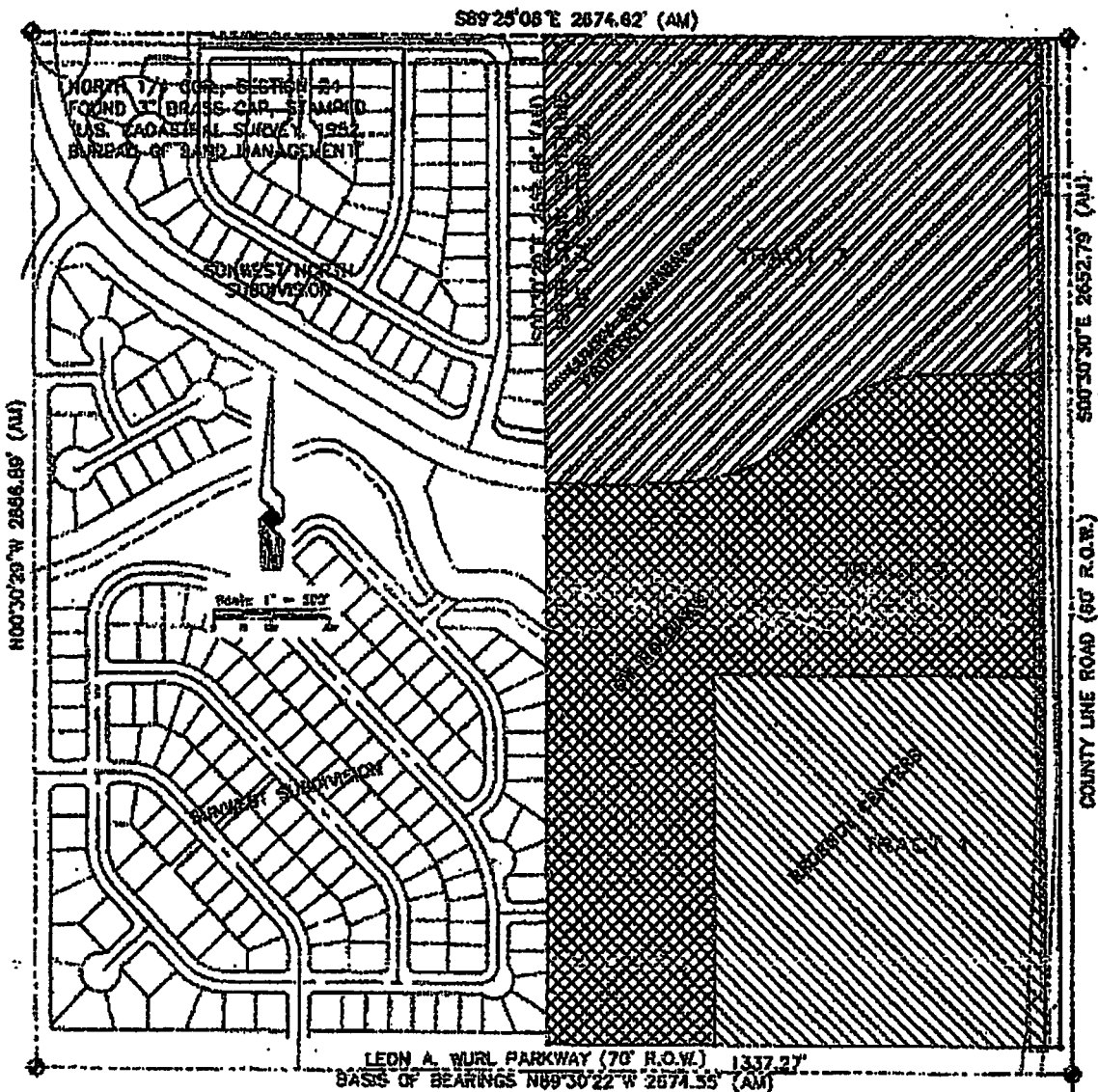
Containing 845,371 square feet or 19.407 acres of land, more or less

EXHIBIT B

CWH Property
(also known as the Lumry's Remaining Property)

PROPERTY IDENTIFICATION

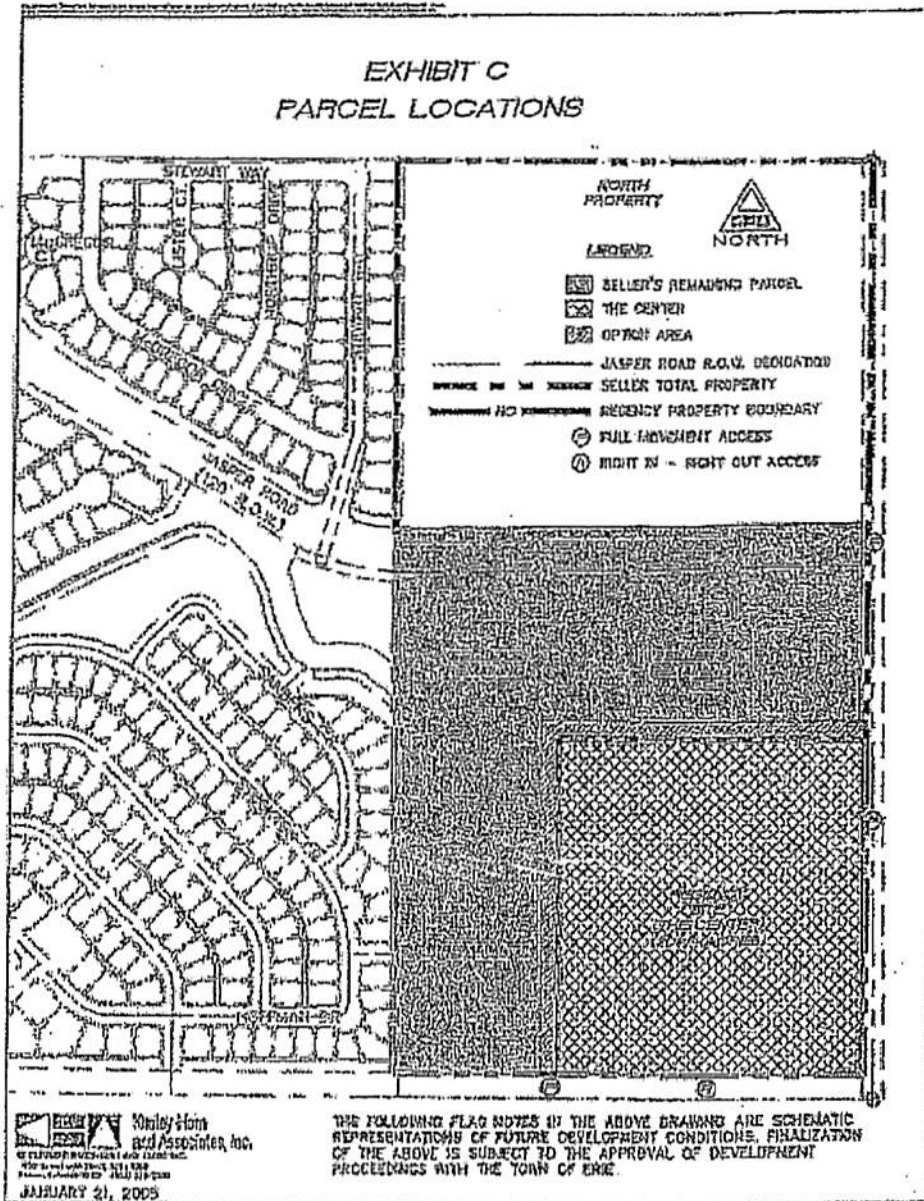
EXHIBIT "B"
rev. 8/18/2008



CCH

EXHIBIT C

Lumry's Total Property



[illegible]

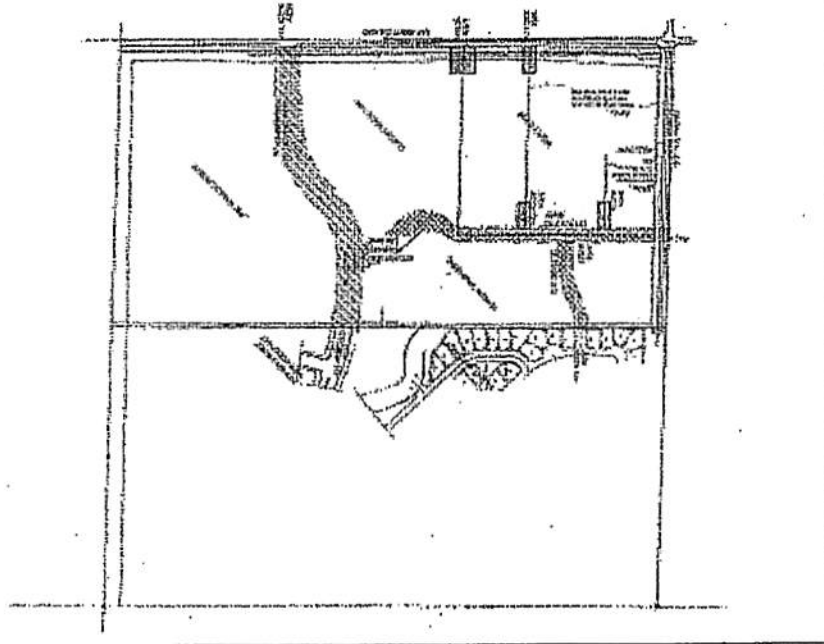
1439875.17

EXHIBIT E

Access Points and Access Easements

EXHIBIT E
REV. 8/18/2003

ACCESS EASEMENTS AND
ACCESS POINTS



Annual Certificates

Document Number 25315690002 Submit Date - 9/2/2014

Pursuant to Title 18, Oklahoma Statutes, Section 2055.2, every domestic limited liability company and every foreign limited liability company registered to do business in this state shall file an Annual Certificate each year in the Office of the Secretary of State. The certificate shall confirm it is an active business and must include its principal place of business address.

The name of the limited liability company is:
GRANDWOOD ASSISTED LIVING, L.C.

If different, the name under which the limited liability company was registered in the state of Oklahoma:

The state or other jurisdiction of its formation:
OK

Is the Limited Liability Company active? YES

The address of the principal place of business address, wherever located:
2001 SUNRISE BLVD
GROVE, OK 74344 USA
Email: Tami@mlcconsult.COM

The annual certificate is due on the **anniversary date of each year** and will have a fee of **\$25.00**.

A limited liability company that neglects, refuses, or fails to file the annual certificate within sixty (60) days after the date due shall cease to be in good standing as a domestic limited liability company or registered as a foreign limited liability company in this state.

Signature of Member or Manager:

I hereby certify that the information provided on this form is true and correct to the best of my knowledge and by attaching the signature I agree and understand that the typed electronic signature shall have the same legal effect as an original signature and is being accepted as my original signature pursuant to the Oklahoma Uniform Electronic Transactions Act, Title 12A Okla. Statutes Section 15-101, et seq.

Signature:
MARY YOUNT
Title:
MANAGER

[End Of Image]

ALTA/NSPS LAND TITLE SURVEY

PROPERTY DESCRIPTION

Tract B, Ranchwood Minor Subdivision, County of Boulder, State of Colorado.

BASIS OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the East line of the Northeast Quarter of Section 24, T.1N., R.69W., as bearing South 00°30'34" East being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2652.79 feet with all other bearings contained herein relative thereto.

The lineal dimensions as contained herein are based upon the "U.S. Survey Foot."

NOTICE

According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon. (13-80-105 C.R.S. 2012)

SURVEYOR'S NOTES

- Property Address: No address posted.
- The subject property is in flood zone "X", "areas determined to be outside the 0.2% annual chance flood plain" per FEMA flood map 08013-C-0441-J revised December 18, 2012.
- No observable evidence of earth moving work, building construction or building additions within recent months.
- No buildings existing on the surveyed property.

SURVEYOR'S CERTIFICATE

To: CAP Acquisitions, LLC, A Washington limited liability company
Legacy Bank, an Oklahoma state banking company
Chicago Title Insurance Company
Inland Group

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 8, 11, 13, & 16 of Table A thereof. The field work was completed on February 26, 2016.

Date of Plat or Map: August 1, 2016

PRELIMINARY

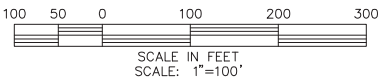
Steven Parks – On Behalf Of King Surveyors
Colorado Licensed Professional
Land Surveyor #38348

This survey does not constitute a title search by King Surveyors to determine ownership or easements of record. For all information regarding easements, rights-of-way and title of records, King Surveyors relied upon Title Commitment Number 097-C2017955-058-LG, Amendment No. 1, dated July 20, 2016 at 7:00 a.m., as prepared by Chicago Title Insurance Company to delineate the aforesaid information.

That this certificate does not extend to any unnamed parties or the successors and/or assigns of CAP Acquisitions, LLC, A Washington limited liability company, Legacy Bank, an Oklahoma state banking company, Chicago Title Insurance Company

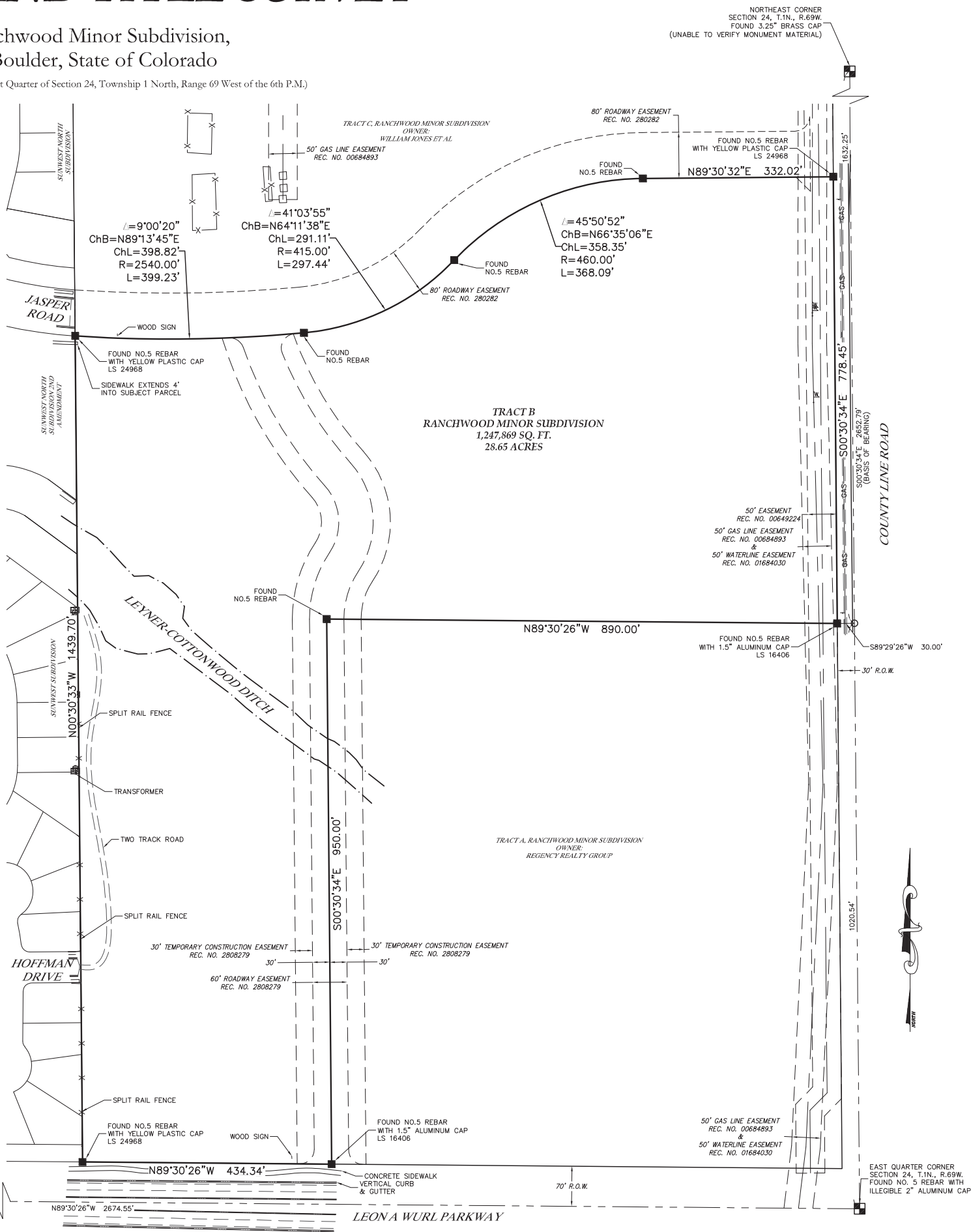


VICINITY MAP
(NOT TO SCALE)



LEGEND	
	EDGE OF ASPHALT
	FLOWLINE
	TOP OF BANK
	FENCE LINE
	EASEMENT LINE
	SECTION LINE
	BOUNDARY LINE
	CABLE TV PEDESTAL
	ELECTRIC BOX
	TELEPHONE PEDESTAL
	WATER MARKER
	REFLECTOR POST
	FOUND ALIQUOT CORNER AS DESCRIBED
	FOUND MONUMENT AS DESCRIBED
	CALCULATED POSITION

CENTER QUARTER CORNER
SECTION 24, T.1N., R.69W.
FOUND NO. 6 REBAR WITH
2" ALUMINUM CAP
LS 28286



DATE:	8-1-2016
FILE NAME:	20160118ALTA
SCALE:	1"=100'
DRAWN BY:	SIP
CHECKED BY:	SIP

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: info@KingSurveyors.com



DATE:	8-1-2016
REVISED:	
REVISED TITLEWORK:	

ALTA/NSPS LAND TITLE SURVEY
FOR
INLAND GROUP
120 W. CATALDO AVENUE SUITE 100
SPOKANE, WA 99201

PROJECT #:
20160118





ENERTIA

CONSULTING
GROUP

prepared by

Enertia Consulting Group, LLC
1529 Market Street, Suite 200
Denver, CO 80202



Phase I Drainage Report *Tract B, Ranchwood Minor Subdivision*



prepared for

Chartered Development Corp
Granite Capital Group, Inc.

2555 49th Street, Suite 3
Boulder, CO 80301



LAND • ENERGY • INFRASTRUCTURE

ENGINEER'S CERTIFICATION

"I hereby certify that this Phase I Drainage Report for the design of Tract B, Ranchwood Minor Subdivision was prepared by me (or under my direct supervision) in accordance with the provisions of the *Town of Erie Standards and Specifications for Design and Construction* for the owners thereof. I understand that the Town of Erie does not and will not assume liability for drainage facilities designed by others, including the designs presented in this report."

Shawn C. Merz, PE
State of Colorado Registration No. 41241
For and on Behalf of Enertia Consulting Group

TOWN ACCEPTANCE

This report has been reviewed and found to be in general compliance with the *Town of Erie Standards and Specifications for Design and Construction* and other Town requirements. **THE ACCURACY AND VALIDITY OF THE ENGINEERING DESIGN, DETAILS, DIMENSIONS, QUANTITIES, AND CONCEPTS IN THIS REPORT REMAINS THE SOLE RESPONSIBILITY OF THE PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE APPEAR HEREON.**

Accepted by: _____
Deputy Public Works Director

Date: _____

TABLE OF CONTENTS

1. GENERAL LOCATION AND DESCRIPTION	1
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3. DRAINAGE FACILITY DESIGN	5
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B. Specific Details.....	6
4. SUMMARY	6
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APPENDIX A – DRAINAGE MAP

- Pre-Development Drainage Map
- Post-Development Drainage Map

APPENDIX B – REFERENCE DOCUMENTS

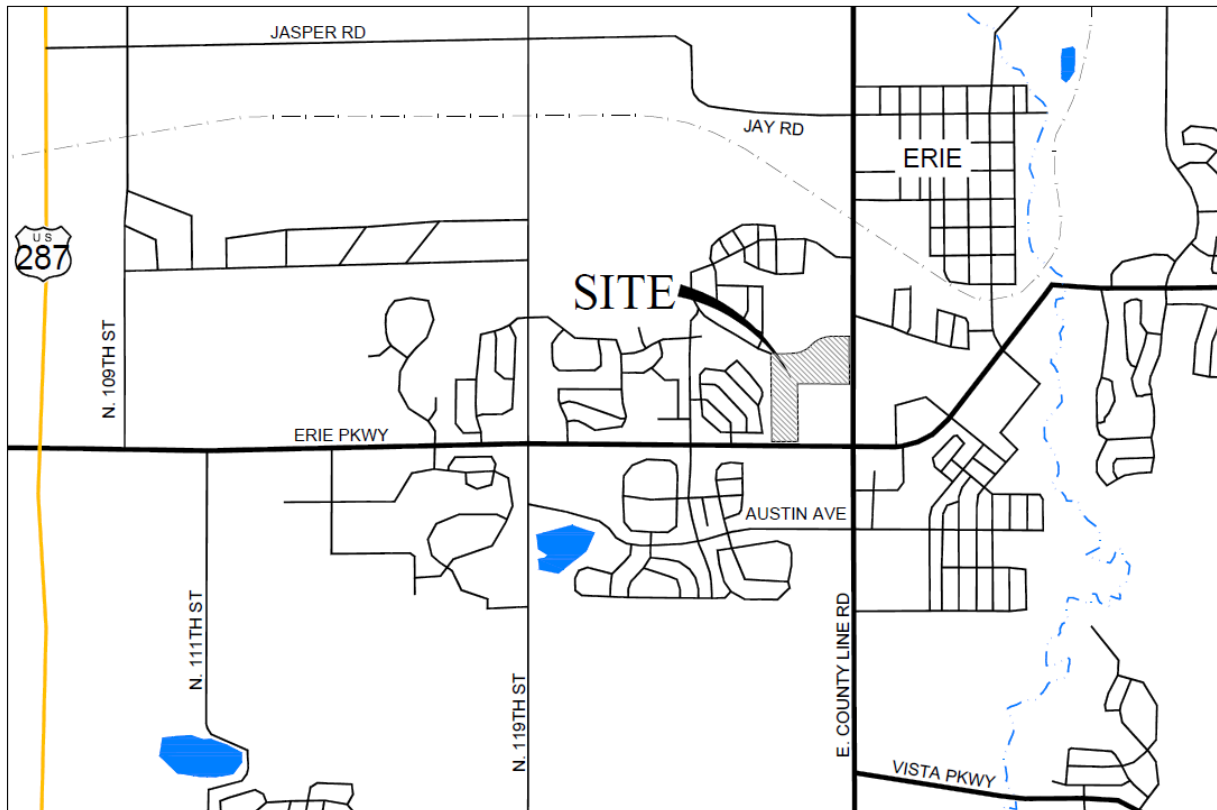
- Site Plan
- FIRM Map
- ALTA SURVEY
- Soils Map

1. GENERAL LOCATION AND DESCRIPTION

A. Site Location

The project site is Tract B within the Ranchwood Minor Subdivision, located in the northeast quarter of Section 24, Township 1 North, Range 69 West of the 6th Principal Meridian, Town of Erie, Count of Boulder, State of Colorado. The project is bounded to the north by the Creekside Subdivision, E. County Line Road to the east, Erie Parkway to the south, and the Sunwest Subdivision to the west.

Tract B, Ranchwood Minor Subdivision Vicinity Map



B. Description of Property

The site that the proposed Ranchwood Development will be within consists of 76.88 acres. The proposed Ranchwood project will occur within Tract B of the site and consists of 28.65 acres. The developed Tract B will consist of 220 multi-family units and six pads for future commercial use. The current zoning for Tract B is Community Mixed Use (CMU). The proposed zoning consists of 22.20 acres as Medium Density Residential (MR) and 6.45 acres as Community Commercial (CC). A total of 220 units results in the proposed Medium Density Residential zoning area results in a density of 10 dwelling units/acre. In the existing conditions, the site is gently sloping from southwest to northeast at an average slope of roughly 3%. Existing ground cover consists of natural grasses. There are no wetlands on the proposed site. Existing soil

conditions consist of Ascalon sandy loam (81.6%) and Manter sandy loam (17.1%). Ascalon sandy loam is hydrologic group B while Manter sandy loam is hydrologic group A.

There are two 50' gas and utility easements located on the east side of Tract B along County Line Road. A 60' roadway easement as well as a 30' temporary construction easement run along the western boundary of Tract B and Tract A to the northern property line of Tract B. An 80' roadway easement runs along the northern property line of Tract B. The pre-development conditions map has been provided in Appendix A of this report as well as the ALTA Survey included in Appendix B.

2. DRAINAGE BASINS

A. Major Basin Description

The project is located within the FEMA Floodplain Panel 08013C0441J. The FIRM Index notes this panel as having “*NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED”. Therefore the project is clear of any floodplain hazards. The project will discharge to a proposed water quality and detention pond on the eastern side of Tract B adjacent to E. County Line Rd. The



lowest elevation of Tract B is 5,065' on the east side of Tract B. The proposed detention pond will be privately owned and maintained. The existing site is not irrigated. Currently, the proposed site is vacant. This project, Tract B Ranchwood Minor Subdivision, will include drainage infrastructure for 220 multi-family residential units as well as six graded pads for future commercial development. Water quality for this project will be provided in the proposed detention pond.

B. Sub-Basin Description

Pre Development Basins (Figure 1)

Basin A1

Basin A1 is located along the northern property line of the site and consists predominantly of Tract C (off site). Basin A1 consists of 28 acres that is currently undisturbed native grasses with an imperviousness of 2% and moderate slopes averaging 3%. Existing drainage patterns for Basin A1 consist of the basin sheet flowing northeast towards a depression at the northeast corner of the site where the associated runoff settles.

Basin A2

Basin A2 is located in the center of the site and consists predominantly of Tract B (on site). Basin A2 consists of 25.5 acres that is currently undisturbed native grasses with an imperviousness of 2% and moderate slopes averaging 3%. Existing drainage patterns for Basin A2 consist of the basin sheet flowing east towards a depression at the eastern corner of the site where the associated runoff settles.

Basin A3

Basin A3 is located in the southeastern corner of the site and within Tract A (off site). Basin A3 consists of 7 acres that is currently undisturbed native grasses with an imperviousness of 2% and moderate slopes averaging 3%. Existing drainage patterns for A3 consist of the basin sheet flowing to the existing grate inlet in the southeastern corner of the property at the termination of the Leyner Cottonwood Number 1 Ditch, although Basin A3 does not enter the ditch itself.

Basin A4

Basin A4 is located in the southwest corner of the site and within Tract A and Tract B. Basin A4 consists of 15 acres that is undisturbed native grasses with an imperviousness of 2% and moderate slopes averaging 3%. Existing drainage patterns for A4 consist of the basin sheet flowing northeast into the Leyner Cottonwood Number 1 Ditch which ultimately outfalls into the existing grate inlet at the corner of E County Line Rd and Erie Pkwy.

Post Development Basins (Figure 2)

Basin B1

Basin B1 is located along the northern property line of Tract C and consists of 25.70 off-site acres. In the developed condition, this basin will consist predominantly of open space that will be undisturbed and will maintain the existing drainage patterns. A portion of the basin will include the extension of Jasper Rd from the Sunwest Residential Subdivision to E County Line Rd. The imperviousness is anticipated to be 5% with the majority of the property maintaining the existing slope of 3%.

Basin B2

Basin B2 consists of 16.71 predominantly on site acres along the eastern side of Tract B that currently is comprised of native grasses. In the developed condition, this basin will consist of four pads for future commercial use, residential units and associated roadway/parking infrastructure, open space park and the proposed detention pond to support the Ranchwood development. The imperviousness is anticipated to be 75% with slopes not exceeding 5%. Based on existing topography, a small portion of the basin consists of flows from Tract A and Tract C that will be included in the drainage infrastructure design. Runoff for Basin B2 will be routed through the proposed detention pond that will provide water quality and detention requirements for the project.

Basin B3

Basin B3 consists of 7.75 predominantly on site acres along the western side of Tract B that currently is comprised of native grasses. In the developed condition, this basin will consist of residential units and associated roadway/parking infrastructure as well as a portion of the Jasper Rd connection to the existing Jasper Rd from the Sunwest Residential Subdivision. The imperviousness is anticipated to be 75% with slopes not exceeding 5%. Based on existing topography, a small portion of Basin B3 is from offsite Tract A and will be incorporated into the drainage infrastructure design. Runoff for Basin B3 will flow southeast into drainage infrastructure that will route the storm water through the proposed detention pond within Basin B2.

Basin B4

Basin B4 is located along the eastern property line of Tract A and consists of 10.14 off-site acres. Basin B4 is comprised of native grasses and will remain unchanged from its pre-development state with the development of Ranchwood. Basin B4 has an imperviousness of 2% with moderate slopes average 3%. Runoff from Basin B4 sheet flows southeast towards E County Line Rd until ultimately out falling into the existing grate inlet located at the intersection of Erie Parkway and E County Line Rd and at the termination of the Leymer Cottonwood Number 1 Ditch.

Basin B5

Basin B5 is located along the southern property line of Tract A and consists of 6.43 off-site acres. Basin B5 is comprised of native grasses and will remain unchanged from its pre-development state with the development of Ranchwood. Basin B5 has an imperviousness of 2% with moderate slopes average 3%. Runoff from Basin B5 sheet flows northeast into the Leymer Cottonwood Number 1 Ditch until ultimately out falling into the existing grate inlet located at the intersection of Erie Parkway and E County Line Rd and at the termination of the Leymer Cottonwood Number 1 Ditch.

Basin B6

Basin B6 consists of 8.81 on site acres located in the southwest corner of Tract B that currently is comprised of native grasses. In the developed condition, this basin will consist of two pads for future commercial use, residential units and associated roadway/parking infrastructure. The imperviousness is anticipated to be 75% with slopes not exceeding 3%. Runoff for Basin B2 will be routed through the proposed detention pond that will provide water quality and detention requirements for the project.

3. DRAINAGE FACILITY DESIGN

A. General Concept

Existing drainage patterns for the site consists of approximately 22 acres at the southern end of the site flowing into Leyner Cottonwood Number 1 Ditch and out falling to the existing gate inlet in the southeast corner of the property. The remaining 53.5 acres of the site (Basins A1 and A2) sheet flow northeast towards depressions along E County Line Rd.

With the development of Tract B, Ranchwood Minor Subdivision, approximately 16.50 acres of the southern property will remain unchanged from the pre development drainage patterns and will continue to flow into Leyner Cotton Number 1 Ditch (Tract A) and outfall to the existing grate inlet in the southeast corner of the property. 5.43 acres that entered the drainage ditch in the pre development phase will now enter the storm drainage system associated with the project. Additionally, the portion of Leyner Cottonwood Number 1 Ditch that is within the proposed Ranchwood development will need to be routed through a box culvert until returning to its natural state within Tract A, east of the Ranchwood development. The majority of the runoff associated with pre-development basin A2 will be routed through the storm drainage system associated with the project. Runoff associated with pre-development basin A1 will continue to predominantly maintain its drainage patterns of flowing northeast. Due to the lack of drainage infrastructure along the eastern property line of the site (E County Line Rd), additional drainage infrastructure may be necessary with the development of the Jasper Rd connection.

The storm drainage system associated with the development of Tract B, Ranchwood Minor Subdivision will include inlets and RCP throughout the project that will outfall to one detention pond located on the eastern side of Tract B that is located at the existing low point of the property to maintain existing drainage patterns. The proposed detention pond will have an outlet structure and will be designed per the Town of Erie “STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS, 2018 Edition” and Urban Drainage and Flood Control District (UDFCD) for post develop flow rates, detention requirements, and water quality requirements. Ultimately, the outfall for the pond will be routed along E County Line Rd to the existing grate inlet in the southeast corner of the property at the termination of the Leyner Cottonwood Number 1 Ditch. The post development state of the site will not adversely impact the existing outfall for Leyner Cottonwood Number 1 Ditch or any downstream drainage facility due to the design requirement of the post development flow rate being less than the pre development flow rate for the developed Ranchwood site.

B. Specific Details

For final design, the inlet and street capacities will be sized using the Urban Drainage and Flood Control District Street Capacity and Sizing spreadsheet. The inlets will be spaced to meet the Town of Erie Design Criteria. The storm sewer pipes will be sized for the 100-year event using Manning's equation assuming a coefficient of 0.015 for RCP pipe. The proposed detention pond will be designed to withhold a 100-yr storm per the Urban Drainage and Flood Control District Design Criteria. The outlet structure will be designed per Town of Erie and UDFCD standards to meet post development flow rate requirements as well as water quality requirements. The proposed detention pond will be privately maintained and easements will be provided for any storm drainage infrastructure located within the public right-of-way.

4. SUMMARY

The proposed Tract B, Ranchwood Minor Subdivision mixed use development will fall within the drainage guidelines outlined in the Town of Erie Standards and Specification as well as the previous drainage studies. The proposed development will construct a storm sewer system to convey runoff to the proposed detention pond located on the eastern side of Tract B. The proposed detention pond will be designed in accordance with Town of Erie Standards and Specifications and will have no adverse impacts to the existing drainage infrastructure or any downstream drainage infrastructure.

5. REFERENCES

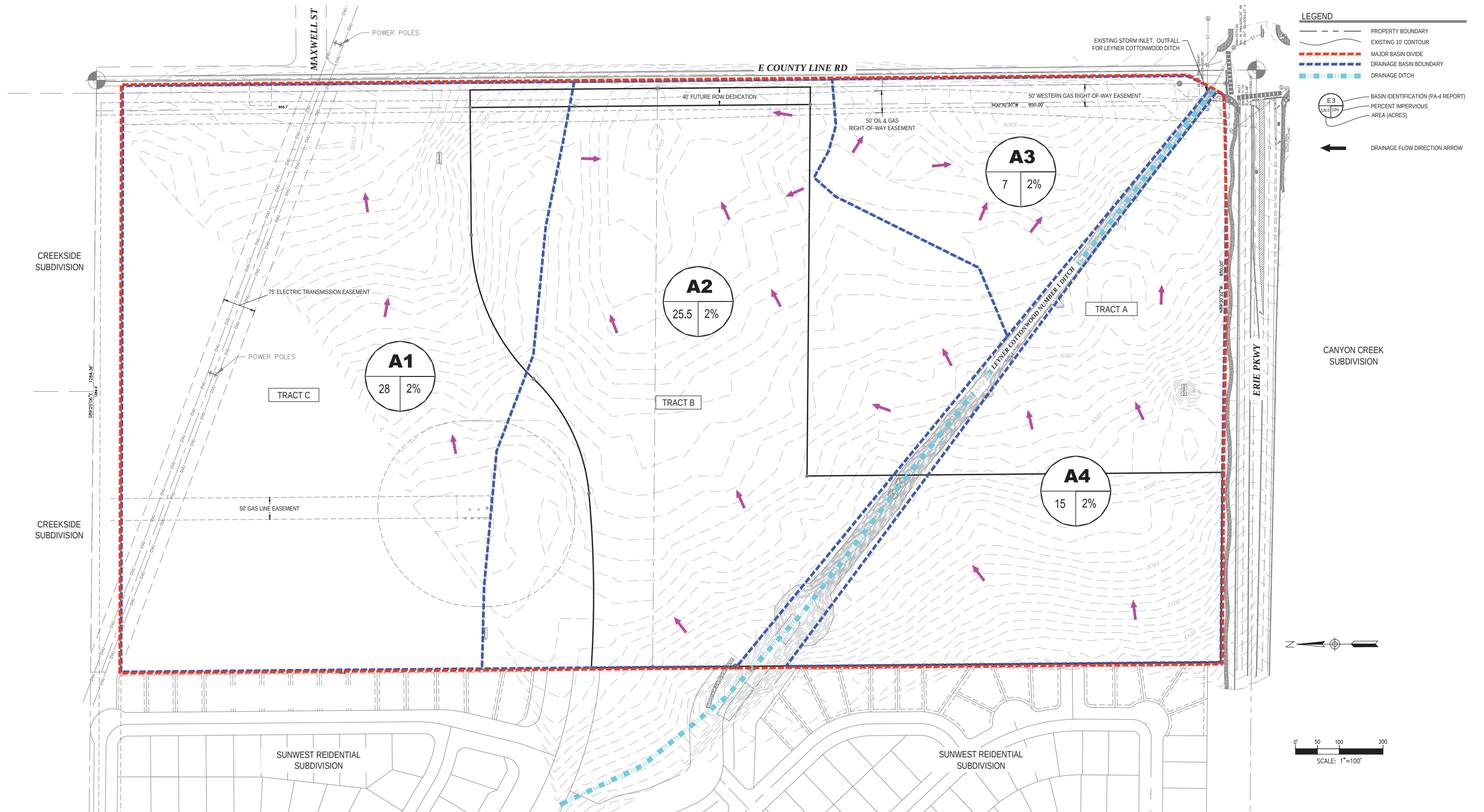
STANDARDS AND SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS, Town of Erie, Colorado, 2018 Edition.

URBAN STORM DRAINAGE CRITERIA MANUAL, VOLUME 1, 2 & 3., UDFCD, Denver, Colorado, Revised April 2008.

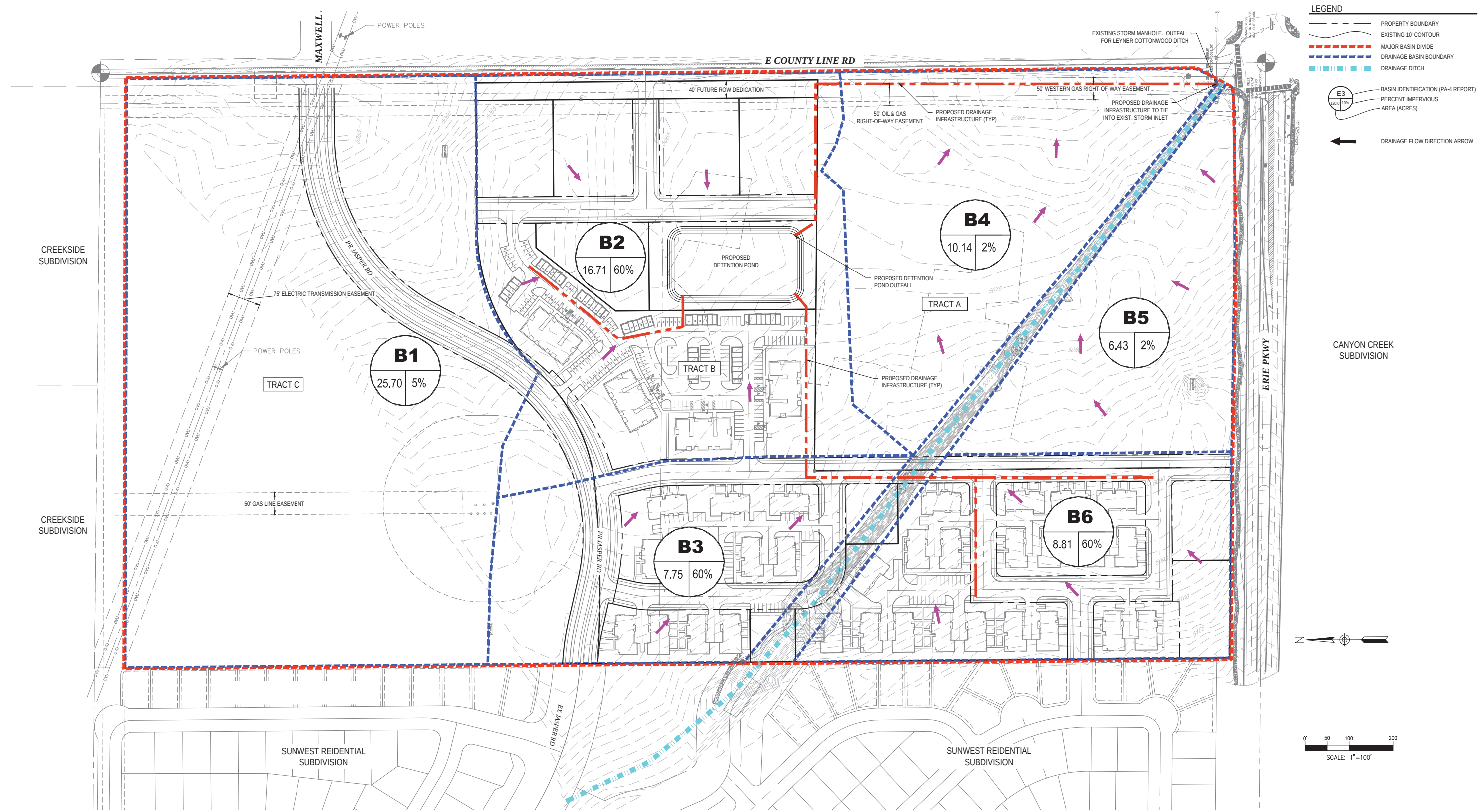
APPENDIX A

Drainage Maps

RANCHWOOD
MIXED USE DEVELOPMENT
PRE-DEVELOPMENT DRAINAGE MAP
FIGURE 1
TOWN OF ERIE, CO
JUNE 1, 2018



RANCHWOOD
MIXED USE DEVELOPMENT
POST-DEVELOPMENT DRAINAGE MAP
FIGURE 2
TOWN OF ERIE, CO
JUNE 1, 2018

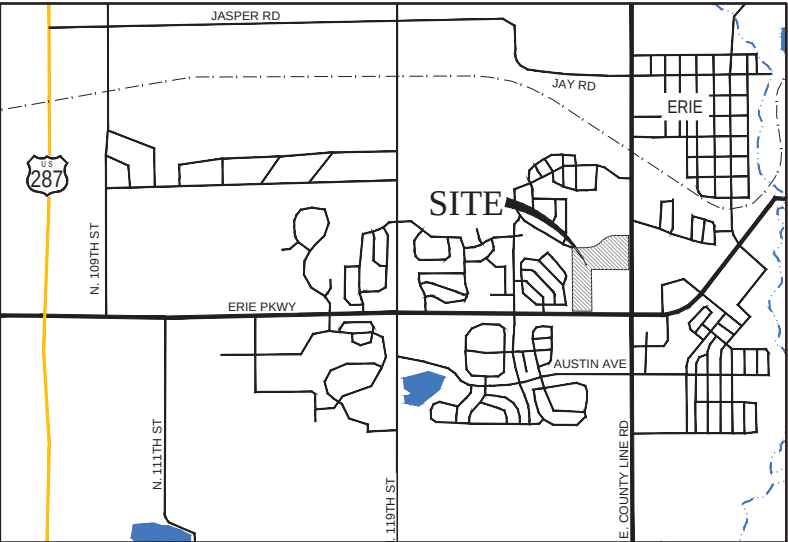
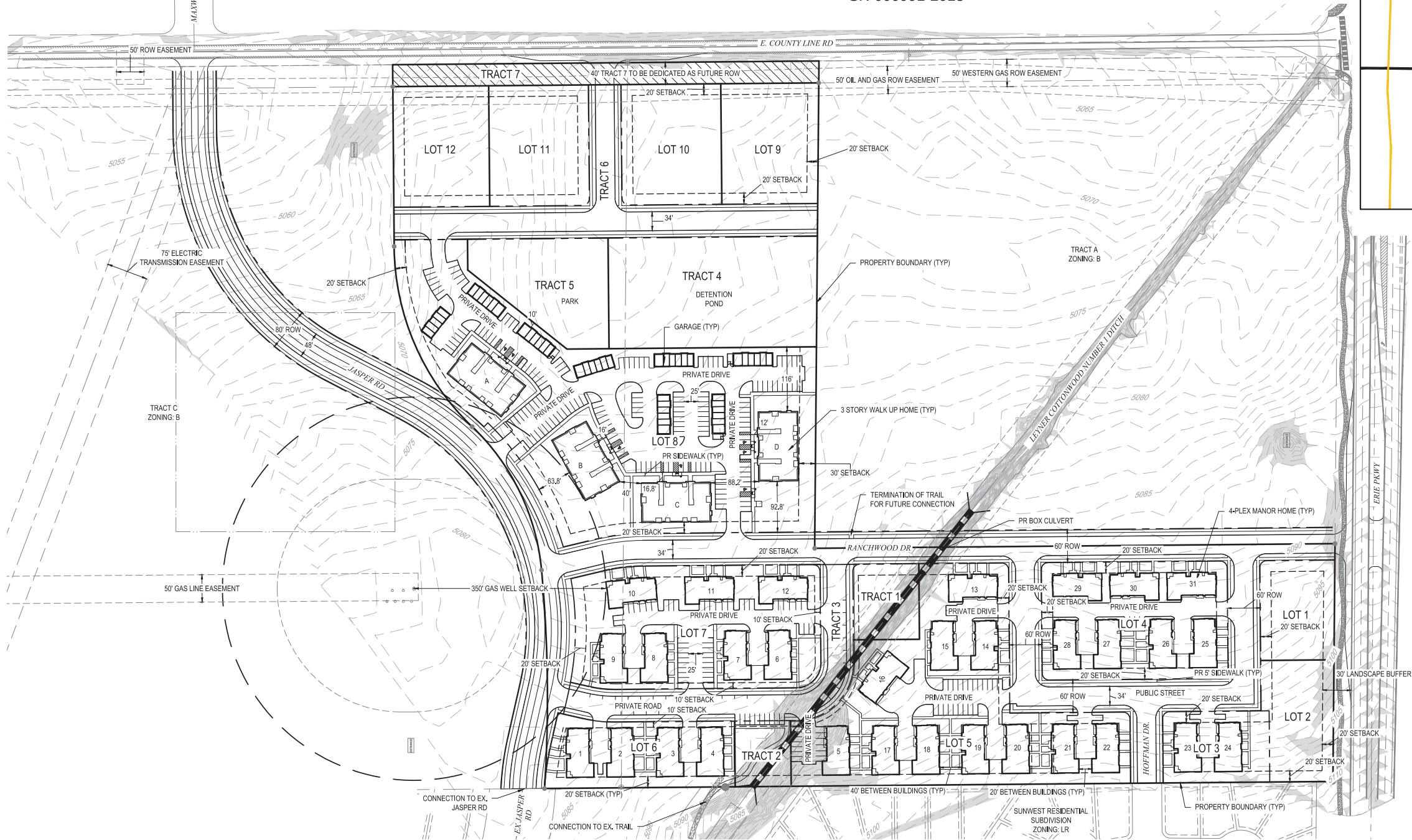


APPENDIX B

Reference Documents

TRACT B, RANCHWOOD MINOR SUBDIVISION

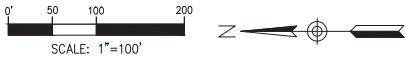
TRACT B, RANCHWOOD MINOR SUBDIVISION, LOCATED IN THE NORTHEAST QUARTER OF SECTION 24, TOWNSHIP 1 NORTH, RANGE 69 WEST OF THE 6TH P.M., TOWN OF ERIE, COUNTY OF BOULDER, STATE OF COLORADO
28.65 ACRES - 8 LOTS/ 6 TRACTS
SK-000991-2018



VICINITY MAP
SCALE 1"=2000'

LAND SUMMARY CHART		
TYPE	AREA	% OF TOTAL AREA
MULTI-FAMILY RESIDENTIAL	14.19 AC	49.53%
TRACTS	6.39 AC	22.30%
COMMERCIAL	4.81 AC	16.79%
RIGHT-OF-WAY	3.26 AC	11.38%
TOTAL	28.65 AC	100%

TRACT SUMMARY CHART				
TRACT	AREA	USE	OWNERSHIP	MAINTENANCE
TRACT 1	0.38 AC	PRIVATE COMMON AREA	HOA	HOA
TRACT 2	0.28 AC	PRIVATE COMMON AREA	HOA	HOA
TRACT 3	0.99 AC	ACCESS	HOA	HOA
TRACT 4	1.76 AC	PRIVATE COMMON AREA/DETENTION	HOA	HOA
TRACT 5	0.89 AC	PRIVATE COMMON AREA	HOA	HOA
TRACT 6	1.37 AC	ACCESS	HOA	HOA
TRACT 7	0.72 AC	FUTURE ROW	ERIE	ERIE



- LEGEND**
- EXISTING SLOPES 8% OR GREATER
 - EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR

TRACT B, RANCHWOOD MINOR SUBDIVISION SITE PLAN

APPLICANT:
CHARTERED DEVELOPMENT CORP.
GRANITE CAPITAL GROUP
2555 49TH ST, SUITE 3
BOULDER, COLORADO 80301
303-545-2554

ENGINEER:
ENERTIA CONSULTING GROUP
1529 MARKET STREET, SUITE 200
DENVER, COLORADO 80202
303-875-7131

LANDSCAPE:
OUTSIDE L.A., LLC
BOULDER, COLORADO 80304
303-517-9256

DATE: 06/01/2018

REVISED:

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NINGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was provided by the FEMA Map Service Center and the Boulder Area Spatial Data Cooperative (BASDC). Additional input was provided by the Town of Erie and the City of Longmont. These data are current as of 2004.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

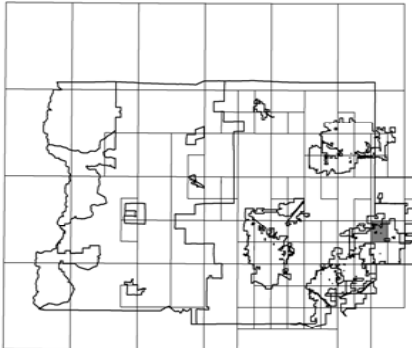
If you have **questions about this map**, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/nfip>.

Accredited Levee Notes to Users: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit the FEMA Website at <http://www.fema.gov/business/nfip/index.htm>.

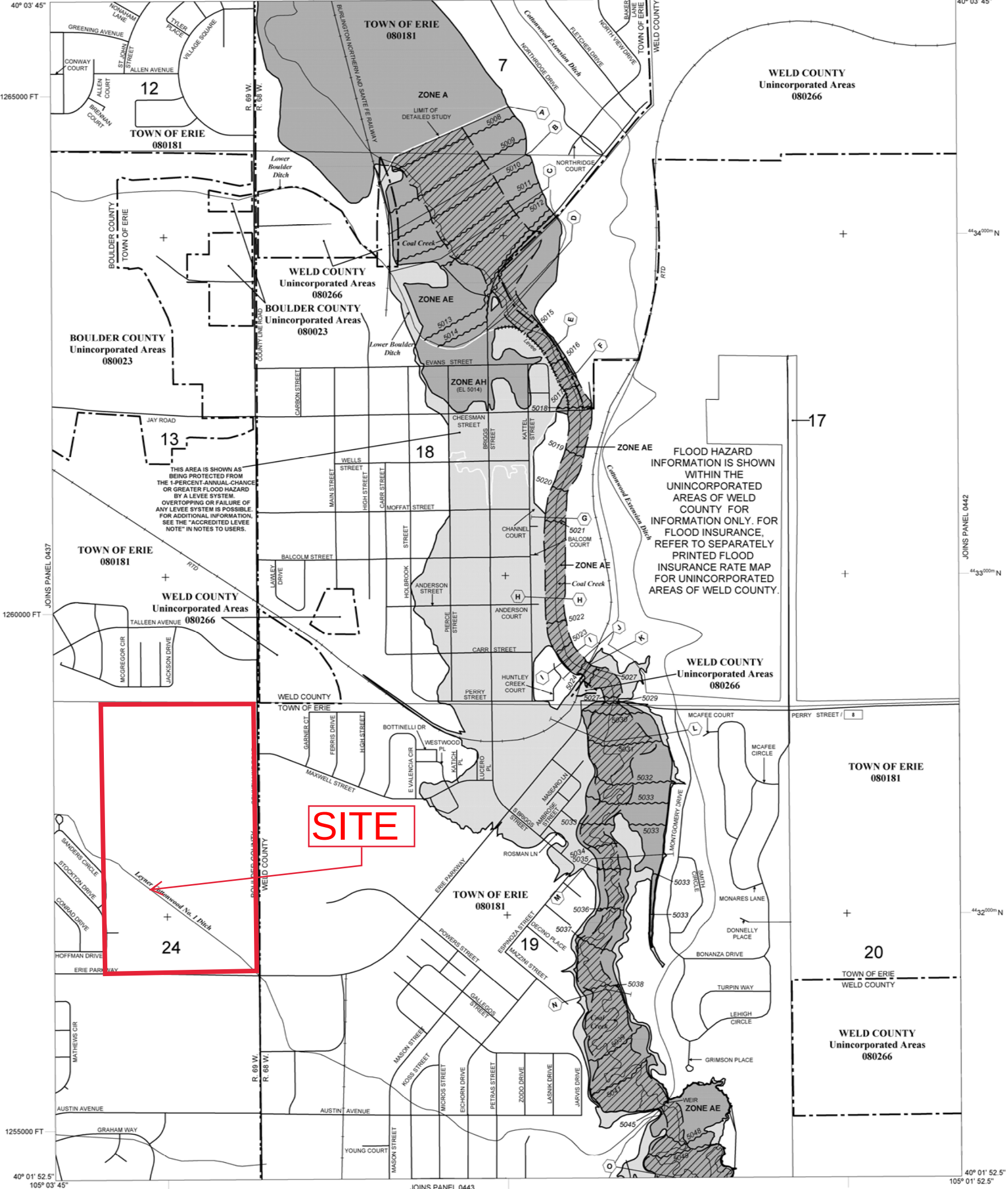
Boulder County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)
Coal Creek (within Town of Erie)	3.0
Example: To convert Coal Creek elevations to NAVD 88, 3.0 feet were added to the NGVD 29 elevations.	

Panel Location Map



This digital Flood Insurance Rate map (FIRM) was produced through a cooperative partnership between the State of Colorado Water Conservation Board, the Urban Drainage and Flood Control District, and the Federal Emergency Management Agency (FEMA). The State of Colorado Water Conservation Board and the Urban Drainage and Flood Control District have implemented a long-term approach of floodplain management to reduce the costs associated with flooding. As part of this effort, both the State of Colorado and the Urban Drainage and Flood Control District have joined in Cooperating Technical Partner agreements with FEMA to produce this digital FIRM.



a 1% chance of being equal or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- ~ 513 ~ (EL 987) Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A A Cross section line
- 23 23 Transient line
- 45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 4900m N 1000-meter Universal Transverse Mercator grid values, zone 13
- 3180000 FT 5000-foot ticks: Colorado State Plane North Zone (FIPS Zone 0501), Lambert Conformal Conic projection
- DX5510 x Bench mark (see explanation in Notes to Users section of this FIRM panel)
- *M1.5 River Mile

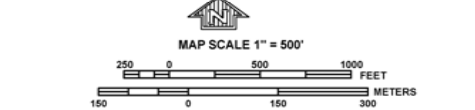
MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTY-WIDE
FLOOD INSURANCE RATE MAP
June 2, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 6, 1996 - to incorporate previously issued Letters of Map Revision; to add roads and road names; and to update corporate limits.
October 4, 2002 - to change base flood elevations; to change special flood hazard areas; to change zone designations; to update roads and road names; to reflect updated topographic information; to incorporate previously issued Letters of Map Revision; and to change floodway.
December 18, 2012 - to update corporate limits; to update roads and road names; to add Special Flood Hazard Areas previously shown on Town of Erie, Colorado Flood Insurance Rate Map dated December 2, 2004; and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0441J

FIRM

**FLOOD INSURANCE RATE MAP
BOULDER COUNTY,
COLORADO
AND INCORPORATED AREAS**

PANEL 441 OF 615

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOULDER COUNTY	080023	0441	J
ERIE, TOWN OF	080181	0441	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



**MAP NUMBER
08013C0441J**



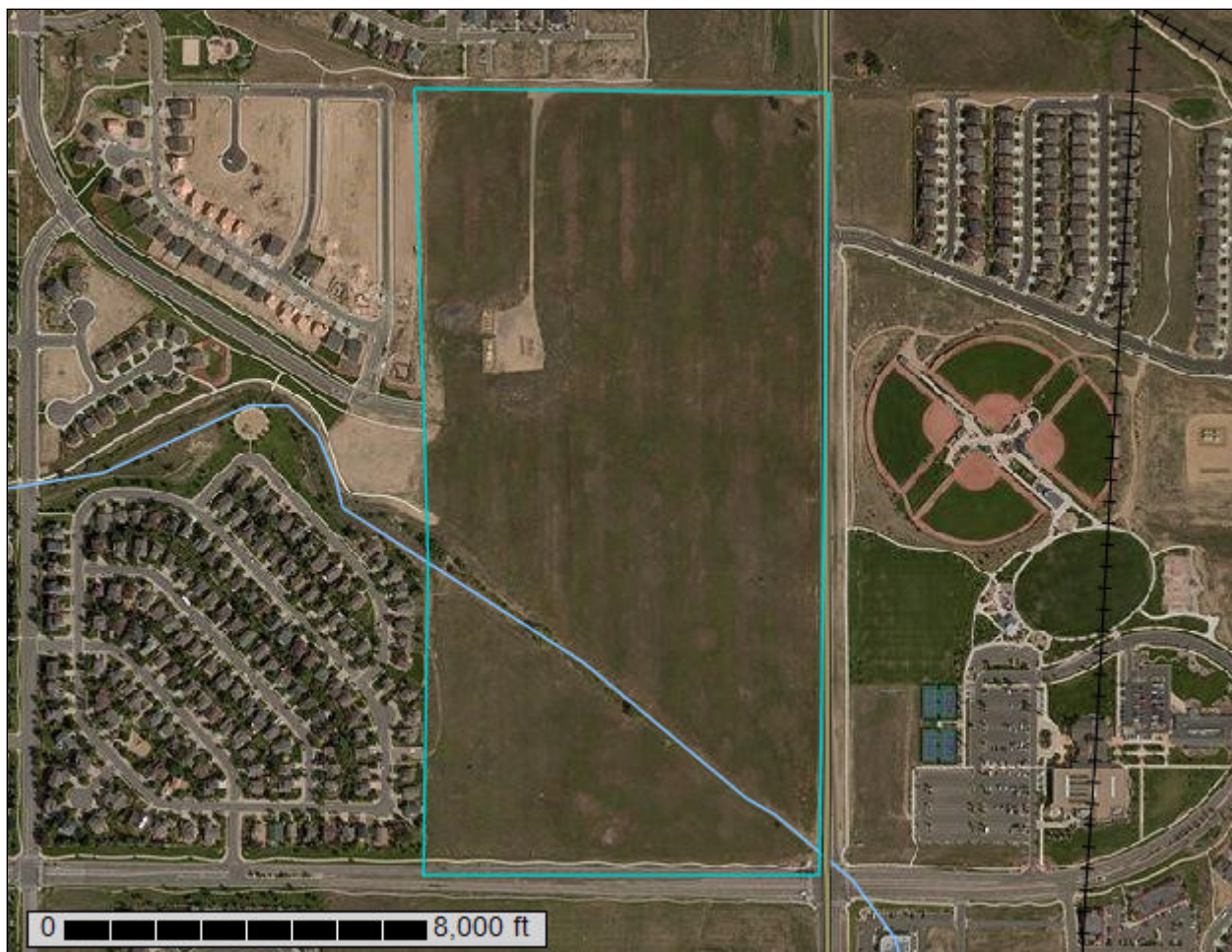
United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Boulder County Area, Colorado; and Weld County, Colorado, Southern Part



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Boulder County Area, Colorado

Survey Area Data: Version 14, Oct 10, 2017

Soil Survey Area: Weld County, Colorado, Southern Part

Survey Area Data: Version 16, Oct 10, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 30, 2014—Sep 18, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AcA	Ascalon sandy loam, 0 to 3 percent slopes	45.8	56.6%
AcC	Ascalon sandy loam, 3 to 5 percent slopes	20.2	25.0%
MdD	Manter sandy loam, 3 to 9 percent slopes	13.9	17.1%
Subtotals for Soil Survey Area		79.8	98.7%
Totals for Area of Interest		80.9	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Ascalon sandy loam, 0 to 3 percent slopes	0.9	1.2%
77	Vona sandy loam, 3 to 5 percent slopes	0.1	0.2%
Subtotals for Soil Survey Area		1.1	1.3%
Totals for Area of Interest		80.9	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas

are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Boulder County Area, Colorado

AcA—Ascalon sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2swl3
Elevation: 3,870 to 5,960 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ascalon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam
Bk - 19 to 35 inches: sandy clay loam
C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: Sandy Plains (R067BY024CO)
Hydric soil rating: No

Minor Components

Olnest

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy Plains (R067BY024CO)
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Sandy Plains (R067BY024CO)
Hydric soil rating: No

AcC—Ascalon sandy loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tInt
Elevation: 3,550 to 5,970 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Ascalon and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam
Bt1 - 6 to 12 inches: sandy clay loam
Bt2 - 12 to 19 inches: sandy clay loam

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Bk - 19 to 35 inches: sandy clay loam

C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Nonsaline (0.1 to 1.9 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: B

Ecological site: Sandy Plains (R067BY024CO), Sandy Plains (R072XY111KS)

Hydric soil rating: No

Minor Components

Stoneham

Percent of map unit: 10 percent

Landform: Interfluves

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Loamy Plains (R067BY002CO), Loamy Tableland (R072XY100KS)

Hydric soil rating: No

Vona

Percent of map unit: 8 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, footslope, shoulder

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Sandy Plains (R067BY024CO), Sandy Plains (R072XY111KS)

Hydric soil rating: No

Platner

Percent of map unit: 2 percent

Landform: Interfluves

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Loamy Plains (R067BY002CO), Loamy Tableland (R072XY100KS)

Hydric soil rating: No

MdD—Manter sandy loam, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: jps4

Elevation: 4,900 to 5,500 feet

Mean annual precipitation: 12 to 18 inches

Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 140 to 155 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Manter and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Manter

Setting

Landform: Terraces

Landform position (three-dimensional): Side slope, tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy eolian deposits and/or outwash

Typical profile

H1 - 0 to 5 inches: sandy loam

H2 - 5 to 14 inches: fine sandy loam, sandy loam

H2 - 5 to 14 inches: sandy loam, loamy sand, loamy fine sand

H3 - 14 to 60 inches:

H3 - 14 to 60 inches:

H3 - 14 to 60 inches:

Properties and qualities

Slope: 3 to 9 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Very high (about 18.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

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Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sandy (R067XB026CO)
Hydric soil rating: No

Minor Components

Ascalon

Percent of map unit: 12 percent
Hydric soil rating: No

Otero

Percent of map unit: 3 percent
Hydric soil rating: No

Weld County, Colorado, Southern Part

5—Ascalon sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2swl3

Elevation: 3,870 to 5,960 feet

Mean annual precipitation: 12 to 16 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 135 to 160 days

Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Ascalon and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ascalon

Setting

Landform: Interfluves

Landform position (two-dimensional): Summit

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Wind-reworked alluvium and/or calcareous sandy eolian deposits

Typical profile

Ap - 0 to 6 inches: sandy loam

Bt1 - 6 to 12 inches: sandy clay loam

Bt2 - 12 to 19 inches: sandy clay loam

Bk - 19 to 35 inches: sandy clay loam

C - 35 to 80 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 10 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: B

Ecological site: Sandy Plains (R067BY024CO)

Custom Soil Resource Report

Hydric soil rating: No

Minor Components

Olnest

Percent of map unit: 10 percent

Landform: Interfluves

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Sandy Plains (R067BY024CO)

Hydric soil rating: No

Vona

Percent of map unit: 5 percent

Landform: Interfluves

Landform position (two-dimensional): Summit

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Sandy Plains (R067BY024CO)

Hydric soil rating: No

77—Vona sandy loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 363x

Elevation: 4,600 to 5,200 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 48 to 55 degrees F

Frost-free period: 130 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Vona and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vona

Setting

Landform: Plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Eolian deposits

Typical profile

H1 - 0 to 6 inches: sandy loam

H2 - 6 to 28 inches: fine sandy loam

H3 - 28 to 60 inches: sandy loam

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Properties and qualities

Slope: 3 to 5 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A

Ecological site: Sandy Plains (R067BY024CO)

Hydric soil rating: No

Minor Components

Remmit

Percent of map unit: 7 percent

Hydric soil rating: No

Olney

Percent of map unit: 5 percent

Hydric soil rating: No

Otero

Percent of map unit: 3 percent

Hydric soil rating: No

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September 17, 2013

INA Group, LLC
6333 Apples' Way, Suite 115
Lincoln, NE 68516

Attention: Tom Beckius

Subject: Supplemental Phase II Environmental Site Assessment
4060 County Line Road, Erie, Colorado
CTL | T Project No. FC05859.001

INTRODUCTION

This report presents the analytical results for soil and groundwater samples collected during the Supplemental Phase II Environmental Site Assessment (ESA) of 4060 County Line Road in Erie, Colorado, hereafter known as "the site". The site is developed with an abandoned former pre-cast concrete manufacturing plant.

BACKGROUND

CTL | Thompson (CTL) conducted a limited Phase II ESA of 4060 County Line Road in Erie, Colorado (CTL Project No. FC05859.001, final report dated April 12, 2013). Among the findings of the investigation, petroleum hydrocarbons were identified in soils within the former pre-cast concrete manufacturing building on the site. The limited assessment performed within the building was not intended to allow for horizontal or vertical delineation of the extent of contamination.

The objective of the Supplemental Phase II ESA was to better delineate the horizontal and vertical extent of petroleum hydrocarbons inside the building. In addition, representative building materials were sampled, composited, and analyzed for disposal characteristics.

DRILLING AND SAMPLING

On July 19, 2013, Mr. Dana Harris of CTL mobilized to the site with subcontractor DrillPro, Inc.. A truck-mounted direct push drill rig was used to advance eight borings (GP-9 through GP-16).

Two hand-excavated surficial soil samples (S-17 and S-18) were collected using a disposable plastic trowel from the trench inside the pre-cast building. Boring and sample locations are shown on Figure 1.



During advancement of each boring, soil samples were collected continuously in 4-foot teflon cores down to a maximum depth of 20 feet below grade.

Soils from core samples were observed in the field using disposable vinyl examination gloves changed after every sample. After the soils were visually inspected, the soil sample from each core was divided. A portion of the sample was transferred into a plastic zip-loc bag and sealed; the other portion of the sample was promptly placed into a uniquely identified glass jar and packed tightly to minimize voids. Samples were containerized for potential laboratory analysis at approximate 5-foot intervals. Sample jars were then placed into a cooler chilled with ice for in-field storage and transit to the laboratory. The samples in the plastic bags were warmed and allowed to sit undisturbed to allow possible volatile organic compounds (VOCs) in the soils to vaporize into the headspace of the bags. A photoionization detector (PID) was used to determine the field concentration of VOCs of the headspace in the zip-loc bags.

Following completion of soil sampling, 1-inch PVC casings with slotted screen were inserted into the boreholes as temporary wells to facilitate groundwater sampling. Groundwater samples were collected using check-ball sampling device and clean disposable tubing. Upon completion of sampling, the temporary wells were removed and each borehole was backfilled with cuttings and hydrated bentonite pellets.

Samples collected for laboratory analysis were delivered under chain of custody protocol to ALS laboratory in Fort Collins, Colorado, an independent analytical laboratory.

FIELD OBSERVATIONS

Boring logs are presented in Appendix A. Soils generally consisted of sandy clays and clayey sands underlain by weathered claystone/sandstone bedrock (generally observed as sand, gravel, pebbles, and cobbles) at depths between 15 and 20 feet below grade. Saturated soils were encountered in several borings within weathered bedrock at depths of approximately 18 to 20 feet below grade.

The interior of the building had a moderate to strong ambient petroleum odor, making it difficult to assess soils for odors during drilling. However, as shown on the boring logs, PID measurements were generally less than, or very slightly higher than, 10 parts per million by volume (ppmv), which is typically indicative of background (ambient PID readings inside the building ranged from 0.5 to 1.2 ppmv). Light surficial staining was observed on soils in various locations inside the building. The trench inside the pre-cast building was partially filled with dumped wastes, but visible soils inside the trench generally appeared similar to those of the dirt floor elsewhere in the building, with light staining and a petroleum odor.

LABORATORY ANALYTICAL RESULTS

Soils

An iterative approach was designed for laboratory analysis of samples collected from soil borings (shallow soils collected from the trench were all analyzed, as planned). The



agreed strategy would be to initially analyze each sample collected from the depth of 5 feet below grade. Because the form oil was believed to have been spray-applied at the surface, it was reasonable to assume that contamination would have entered at the ground surface and migrated downward. If no significant contamination was present at 5 feet depth below grade, it would be reasonable to assume that significant contamination would not be found at deeper depths from the form oil application. Therefore, each soil sample from the 5-foot below grade depth level was initially submitted to be analyzed for oil & grease by EPA Method 9071 and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260; remaining samples were held at the laboratory. Following receipt of initial analytical results, selected deeper samples were analyzed for oil & grease and BTEX, based on initial analytical results. Due to accelerated laboratory turnaround, all sample analyses were completed within the EPA-established method holding times for oil & grease and BTEX. Laboratory analytical results are included in Appendix B, and soil results are summarized on Table 1 below.

Table 1 Soil Analytical Results – Inside Pre-Cast Building							
Boring No.	Depth (feet)	Sample Date	O&G ^{1,2} (mg/kg ³)	Benzene (µg/kg ³)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Xylenes (µg/kg)
GP-2	21-22	3/26/2013	< 50	< 10	< 10	< 10	< 10
GP-9 ⁴	5	7/19/2013	< 110	< 5.4	< 5.4	< 5.4	< 5.4
GP-10 ⁴	5	7/19/2013	< 110	< 5.0	< 5.0	< 5.0	< 5.0
GP-11 ⁴	5	7/19/2013	< 110	< 5.2	< 5.2	< 5.2	< 5.2
GP-12 ⁴	5	7/19/2013	< 110	< 5.2	< 5.2	< 5.2	< 5.2
GP-13 ⁴	5	7/19/2013	< 110	< 4.8	< 4.8	< 4.8	< 4.8
GP-14 ⁴	5	7/19/2013	< 110	< 5.4	< 5.4	< 5.4	< 5.4
GP-15 ⁴	5	7/19/2013	< 110	< 5.2	< 5.2	< 5.2	< 5.2
GP-16	5	7/19/2013	380	< 5.4	< 5.4	< 5.4	< 5.4
	10	7/19/2013	< 120	< 5.7	< 5.7	< 5.7	< 5.7
	15	7/19/2013	< 100	< 4.7	< 4.7	< 4.7	< 4.7
	20	7/19/2013	< 110	< 5.2	< 5.2	< 5.2	< 5.2
S-8	1-2	3/26/2013	316	< 10	< 10	< 10	< 10
S-17	1-2	7/19/2013	5800	< 5.1	< 5.1	< 5.1	< 5.1
S-18	1-2	7/19/2013	1500	< 4.8	< 4.8	< 4.8	< 4.8
Colorado OPS Limit ⁵			500	260	140000	190000	260000

1. Results in bold exceed regulatory comparison value
2. Total petroleum hydrocarbons as Oil & Grease by EPA Method 9071
3. mg/kg = milligrams per kilogram. µg/kg = micrograms per kilogram
4. Samples collected at 5-foot intervals, but only the samples from 5-foot depth were analyzed.
5. Colorado Department of Labor and Employment, Division of Oil and Public Safety, Tier I Risk Based Screening Levels, 2005.



With the exception of boring GP-16, none of the 5-foot depth soil samples contained oil & grease or BTEX above laboratory method detection limits (MDLs). The 5-foot depth sample from GP-16 contained an oil & grease concentration of 380 milligrams per kilogram (mg/kg), which is less than the Colorado limit of 500 milligrams per kilogram (mg/kg) for USTs, which is not directly applicable to releases from the pre-cast operation but is the most relevant regulatory standard. BTEX were not detected above MDLs. The soil samples from 10 feet, 15 feet and 20 feet below grade at GP-16 were also analyzed, but neither oil and grease nor BTEX were detected above MDLs.

The surficial soil samples S-17 and S-18, collected from the trench inside the building, contained oil & grease at concentrations of 5,800 mg/kg and 1,500 mg/kg, respectively, both exceeding the OPS limit; neither sample contained BTEX above MDLs. Analysis for PAHs was not performed.

Groundwater

Limited amounts of groundwater were present in each temporary well; however, four of the wells (GP-10, GP-12, GP-13, and GP-16) went dry while attempting to purge and a sample could not be collected. Groundwater samples were collected from temporary wells GP-9, GP-11, GP-14, and GP-15 and were analyzed for oil & grease by EPA Method 1664 and BTEX by EPA method 8260. Laboratory analytical results are included in Appendix B and are summarized on Table 2 below.

Table 2 Groundwater Analytical Results – Inside Pre-Cast Building						
Sample No.	Sample Date	Oil & Grease (mg/l ¹)	Benzene (µg/l ¹)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)
GP-9	7/19/2013	< 5.7	< 1	7.6	< 1	< 1
GP-11	7/19/2013	< 5.3	< 1	2.6	< 1	< 1
GP-14	7/19/2013	< 5.6	< 1	1.3	< 1	< 1
GP-15	7/19/2013	< 5.6	< 1	0.56	< 1	< 1
Colorado GWS ²		None established	5	560	700	1,400

1. mg/l = milligrams per liter. µg/liter = micrograms per liter

2. Colorado Department of Health and Environment, Water Quality Control Division, The Basic Standards for Groundwater (Regulation 41). 5 CCR 1002-41, January 31, 2013.

Toluene was detected in all four groundwater samples, at concentrations up to 7.6 µg/l, which is well below the Colorado groundwater standard of 560 µg/l. None of the other target analytes were detected above MDLs.



BUILDING WASTE CHARACTERIZATION

CTL collected representative samples of building materials that were visibly stained (presumably with form oil). Materials sampled included wood (approximately 70 percent of the sample by weight) and metal. The materials were composited in a clean 5-gallon bucket and submitted to ALS laboratory to be analyzed for polychlorinated biphenyls (PCBs) and toxicity characteristic leaching procedure (TCLP) benzene. As shown on the lab report in Appendix B, PCBs were not detected above MDLs and the TCLP benzene concentration was less than 10 µg/l, which is less than the hazardous waste limit of 500 µg/l. Therefore, the building debris will not be considered a characteristic hazardous waste.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this investigation, oil-contaminated soil within the pre-cast building appears to be limited to the area of the trench and depths of less than 10 feet immediately north of the east end of the trench (where boring GP-16 was advanced). Groundwater under the building contained low levels of toluene, at concentrations well below Colorado groundwater standards. Following demolition, the building debris stained with form oil will not be considered characteristically hazardous due to benzene content.

If it is desired to enter into the Colorado Voluntary Cleanup (VCUP) program, we recommend that a final site development plan be prepared and that a work plan be developed to address the concerns identified during this and prior investigations. Depending on the proposed development and use of the property, limited soil or other remedial actions may be warranted. CTL would be happy to assist with remedial design, work plan development, and the VCUP application and project management process.

LIMITATIONS

The subsurface investigation and chemical analysis were performed for specific parameters, as detailed in this letter. The accuracy and reliability of environmental studies are a reflection of the number and type of samples taken and extent of the analyses conducted, and are thus inherently limited and dependent upon the resources expended. An independent laboratory performed laboratory analysis. We are not responsible for the accuracy of data presented by others. The services performed should not be interpreted as providing any guarantee that the materials are free and clear of all hazardous or toxic materials.

We believe that our services were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the locality of the project. No warranty, express or implied, is made.



Thank you for choosing us to assist you with this project. If you have any questions or would like further clarification regarding this letter, please contact us.

Very truly yours,

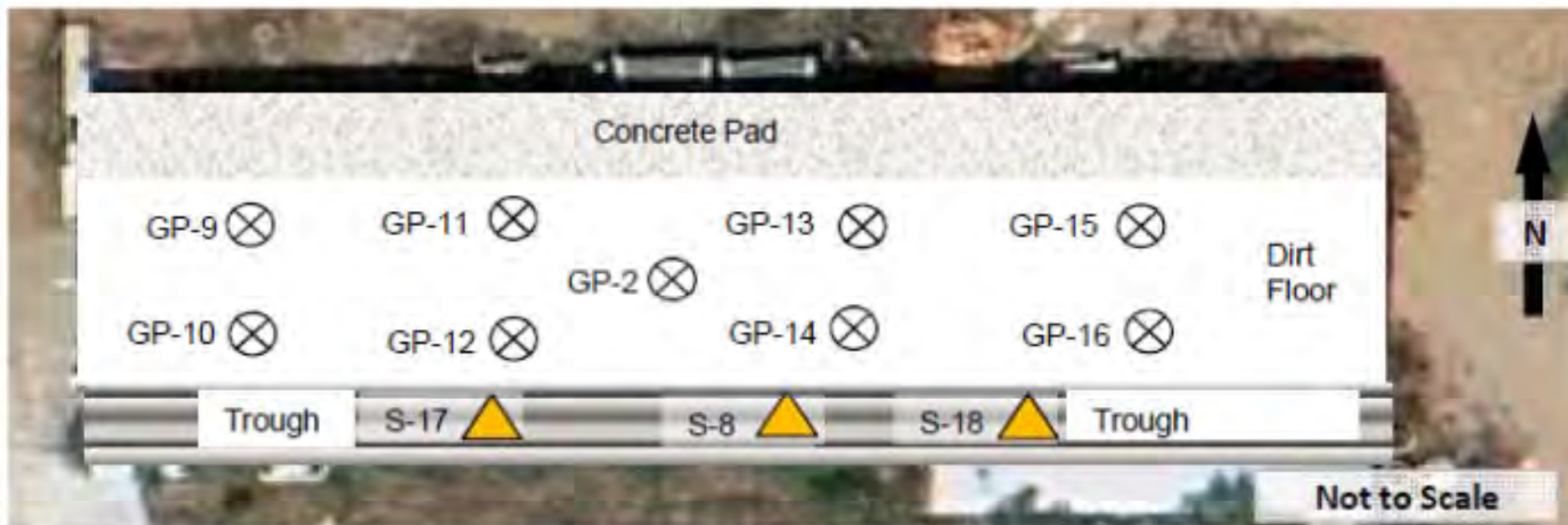
CTL | THOMPSON, INC.

A handwritten signature in blue ink, reading "Dana L. Harris".

Dana L. Harris
Environmental Department Manager, Fort Collins

A handwritten signature in blue ink, reading "Matthew L. Wardlow".

Matthew L. Wardlow, P.E.
Environmental Department Manager, Denver



⊗ Boring location

▲ Shallow soil sample location

Figure 1
Warehouse Sample Locations
Supplemental Phase II Environmental Site Assessment
4060 County Line Road, Erie, Colorado
CTL No. FC05859.001

Appendix A

Boring Logs

Field Boring Log

CTLITHOMPSON

Lat: _____ Long: _____

Date: 7/19/13 Project #: _____ Project Name: 4060 CLR Eric Hole#: GP-9
 CTL Representative: DH Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe / Manual Auto / 4"SS 6"HS Other

Depth	Hatch Pattern	Sample 1	Sample 2	PID Block Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0													0
				2.1 3.1								Gray clayey sand w/ gravel, pebbles, rubber-chy, odor	
												Grader to red-brown clayey sand, dry, no odor	
5	x 0810			3.1								Grader to red-yellow clayey sand, dry, no odor	5
10	x 0810			1.0								SAA, becoming moist, no odor	10
15	x 0810			2.1									15
20	x 0810			2.1								Grader to weathered bedrock, becomes saturated	20
												Drive to 25' + set keys well	
25													25
30													30
35													35



Split Spoon
California
Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer seal

Depth to Bedrock

Groundwater During Drilling

Groundwater After Drilling

Date

Ambient PID → 0.5 - 1.2 ppm

Field Boring Log



CTL THOMPSON

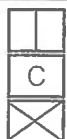
Lat: _____ Long: _____

Date: 7/19/13 Project #: _____ Project Name: Y061 CLR Eric Hole#: GP-10

CTL Representative: DH Hole Location: _____ Elevation: _____ Start: _____ Finish: _____

Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe / Manual Auto / 4"SS 6"HS Other: _____

Depth	Hatch Pattern	Sample 1	Sample 2	Blow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0													0
				11.4								Gray clayey sand, dry, slight odor	
												Gray - brown clayey sand, gravel, cobbles, dry, sl. odor	
5	x 0850											Grader to red-brown clayey soil, dry, no odor	
				3.7								Grader to yellow-brown clayey sand, dry, sl. odor	5
												↓	
10	x 0855			4.9								clay grades out - still slight odor,	
												↓ becoming moist	
15	x 0905			3.7									15
				7.2								Grader to wk bdrx + saturated, odor grades out	
20	x 0915											push to 25' pl keep well	20
25													25
30													30
35													35



Split Spoon
California
Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: Y N

Depth to Bedrock _____

Groundwater During Drilling _____ Groundwater After Drilling _____ Date _____

Field Boring Log

Lat: _____ Long: _____



CTL THOMPSON

Date: 7/19/13 Project #: _____ Project Name: 4060 CLR Ene Hole#: GP-11
 CTL Representative: DM Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geopac / Manual Auto / 4"SS 6"HS Other

Depth	Hatch Pattern	Sample 1	Sample 2	Blow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0													0
				3.0			Gry clayey sand, dry, slight odor						
							Red-brown clay sand, gravel, cobbles, dry, sl. odor						
							Red-brown clayey sand, dry, sl. odor						
5		X0930		2.3			Gravel to red-yellow clayey sand, dry, sl. odor						5
10		X0935		3.7			SAA						10
15		X0945		2.5			↓ becoming moist						15
20		X0955		4.2			Gravel to wk bdrx, become saturated, sl. odor still present						20
25							Push to 25', set well						25
30													30
35													35



Split Spoon

California

Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set. Y N

Depth to Bedrock _____

Groundwater During Drilling

Groundwater After Drilling _____ Date

Field Boring Log

CTLITHOMPSON

Lat: _____ Long: _____

Date: 7/19/17 Project #: _____ Project Name: 4060 CLR Eric Hole#: GP-12
 CTL Representative: DH Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe / Manual Auto / 4"SS 6"HS Other: _____

Depth	Hatch Pattern	Sample 1	Sample 2	Blow Count P.D	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0													0
				8.1			Gray	clayey	sand				
							Brown	clayey	sand, gravel, cobbles, dry, moderate odor				
							Gravel to brown	clayey	sand, dry, sl. odor				
5		X 1000		6.6									5
							Gravel to yellow-red	clayey	sand, dry, sl. odor				
10		X 1005		10.0									10
				9.3									
15		X 1015											15
				6.7			Gravel to wa	bedrock, dry, sl. odor					
20		X 1025											20
25													25
30													30
35													35



Split Spoon
California
Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: Y N

Depth to Bedrock: _____

Groundwater During Drilling

Groundwater After Drilling

Date: _____

Field Boring Log

CTLITHOMPSON

Lat: _____ Long: _____

Date: 7/19/17 Project #: _____ Project Name: Y060 CLR ERIE Hole#: GP-17
 CTL Representative: DM Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe / Manual Auto / 4"SS 6"HS Other _____

Depth	Hatch Pattern	Sample 1	Sample 2	Flow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
0							Primary	Modifier	Moisture	Consistency	Color	Notes	0
				7.0			Gray sandy clay, clay, moderate odor Brown sandy clay, clay, moderate odor						
5	X 1040			4.3			Grader to tan sandy clay, clay, slight odor						5
10	X 1045			6.2			Grader to tan clay, stiff, moist, moderate odor						10
				5.1			Grader to tan clayey sand, clay, sl. odor						
15	X 1050			3.1			Grader to w _x bedrock, clay, moist, no odor						15
20	X 1105						not scheduled push to 21' set well						20
25													25
30													30
35													35



Split Spoon
California
Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: ☒ Y ☐ N

Groundwater During Drilling

Depth to Bedrock _____

Groundwater After Drilling _____ Date _____

Field Boring Log



CTLITHOMPSON

Lat: _____ Long: _____

Date: 7/19/17 Project #: _____ Project Name: 4060 CLR Case Hole#: GP-14
 CTL Representative: DM Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe / Manual Auto / 4"SS 6"HS Other _____

Depth	Hatch Pattern	Sample 1	Sample 2	Blow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0							Gray sandy clay, dry, no odor						0
				51.4			Brown sandy clay, clay, sl. odor						
5	X 1110			6.1									5
10	X 1115			11.3			Gravel to sand, dry, sl. odor						10
15	X 1125			4.4									15
20	X 1135			7.7			Gravel to wa below, clay, no odor						20
							Push to 25', set well						
25													25
30													30
35													35



Split Spoon
California
Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: Y N

Depth to Bedrock: _____

Groundwater During Drilling

Groundwater After Drilling _____ Date _____

Field Boring Log

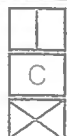
Lat: _____ Long: _____



CTLITHOMPSON

Date: 7/19/17 Project #: _____ Project Name: 4060 CLR EDC Hole#: GP-15
 CTL Representative: DM Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company: _____ Rig / Hammer / Auger Type: CME 45 55 Other: Geoprobe /Manual Auto / 4"SS 6"HS Other

Depth	Hatch Pattern	Sample 1	Sample 2	Blow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0							G Gr Sandy clay, gravel, cobbles, ch, sl. odor						0
				2.4			Brown sandy clay, ch, no odor						
5	X1140			2.7			Gravel to fine sandy clay, ch, no odor						5
10	X1145			2.5			Become more cl. odor						10
				2.0			Gravel to sand + gravel, ch, no odor						
15	X1155			2.9			Gravel to clay, much, no odor						15
							Gravel to w. bedrock, much, sl. odor						
20	X1200						no sch.						20
							Rph to 28' set well						
25													25
30													30
35													35



Split Spoon
 California
 Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: Y N

Depth to Bedrock: _____

Groundwater During Drilling

Groundwater After Drilling _____ Date: _____

Field Boring Log

CTL THOMPSON

Lat: _____ Long: _____

Date: 7/19/13 Project #: _____ Project Name: 4060 CLR Erie Hole#: GP-16
 CTL Representative DM Hole Location: _____ Elevation: _____ Start: _____ Finish: _____
 Drill Company _____ Rig / Hammer / Auger Type: CME 45 55 Other: Legix / Manual Auto / 4"SS 6"HS Other _____

Depth	Hatch Pattern	Sample 1	Sample 2	P10 Flow Count	% Fines	USC Symbol	DESCRIPTIONS / NOTES						Depth
							Primary	Modifier	Moisture	Consistency	Color	Notes	
0							Tan. sand, gravel, cobbles, dry, no odor						0
				6.2			Grader to brown sandy clay, dry, no odor						
5	X1210			4.7			Grader to tan clay, sand, dry, no odor						5
							Grader to tan clay, stiff, dry, no odor						
10	X1215			3.0			Grader to tan clay, sand, moist, no odor						10
				6.8			Grader to tan sandy clay, dry, no odor						
15	X1220			4.8			Grader to tan to red sand, gravel, pebbles, cobbles, dry, no odor (w/ gravel)						15
20	X1230						Push to 25' set well						20
25													25
30													30
35													35



Split Spoon

California

Bulk



Clay



Sand



Gravel



Claystone



Sandstone

Piezometer set: Y N

Depth to Bedrock: _____

Groundwater During Drilling

Groundwater After Drilling _____ Date: _____



Appendix B

Laboratory Analytical Results



1307328

GC/MS Volatiles:

The samples were analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

All acceptance criteria were met with the following exceptions:

1. Sample 1307328-35, provided for volatiles, had a pH > 2 at the time of analysis. All other samples had a pH < 2 at the time of analysis.
2. All internal standard recoveries were within acceptance criteria with the following exception:

Internal Standard	Sample	Direction
1,4-Dichlorobenzene-d4	1307328-9MS	Low

No further action was taken.

Oil and Grease:

The water samples were prepared and analyzed according to EPA Method 1664A procedures utilizing the current revision of SOP 671.

The soil samples were prepared and analyzed according to SW-846, 3rd Edition procedures based on Method SW-9071 and utilizing the current revision of SOP 640.

All acceptance criteria were met.

PCBs:

The extract was analyzed using GC/ECD (electron capture detectors) with an RTX-5 capillary column according to the current revision of SOP 409 based on SW-846 Method 8082. All positive results were then confirmed on an RTX-CLPesticidesII column. Unless interferences were present, the quantitation of each analyte is the higher of the concentrations obtained from each column that met initial and continuing calibration criteria. Note that analyst raw data annotation may provide further clarification.

All surrogate recoveries were within acceptable limits with the following exception:

Surrogate	Sample	Direction
Decachlorobiphenyl	39	Low



It is the practice of ALS to evaluate the recovery of both surrogates in samples and associated quality control samples, but to control on only one of the two surrogates for this test.

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1307328

Client Name: CTL Thompson

Client Project Name: 4060 CLR Erie

Client Project Number: FC05859.001-205

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
GP-9 (5')	1307328-1		SOIL	19-Jul-13	8:05
GP-10 (5')	1307328-2		SOIL	19-Jul-13	8:50
GP-11 (5')	1307328-3		SOIL	19-Jul-13	9:30
GP-12 (5')	1307328-4		SOIL	19-Jul-13	10:00
GP-13 (5')	1307328-5		SOIL	19-Jul-13	10:40
GP-14 (5')	1307328-6		SOIL	19-Jul-13	11:10
GP-15 (5')	1307328-7		SOIL	19-Jul-13	11:40
GP-16 (5')	1307328-8		SOIL	19-Jul-13	12:10
S-17	1307328-9		SOIL	19-Jul-13	14:10
S-18	1307328-10		SOIL	19-Jul-13	14:20
GP-9 (10')	1307328-11		SOIL	19-Jul-13	8:10
GP-9 (15')	1307328-12		SOIL	19-Jul-13	8:20
GP-9 (20')	1307328-13		SOIL	19-Jul-13	8:30
GP-10 (10')	1307328-14		SOIL	19-Jul-13	8:55
GP-10 (15')	1307328-15		SOIL	19-Jul-13	9:05
GP-10 (20')	1307328-16		SOIL	19-Jul-13	9:15
GP-11 (10')	1307328-17		SOIL	19-Jul-13	9:35
GP-11 (15')	1307328-18		SOIL	19-Jul-13	9:45
GP-11 (20')	1307328-19		SOIL	19-Jul-13	9:55
GP-12 (10')	1307328-20		SOIL	19-Jul-13	10:05
GP-12 (15')	1307328-21		SOIL	19-Jul-13	10:15
GP-12 (20')	1307328-22		SOIL	19-Jul-13	10:25
GP-13 (10')	1307328-23		SOIL	19-Jul-13	10:45
GP-13 (15')	1307328-24		SOIL	19-Jul-13	10:55
GP-13 (20')	1307328-25		SOIL	19-Jul-13	11:05
GP-14 (10')	1307328-26		SOIL	19-Jul-13	11:15
GP-14 (15')	1307328-27		SOIL	19-Jul-13	11:25
GP-14 (20')	1307328-28		SOIL	19-Jul-13	11:35
GP-15 (10')	1307328-29		SOIL	19-Jul-13	11:45
GP-15 (15')	1307328-30		SOIL	19-Jul-13	11:55

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1307328

Client Name: CTL Thompson

Client Project Name: 4060 CLR Erie

Client Project Number: FC05859.001-205

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
GP-15 (20')	1307328-31		SOIL	19-Jul-13	12:00
GP-16 (10')	1307328-32		SOIL	19-Jul-13	12:15
GP-16 (15')	1307328-33		SOIL	19-Jul-13	12:20
GP-16 (20')	1307328-34		SOIL	19-Jul-13	12:30
GP-9	1307328-35		WATER	19-Jul-13	13:30
GP-11	1307328-36		WATER	19-Jul-13	14:00
GP-14	1307328-37		WATER	19-Jul-13	14:15
GP-15	1307328-38		WATER	19-Jul-13	14:25
BW-19	1307328-39		SOLID	19-Jul-13	17:30
BW-19	1307328-40		LEACHAT	19-Jul-13	17:30
Trip Blank	1307328-41		WATER	19-Jul-13	



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202/8

PROJECT NAME 4060 CLR Erie		SAMPLER Dana Harris		DATE 7/19/13		WORKORDER 1307328	
PROJECT NO. FC 05859 .001-205		SITE ID -		TURNAROUND standard/1wk.		PAGE 1 of 1	
COMPANY NAME CTL Thompson		EDD FORMAT -				DISPOSAL	
SEND REPORT TO Dana Harris		PURCHASE ORDER -					
ADDRESS 351 Linden St. #140		BILL TO COMPANY SAA					
CITY/STATE/ZIP Fort Collins, CO 80524		INVOICE ATTN TO					
PHONE 970-206-9455		ADDRESS					
FAX		CITY/STATE/ZIP					
E-MAIL dharris@ctlthompson.com		PHONE					
		FAX					
		E-MAIL					

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC
①	GP-9 (5')	S	7/19/13	1505	2		
②	GP-10 (5')	S	7/19/13	1505	2		
③	GP-11 (5')	S	7/19/13	1505	2		
④	GP-12 (5')	S	7/19/13	1505	2		
⑤	GP-13 (5')	S	7/19/13	1505	2		
⑥	GP-14 (5')	S	7/19/13	1505	2		
⑦	GP-15 (5')	S	7/19/13	1505	2		
⑧	GP-16 (5')	S	7/19/13	1505	2		
⑨	S-17	S	7/19/13	1505	2		
⑩	S-18	S	7/19/13	1505	2		

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

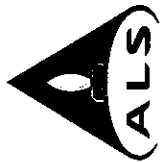
For metals or anions, please detail analytes below.

Comments:	SIGNATURE Dana Harris	PRINTED NAME Dana Harris	DATE 7/20/13	TIME 0935
	RELINQUISHED BY	RECEIVED BY	DATE	TIME
	RELINQUISHED BY	RECEIVED BY	DATE	TIME
	RELINQUISHED BY	RECEIVED BY	DATE	TIME
	RELINQUISHED BY	RECEIVED BY	DATE	TIME
	RELINQUISHED BY	RECEIVED BY	DATE	TIME

QC PACKAGE (check below)

☒ LEVEL II (Standard QC)
☐ LEVEL III (Std QC + forms)
☐ LEVEL IV (Std QC + forms + raw data)

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202-8

PROJECT NAME 4060 CLR Erie		SAMPLER SITE ID		DATE 7/19/13		WORKORDER # 1307328	
PROJECT NO. F05859.001-205		EDD FORMAT		TURNAROUND		PAGE 2 of 4	
COMPANY NAME CTL Thompson		PURCHASE ORDER				DISPOSAL By Lab or Return to Client	
SEND REPORT TO		BILL TO COMPANY					
ADDRESS		INVOICE ATTN TO					
CITY / STATE / ZIP		ADDRESS					
PHONE		CITY / STATE / ZIP					
FAX		PHONE					
E-MAIL		FAX					
E-MAIL		E-MAIL					

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC
11	GP-9 (10')	S	7/19/13	0810	2		HOLD
12	GP-9 (15')	S	7/19/13	0820	2		HOLD
13	GP-9 (20')	S	7/19/13	0830	2		HOLD
14	GP-10 (10')	S	7/19/13	0855	2		HOLD
15	GP-10 (15')	S	7/19/13	0905	2		HOLD
16	GP-10 (20')	S	7/19/13	0915	2		HOLD
17	GP-11 (10')	S	7/19/13	0935	2		HOLD
18	GP-11 (15')	S	7/19/13	0945	2		HOLD
19	GP-11 (20')	S	7/19/13	0955	2		HOLD
20	GP-12 (10')	S	7/19/13	1005	2		HOLD

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	QC PACKAGE (check below)			
	LEVEL II (Standard QC)			
	LEVEL III (Std QC + forms)			
	LEVEL IV (Std QC + forms + raw data)			
Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035				

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY	<i>[Signature]</i>	Dana Harass	7/20/13	0935
RELINQUISHED BY	<i>[Signature]</i>	Lawrence Schmitz	7/20/13	0940
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
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Chain-of-Custody

Form 202a

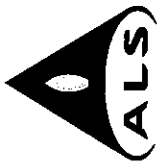
PROJECT NAME 4060 CLR Ede		SAMPLER Dane Harris		DATE 7/19/13		WORKORDER # 1307328	
PROJECT NO. FC05859.001-205		SITE ID		TURNAROUND		PAGE 3 of 9	
COMPANY NAME CIL Thompson		EDD FORMAT				DISPOSAL By Lab or Return to Client	
SEND REPORT TO		PURCHASE ORDER					
ADDRESS		BILL TO COMPANY					
CITY / STATE / ZIP		INVOICE ATTN TO					
PHONE		ADDRESS					
FAX		CITY / STATE / ZIP					
E-MAIL		PHONE					
		FAX					
		E-MAIL					

Lab ID	Field ID	Matrix	Sample Date Time	Sample Time Date	# Bottles	Pres.	QC
21	GP-12 (15')	S	1015	7/19/13	2		HOLD
22	GP-12 (20')	S	1025	7/19/13	2		HOLD
23	GP-13 (10')	S	1045	7/19/13	2		HOLD
24	GP-13 (15')	S	1055	7/19/13	2		HOLD
25	GP-13 (20')	S	1105	7/19/13	2		HOLD
26	GP-14 (10')	S	1115	7/19/13	2		HOLD
27	GP-14 (15')	S	1125	7/19/13	2		HOLD
28	GP-14 (20')	S	1135	7/19/13	2		HOLD
29	GP-15 (10')	S	1145	7/19/13	2		HOLD
30	GP-15 (15')	S	1155	7/19/13	2		HOLD

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	QC PACKAGE (check below)		SIGNATURE Dane Harris Lauren Schmitz	PRINTED NAME Dane Harris Lauren Schmitz	DATE 7/20/13	TIME 0935
	LEVEL II (Standard QC)					
	LEVEL III (Std QC + forms)					
	LEVEL IV (Std QC + forms + raw data)					
Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035						



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 2028

PROJECT NAME 4066 CLR E&E		SAMPLER Dane Harris		DATE 7/19/13		WORKORDER 1307328	
PROJECT NO. FC05859.001-265		SITE ID		TURNAROUND		PAGE 4 of 4	
COMPANY NAME CTL Thompson		EDD FORMAT		DATE		By Lab or Return to Client	
SEND REPORT TO		PURCHASE ORDER		TURNAROUND		DISPOSAL	
ADDRESS		BILL TO COMPANY		TURNAROUND		DISPOSAL	
CITY / STATE / ZIP		INVOICE ATTN TO		TURNAROUND		DISPOSAL	
PHONE		ADDRESS		TURNAROUND		DISPOSAL	
FAX		CITY / STATE / ZIP		TURNAROUND		DISPOSAL	
E-MAIL		PHONE		TURNAROUND		DISPOSAL	
E-MAIL		FAX		TURNAROUND		DISPOSAL	
E-MAIL		E-MAIL		TURNAROUND		DISPOSAL	
Field ID		Matrix	Sample Depth Time	Sample Time Date	# Bottles	Pres.	QC
31	GP-15 (20')	S	1200	7/19/13	2		
32	GP-16 (10')	S	1215	7/19/13	2		
33	GP-16 (15')	S	1230	7/19/13	2		
34	GP-16 (20')	S	1270	7/19/13	2		
35	GP-9	W	1330	7/19/13	4		
36	GP-11	W	1400	7/19/13	4		
37	GP-14	W	1415	7/19/13	4		
38	GP-15	W	1425	7/19/13	4		
39	BN-19	NS	1730	7/19/13	2		

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:

(41) TB

QC PACKAGE (check below)	
LEVEL II (Standard QC)	
LEVEL III (Std QC + forms)	
LEVEL IV (Std QC + forms + raw data)	

8 of 39

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

SIGNATURE	PRINTED NAME	DATE	TIME
(Signature)	Dane Harris	7/20/13	0935
	Lauren Schmitz	7/20/13	0940
RELINQUISHED BY			
RECEIVED BY			
RELINQUISHED BY			
RECEIVED BY			
RELINQUISHED BY			
RECEIVED BY			



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CTL Thompson

Workorder No: 1307328

Project Manager: ARW

Initials: LAS Date: 7/20/13

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<u>NO</u>
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO
3. Are Custody seals on sample containers intact?	<u>NONE</u>	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<u>YES</u>	NO
5. Are the COC and bottle labels complete and legible?		<u>YES</u>	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO
7. Were airbills / shipping documents present and/or removable?	<u>DROP OFF</u>	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<u>N/A</u>	YES	<u>NO</u>
9. Are all aqueous non-preserved samples pH 4-9?	<u>N/A</u>	YES	NO
10. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO
11. Were all samples placed in the proper containers for the requested analyses?		<u>YES</u>	NO
12. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<u>YES</u>	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: _____ < green pea _____ > green pea	<u>N/A</u>	<u>YES</u>	NO
15. Do any water samples contain sediment? Amount Amount of sediment: _____ dusting _____ moderate _____ heavy	<u>N/A</u>	YES	<u>NO</u>
16. Were the samples shipped on ice?		<u>YES</u>	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <u>#2</u> #4 RAD ONLY		<u>YES</u>	NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>			
Temperature (°C): <u>4.8</u> <u>1.2</u> <u>3.0</u>			
No. of custody seals on cooler: <u>0</u> →			
External µR/hr reading: <u>N/A</u> →			
Background µR/hr reading: <u>10</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <u>NA</u> (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

*please see page 2

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 7/20/13



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CTL

Workorder No: 1307328

Project Manager: ARW

Initials: UAS Date: 7/20/13

Additional Information:

(*) 6 Trip Blank not listed on COC. Arrived
in cooler #1 added to W.O. as 1307328-41
(2 vials)

NOTE:

No pH adjustments shall be made without prior consent of Project Manager. After pH adjustments, hold metals
and radchem samples ≥ 24 hrs. before analysis.

Was the pH of any sample adjusted by the laboratory? YES (See Table below) / NO

pH Excursion:

ALS Sample ID	Client Sample ID	Initial pH	Final pH	Reagent Used	Volume Added (mL)	Lot No. of Reagent	Requested Analysis	Initials / Date / Time
1307328-35-4	GP-9	7	<2	H ₂ SO ₄	1.0	50048	04G	UAS 7/20/13 0940
↓ 36-4	GP-11	4	↓	↓	↓	↓	↓	↓
↓ 37-4	GP-14	3	↓	↓	↓	↓	↓	↓
↓ 38-4	GP-15	4	↓	↓	↓	↓	↓	↓

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: C. Wolf 7/20/13

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-9 (5')
Legal Location:
Collection Date: 7/19/2013 08:05

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-1
Matrix: SOIL
Percent Moisture: 7.9

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		5.4	UG/KG	1	7/23/2013 18:46
TOLUENE	ND		5.4	UG/KG	1	7/23/2013 18:46
ETHYLBENZENE	ND		5.4	UG/KG	1	7/23/2013 18:46
M+P-XYLENE	ND		5.4	UG/KG	1	7/23/2013 18:46
O-XYLENE	ND		5.4	UG/KG	1	7/23/2013 18:46
Surr: DIBROMOFLUOROMETHANE	100		61-134	%REC	1	7/23/2013 18:46
Surr: TOLUENE-D8	98		57-135	%REC	1	7/23/2013 18:46
Surr: 4-BROMOFLUOROBENZENE	98		52-151	%REC	1	7/23/2013 18:46
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-10 (5')
Legal Location:
Collection Date: 7/19/2013 08:50

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-2
Matrix: SOIL
Percent Moisture: 7.1

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		5	UG/KG	1	7/23/2013 19:09
TOLUENE	ND		5	UG/KG	1	7/23/2013 19:09
ETHYLBENZENE	ND		5	UG/KG	1	7/23/2013 19:09
M+P-XYLENE	ND		5	UG/KG	1	7/23/2013 19:09
O-XYLENE	ND		5	UG/KG	1	7/23/2013 19:09
Surr: DIBROMOFLUOROMETHANE	97		61-134	%REC	1	7/23/2013 19:09
Surr: TOLUENE-D8	96		57-135	%REC	1	7/23/2013 19:09
Surr: 4-BROMOFLUOROBENZENE	95		52-151	%REC	1	7/23/2013 19:09
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-11 (5')
Legal Location:
Collection Date: 7/19/2013 09:30

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-3
Matrix: SOIL
Percent Moisture: 7.3

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		5.2	UG/KG	1	7/23/2013 19:33
TOLUENE	ND		5.2	UG/KG	1	7/23/2013 19:33
ETHYLBENZENE	ND		5.2	UG/KG	1	7/23/2013 19:33
M+P-XYLENE	ND		5.2	UG/KG	1	7/23/2013 19:33
O-XYLENE	ND		5.2	UG/KG	1	7/23/2013 19:33
Surr: DIBROMOFLUOROMETHANE	98		61-134	%REC	1	7/23/2013 19:33
Surr: TOLUENE-D8	97		57-135	%REC	1	7/23/2013 19:33
Surr: 4-BROMOFLUOROBENZENE	95		52-151	%REC	1	7/23/2013 19:33
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-12 (5')
Legal Location:
Collection Date: 7/19/2013 10:00

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-4
Matrix: SOIL
Percent Moisture: 8.7

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		5.2	UG/KG	1	7/23/2013 19:56
TOLUENE	ND		5.2	UG/KG	1	7/23/2013 19:56
ETHYLBENZENE	ND		5.2	UG/KG	1	7/23/2013 19:56
M+P-XYLENE	ND		5.2	UG/KG	1	7/23/2013 19:56
O-XYLENE	ND		5.2	UG/KG	1	7/23/2013 19:56
Surr: DIBROMOFLUOROMETHANE	99		61-134	%REC	1	7/23/2013 19:56
Surr: TOLUENE-D8	97		57-135	%REC	1	7/23/2013 19:56
Surr: 4-BROMOFLUOROBENZENE	95		52-151	%REC	1	7/23/2013 19:56
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-13 (5')
Legal Location:
Collection Date: 7/19/2013 10:40

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-5
Matrix: SOIL
Percent Moisture: 7.7

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		4.8	UG/KG	1	7/23/2013 20:20
TOLUENE	ND		4.8	UG/KG	1	7/23/2013 20:20
ETHYLBENZENE	ND		4.8	UG/KG	1	7/23/2013 20:20
M+P-XYLENE	ND		4.8	UG/KG	1	7/23/2013 20:20
O-XYLENE	ND		4.8	UG/KG	1	7/23/2013 20:20
Surr: DIBROMOFLUOROMETHANE	100		61-134	%REC	1	7/23/2013 20:20
Surr: TOLUENE-D8	97		57-135	%REC	1	7/23/2013 20:20
Surr: 4-BROMOFLUOROBENZENE	98		52-151	%REC	1	7/23/2013 20:20
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-14 (5')
Legal Location:
Collection Date: 7/19/2013 11:10

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-6
Matrix: SOIL
Percent Moisture: 9.1

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES						
			SW8260		Prep Date: 7/23/2013	PrepBy: SDW
BENZENE	ND		5.4	UG/KG	1	7/23/2013 20:44
TOLUENE	ND		5.4	UG/KG	1	7/23/2013 20:44
ETHYLBENZENE	ND		5.4	UG/KG	1	7/23/2013 20:44
M+P-XYLENE	ND		5.4	UG/KG	1	7/23/2013 20:44
O-XYLENE	ND		5.4	UG/KG	1	7/23/2013 20:44
Surr: DIBROMOFLUOROMETHANE	98		61-134	%REC	1	7/23/2013 20:44
Surr: TOLUENE-D8	97		57-135	%REC	1	7/23/2013 20:44
Surr: 4-BROMOFLUOROBENZENE	95		52-151	%REC	1	7/23/2013 20:44
OIL & GREASE, GRAVIMETRIC						
			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-15 (5')
Legal Location:
Collection Date: 7/19/2013 11:40

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-7
Matrix: SOIL
Percent Moisture: 7.9

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/24/2013	PrepBy: SDW
BENZENE	ND		5.2	UG/KG	1	7/24/2013 14:46
TOLUENE	ND		5.2	UG/KG	1	7/24/2013 14:46
ETHYLBENZENE	ND		5.2	UG/KG	1	7/24/2013 14:46
M+P-XYLENE	ND		5.2	UG/KG	1	7/24/2013 14:46
O-XYLENE	ND		5.2	UG/KG	1	7/24/2013 14:46
Surr: DIBROMOFLUOROMETHANE	99		61-134	%REC	1	7/24/2013 14:46
Surr: TOLUENE-D8	96		57-135	%REC	1	7/24/2013 14:46
Surr: 4-BROMOFLUOROBENZENE	96		52-151	%REC	1	7/24/2013 14:46
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	ND		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (5')
Legal Location:
Collection Date: 7/19/2013 12:10

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-8
Matrix: SOIL
Percent Moisture: 8.5

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/24/2013	PrepBy: SDW
BENZENE	ND		5.4	UG/KG	1	7/24/2013 15:09
TOLUENE	ND		5.4	UG/KG	1	7/24/2013 15:09
ETHYLBENZENE	ND		5.4	UG/KG	1	7/24/2013 15:09
M+P-XYLENE	ND		5.4	UG/KG	1	7/24/2013 15:09
O-XYLENE	ND		5.4	UG/KG	1	7/24/2013 15:09
Surr: DIBROMOFLUOROMETHANE	99		61-134	%REC	1	7/24/2013 15:09
Surr: TOLUENE-D8	98		57-135	%REC	1	7/24/2013 15:09
Surr: 4-BROMOFLUOROBENZENE	98		52-151	%REC	1	7/24/2013 15:09
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	380		110	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: S-17
Legal Location:
Collection Date: 7/19/2013 14:10

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-9
Matrix: SOIL
Percent Moisture: 2.8

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/25/2013	PrepBy: SDW
BENZENE	ND		5.1	UG/KG	1	7/25/2013 13:29
TOLUENE	ND		5.1	UG/KG	1	7/25/2013 13:29
ETHYLBENZENE	ND		5.1	UG/KG	1	7/25/2013 13:29
M+P-XYLENE	ND		5.1	UG/KG	1	7/25/2013 13:29
O-XYLENE	ND		5.1	UG/KG	1	7/25/2013 13:29
Surr: DIBROMOFLUOROMETHANE	100		61-134	%REC	1	7/25/2013 13:29
Surr: TOLUENE-D8	97		57-135	%REC	1	7/25/2013 13:29
Surr: 4-BROMOFLUOROBENZENE	94		52-151	%REC	1	7/25/2013 13:29
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	5800		100	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: S-18
Legal Location:
Collection Date: 7/19/2013 14:20

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-10
Matrix: SOIL
Percent Moisture: 0.9

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/24/2013	PrepBy: SDW
BENZENE	ND		4.8	UG/KG	1	7/24/2013 15:56
TOLUENE	ND		4.8	UG/KG	1	7/24/2013 15:56
ETHYLBENZENE	ND		4.8	UG/KG	1	7/24/2013 15:56
M+P-XYLENE	ND		4.8	UG/KG	1	7/24/2013 15:56
O-XYLENE	ND		4.8	UG/KG	1	7/24/2013 15:56
Surr: DIBROMOFLUOROMETHANE	102		61-134	%REC	1	7/24/2013 15:56
Surr: TOLUENE-D8	104		57-135	%REC	1	7/24/2013 15:56
Surr: 4-BROMOFLUOROBENZENE	89		52-151	%REC	1	7/24/2013 15:56
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/25/2013	PrepBy: TLB
OIL AND GREASE	1500		100	MG/KG	1	7/26/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-9
Legal Location:
Collection Date: 7/19/2013 13:30

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-35
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/21/2013	PrepBy: SDW
BENZENE	ND		1	UG/L	1	7/21/2013 16:21
ETHYLBENZENE	ND		1	UG/L	1	7/21/2013 16:21
M+P-XYLENE	ND		1	UG/L	1	7/21/2013 16:21
O-XYLENE	ND		1	UG/L	1	7/21/2013 16:21
TOLUENE	7.6		1	UG/L	1	7/21/2013 16:21
Surr: 4-BROMOFLUOROBENZENE	99		85-115	%REC	1	7/21/2013 16:21
Surr: DIBROMOFLUOROMETHANE	99		84-118	%REC	1	7/21/2013 16:21
Surr: TOLUENE-D8	101		85-115	%REC	1	7/21/2013 16:21
HEXANE EXTRACTABLE MATERIAL--GRAVIMETRIC			EPA1664		Prep Date: 7/25/2013	PrepBy: BCH
OIL AND GREASE	ND		5.7	MG/L	1	7/25/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-11
Legal Location:
Collection Date: 7/19/2013 14:00

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-36
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/21/2013	PrepBy: SDW
BENZENE	ND		1	UG/L	1	7/21/2013 17:08
ETHYLBENZENE	ND		1	UG/L	1	7/21/2013 17:08
M+P-XYLENE	ND		1	UG/L	1	7/21/2013 17:08
O-XYLENE	ND		1	UG/L	1	7/21/2013 17:08
TOLUENE	2.6		1	UG/L	1	7/21/2013 17:08
Surr: 4-BROMOFLUOROBENZENE	96		85-115	%REC	1	7/21/2013 17:08
Surr: DIBROMOFLUOROMETHANE	100		84-118	%REC	1	7/21/2013 17:08
Surr: TOLUENE-D8	102		85-115	%REC	1	7/21/2013 17:08
HEXANE EXTRACTABLE MATERIAL--GRAVIMETRIC			EPA1664		Prep Date: 7/25/2013	PrepBy: BCH
OIL AND GREASE	ND		5.3	MG/L	1	7/25/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-14
Legal Location:
Collection Date: 7/19/2013 14:15

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-37
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/21/2013	PrepBy: SDW
BENZENE	ND		1	UG/L	1	7/21/2013 17:55
ETHYLBENZENE	ND		1	UG/L	1	7/21/2013 17:55
M+P-XYLENE	ND		1	UG/L	1	7/21/2013 17:55
O-XYLENE	ND		1	UG/L	1	7/21/2013 17:55
TOLUENE	1.3		1	UG/L	1	7/21/2013 17:55
Surr: 4-BROMOFLUOROBENZENE	99		85-115	%REC	1	7/21/2013 17:55
Surr: DIBROMOFLUOROMETHANE	99		84-118	%REC	1	7/21/2013 17:55
Surr: TOLUENE-D8	101		85-115	%REC	1	7/21/2013 17:55
HEXANE EXTRACTABLE MATERIAL--GRAVIMETRIC			EPA1664		Prep Date: 7/25/2013	PrepBy: BCH
OIL AND GREASE	ND		5.6	MG/L	1	7/25/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-15
Legal Location:
Collection Date: 7/19/2013 14:25

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-38
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/21/2013	PrepBy: SDW
BENZENE	ND		1	UG/L	1	7/21/2013 18:42
ETHYLBENZENE	ND		1	UG/L	1	7/21/2013 18:42
M+P-XYLENE	ND		1	UG/L	1	7/21/2013 18:42
O-XYLENE	ND		1	UG/L	1	7/21/2013 18:42
TOLUENE	0.56	J	1	UG/L	1	7/21/2013 18:42
Surr: 4-BROMOFLUOROBENZENE	99		85-115	%REC	1	7/21/2013 18:42
Surr: DIBROMOFLUOROMETHANE	99		84-118	%REC	1	7/21/2013 18:42
Surr: TOLUENE-D8	103		85-115	%REC	1	7/21/2013 18:42
HEXANE EXTRACTABLE MATERIAL--GRAVIMETRIC			EPA1664		Prep Date: 7/25/2013	PrepBy: BCH
OIL AND GREASE	ND		5.6	MG/L	1	7/25/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: BW-19
Legal Location:
Collection Date: 7/19/2013 17:30

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-39
Matrix: SOLID
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
PCBS			SW8082		Prep Date: 7/25/2013	PrepBy: TLB
AROCLOR-1016	ND		33	UG/KG	1	7/26/2013 18:44
AROCLOR-1221	ND		67	UG/KG	1	7/26/2013 18:44
AROCLOR-1232	ND		33	UG/KG	1	7/26/2013 18:44
AROCLOR-1242	ND		33	UG/KG	1	7/26/2013 18:44
AROCLOR-1248	ND		33	UG/KG	1	7/26/2013 18:44
AROCLOR-1254	ND		33	UG/KG	1	7/26/2013 18:44
AROCLOR-1260	ND		33	UG/KG	1	7/26/2013 18:44
Surr: TETRACHLORO-M-XYLENE	77		61-120	%REC	1	7/26/2013 18:44
Surr: DECACHLOROBIPHENYL	30	*	56-130	%REC	1	7/26/2013 18:44

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: BW-19
Legal Location:
Collection Date: 7/19/2013 17:30

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-40
Matrix: LEACHATE
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/26/2013	PrepBy: SDW
BENZENE	ND		10	UG/L	10	7/26/2013 19:05
Surr: DIBROMOFLUOROMETHANE	101		84-118	%REC	10	7/26/2013 19:05
Surr: TOLUENE-D8	104		85-115	%REC	10	7/26/2013 19:05
Surr: 4-BROMOFLUOROBENZENE	101		85-115	%REC	10	7/26/2013 19:05

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: Trip Blank
Legal Location:
Collection Date: 7/19/2013

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-41
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260_25		Prep Date: 7/21/2013	PrepBy: SDW
BENZENE	ND		1	UG/L	1	7/21/2013 15:34
ETHYLBENZENE	ND		1	UG/L	1	7/21/2013 15:34
M+P-XYLENE	ND		1	UG/L	1	7/21/2013 15:34
O-XYLENE	ND		1	UG/L	1	7/21/2013 15:34
TOLUENE	ND		1	UG/L	1	7/21/2013 15:34
Surr: 4-BROMOFLUOROBENZENE	97		85-115	%REC	1	7/21/2013 15:34
Surr: DIBROMOFLUOROMETHANE	100		84-118	%REC	1	7/21/2013 15:34
Surr: TOLUENE-D8	103		85-115	%REC	1	7/21/2013 15:34

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: Trip Blank
Legal Location:
Collection Date: 7/19/2013

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-41
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	L - LCS Recovery below lower control limit.
Y2 - Chemical Yield outside default limits.	H - LCS Recovery above upper control limit.
W - DER is greater than Warning Limit of 1.42	P - LCS, Matrix Spike Recovery within control limits.
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	N - Matrix Spike Recovery outside control limits
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	NC - Not Calculated for duplicate results less than 5 times MDC
G - Sample density differs by more than 15% of LCS density.	B - Analyte concentration greater than MDC.
D - DER is greater than Control Limit	B3 - Analyte concentration greater than MDC but less than Requested MDC.
M - Requested MDC not met.	
LT - Result is less than requested MDC but greater than achieved MDC.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.

Diesel Range Organics:

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: Trip Blank
Legal Location:
Collection Date: 7/19/2013

Date: 29-Jul-13
Work Order: 1307328
Lab ID: 1307328-41
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
G - A pattern resembling gasoline was detected in this sample. D - A pattern resembling diesel was detected in this sample. M - A pattern resembling motor oil was detected in this sample. C - A pattern resembling crude oil was detected in this sample. 4 - A pattern resembling JP-4 was detected in this sample. 5 - A pattern resembling JP-5 was detected in this sample. H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest. L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest. Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products: - gasoline - JP-8 - diesel - mineral spirits - motor oil - Stoddard solvent - bunker C						

ALS Environmental -- FC

Client: CTL Thompson

Work Order: 1307328

Project: FC05859.001-205 4060 CLR Erie

Date: 7/29/2013 2:11:

QC BATCH REPORT

Batch ID: **EX130725-3-1** Instrument ID **Balance** Method: **EPA1664**

LCS	Sample ID: EX130725-3				Units: MG/L		Analysis Date: 7/25/2013			
Client ID:	Run ID: EX130725-3A						Prep Date: 7/25/2013		DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	39.9	5	39.9		100	78-114			18	

LCSD	Sample ID: EX130725-3				Units: MG/L		Analysis Date: 7/25/2013			
Client ID:	Run ID: EX130725-3A				Prep Date: 7/25/2013		DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	40.5	5	39.9		102	78-114	39.9	1	18	

MB	Sample ID: EX130725-3				Units: MG/L		Analysis Date: 7/25/2013			
Client ID:	Run ID: EX130725-3A				Prep Date: 7/25/2013		DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	ND	5								

The following samples were analyzed in this batch:

1307328-35	1307328-36	1307328-37
1307328-38		

Client: CTL Thompson
Work Order: 1307328
Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **EX130725-8-1** Instrument ID **Balance** Method: **SW9071**

LCS	Sample ID: EX130725-8			Units: MG/KG			Analysis Date: 7/26/2013			
Client ID:	Run ID: EX130725-8A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2050	100	2060		100	80-120			20	

LCSD	Sample ID: EX130725-8			Units: MG/KG			Analysis Date: 7/26/2013			
Client ID:	Run ID: EX130725-8A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2040	100	2060		99	80-120	2050	1	20	

MB	Sample ID: EX130725-8			Units: MG/KG			Analysis Date: 7/26/2013			
Client ID:	Run ID: EX130725-8A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	ND	100								

MS	Sample ID: 1307328-3			Units: MG/KG			Analysis Date: 7/26/2013			
Client ID: GP-11 (5')	Run ID: EX130725-8A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2200	107	2210	110	97	80-120			20	

MSD	Sample ID: 1307328-3			Units: MG/KG			Analysis Date: 7/26/2013			
Client ID: GP-11 (5')	Run ID: EX130725-8A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2230	107	2220	110	98	80-120	2200	1	20	

The following samples were analyzed in this batch:

1307328-1	1307328-2	1307328-3
1307328-4	1307328-5	1307328-6
1307328-7	1307328-8	1307328-9
1307328-10		

Client: CTL Thompson
Work Order: 1307328
Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **EX130725-7-1** Instrument ID **Pest-1** Method: **SW8082**

LCS		Sample ID: EX130725-7			Units: UG/KG			Analysis Date: 7/26/2013 17:36		
Client ID:		Run ID: PT130726-11			Prep Date: 7/25/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
AROCLOR-1016	130	33.3	133		97	64-126			50	
AROCLOR-1260	141	33.3	133		106	60-130			50	
Surr: TETRACHLORO-M-XYLEN	15.5		16.7		93	61-120				
Surr: DECACHLOROBIPHENYL	15.1		16.7		91	56-130				

LCSD		Sample ID: EX130725-7			Units: UG/KG			Analysis Date: 7/26/2013 17:59		
Client ID:		Run ID: PT130726-11			Prep Date: 7/25/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
AROCLOR-1016	128	33.3	133		96	64-126	130	1	50	
AROCLOR-1260	141	33.3	133		105	60-130	141	1	50	
Surr: TETRACHLORO-M-XYLEN	15.3		16.7		92	61-120		1		
Surr: DECACHLOROBIPHENYL	15.3		16.7		92	56-130		1		

MB		Sample ID: EX130725-7			Units: UG/KG			Analysis Date: 7/26/2013 16:28		
Client ID:		Run ID: PT130726-11			Prep Date: 7/25/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
AROCLOR-1016	ND	33								
AROCLOR-1221	ND	67								
AROCLOR-1232	ND	33								
AROCLOR-1242	ND	33								
AROCLOR-1248	ND	33								
AROCLOR-1254	ND	33								
AROCLOR-1260	ND	33								
Surr: TETRACHLORO-M-XYLEN	15.3		16.7		92	61-120				
Surr: DECACHLOROBIPHENYL	14.9		16.7		89	56-130				

The following samples were analyzed in this batch:

1307328-39

Client: CTL Thompson
 Work Order: 1307328
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130721-4-1** Instrument ID **HPV1** Method: **SW8260_25**

LCS		Sample ID: VL130721-4			Units: %REC			Analysis Date: 7/21/2013 14:24		
Client ID:		Run ID: VL130721-4A			Prep Date: 7/21/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZE	25.1		25		100	85-115				
Surr: DIBROMOFLUOROMETHA	24.8		25		99	84-118				
Surr: TOLUENE-D8	25.5		25		102	85-115				
BENZENE	9.55	1	10		96	83-117			20	
ETHYLBENZENE	9.8	1	10		98	81-113			20	
M+P-XYLENE	19.9	1	20		100	82-115			20	
O-XYLENE	10	1	10		100	81-115			20	
TOLUENE	9.56	1	10		96	82-113			20	

LCSD		Sample ID: VL130721-4			Units: %REC			Analysis Date: 7/21/2013 14:47		
Client ID:		Run ID: VL130721-4A			Prep Date: 7/21/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZE	24.9		25		100	85-115		1		
Surr: DIBROMOFLUOROMETHA	25.1		25		100	84-118		1		
Surr: TOLUENE-D8	25.4		25		102	85-115		0		
BENZENE	9.65	1	10		96	83-117	9.55	1	20	
ETHYLBENZENE	9.62	1	10		96	81-113	9.8	2	20	
M+P-XYLENE	19.6	1	20		98	82-115	19.9	2	20	
O-XYLENE	9.95	1	10		99	81-115	10	1	20	
TOLUENE	9.38	1	10		94	82-113	9.56	2	20	

MB		Sample ID: VL130721-4			Units: %REC			Analysis Date: 7/21/2013 15:10		
Client ID:		Run ID: VL130721-4A			Prep Date: 7/21/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZE	24.5		25		98	85-115				
Surr: DIBROMOFLUOROMETHA	24.9		25		99	84-118				
Surr: TOLUENE-D8	25.6		25		102	85-115				
BENZENE	ND	1								
ETHYLBENZENE	ND	1								
M+P-XYLENE	ND	1								
O-XYLENE	ND	1								
TOLUENE	ND	1								

The following samples were analyzed in this batch:

1307328-35	1307328-36	1307328-37
1307328-38	1307328-41	

Client: CTL Thompson
 Work Order: 1307328
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130723-2-4** Instrument ID **HPV1** Method: **SW8260**

LCS		Sample ID: VL130723-2			Units: UG/KG			Analysis Date: 7/23/2013 11:34		
Client ID:		Run ID: VL130723-2A			Prep Date: 7/23/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	40.1	5	40		100	73-126			30	
TOLUENE	37.9	5	40		95	71-127			30	
ETHYLBENZENE	37.2	5	40		93	74-127			30	
M+P-XYLENE	75.4	5	80		94	79-126			30	
O-XYLENE	37.6	5	40		94	77-125			30	
Surr: DIBROMOFLUOROMETHA	50.2		50		100	61-134				
Surr: TOLUENE-D8	48.5		50		97	57-135				
Surr: 4-BROMOFLUOROBENZE	50.6		50		101	52-151				

LCSD		Sample ID: VL130723-2			Units: UG/KG			Analysis Date: 7/23/2013 11:56		
Client ID:		Run ID: VL130723-2A			Prep Date: 7/23/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	37.3	5	40		93	73-126	40.1	7	30	
TOLUENE	34.8	5	40		87	71-127	37.9	9	30	
ETHYLBENZENE	34.2	5	40		85	74-127	37.2	8	30	
M+P-XYLENE	69.5	5	80		87	79-126	75.4	8	30	
O-XYLENE	34.8	5	40		87	77-125	37.6	8	30	
Surr: DIBROMOFLUOROMETHA	50.6		50		101	61-134		1		
Surr: TOLUENE-D8	48.8		50		98	57-135		1		
Surr: 4-BROMOFLUOROBENZE	50.8		50		102	52-151		0		

MB		Sample ID: VL130723-2			Units: UG/KG			Analysis Date: 7/23/2013 12:17		
Client ID:		Run ID: VL130723-2A			Prep Date: 7/23/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	ND	5								
TOLUENE	ND	5								
ETHYLBENZENE	ND	5								
M+P-XYLENE	ND	5								
O-XYLENE	ND	5								
Surr: DIBROMOFLUOROMETHA	49.2		50		98	61-134				
Surr: TOLUENE-D8	48.5		50		97	57-135				
Surr: 4-BROMOFLUOROBENZE	49.3		50		99	52-151				

The following samples were analyzed in this batch:

1307328-1	1307328-2	1307328-3
1307328-4	1307328-5	1307328-6

Client: CTL Thompson
Work Order: 1307328
Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130724-2-2** Instrument ID **HPV1** Method: **SW8260**

LCS	Sample ID: VL130724-2				Units: UG/KG		Analysis Date: 7/24/2013 13:39			
Client ID:	Run ID: VL130724-2A				Prep Date: 7/24/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	40.9	5	40		102	73-126			30	
TOLUENE	39	5	40		97	71-127			30	
ETHYLBENZENE	38.3	5	40		96	74-127			30	
M+P-XYLENE	77.2	5	80		96	79-126			30	
O-XYLENE	38.6	5	40		97	77-125			30	
Surr: DIBROMOFLUOROMETHA	50.2		50		100	61-134				
Surr: TOLUENE-D8	48.8		50		98	57-135				
Surr: 4-BROMOFLUOROBENZE	51.1		50		102	52-151				

LCSD	Sample ID: VL130724-2				Units: UG/KG		Analysis Date: 7/24/2013 14:01			
Client ID:	Run ID: VL130724-2A				Prep Date: 7/24/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	41.4	5	40		103	73-126	40.9	1	30	
TOLUENE	38.4	5	40		96	71-127	39	1	30	
ETHYLBENZENE	37.6	5	40		94	74-127	38.3	2	30	
M+P-XYLENE	76	5	80		95	79-126	77.2	2	30	
O-XYLENE	38.3	5	40		96	77-125	38.6	1	30	
Surr: DIBROMOFLUOROMETHA	51.2		50		102	61-134		2		
Surr: TOLUENE-D8	49.3		50		99	57-135		1		
Surr: 4-BROMOFLUOROBENZE	50.5		50		101	52-151		1		

MB	Sample ID: VL130724-2				Units: UG/KG		Analysis Date: 7/24/2013 14:23			
Client ID:	Run ID: VL130724-2A				Prep Date: 7/24/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	ND	5								
TOLUENE	ND	5								
ETHYLBENZENE	ND	5								
M+P-XYLENE	ND	5								
O-XYLENE	ND	5								
Surr: DIBROMOFLUOROMETHA	49.5		50		99	61-134				
Surr: TOLUENE-D8	48.3		50		97	57-135				
Surr: 4-BROMOFLUOROBENZE	49.2		50		98	52-151				

Client: CTL Thompson
 Work Order: 1307328
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130724-2-2** Instrument ID **HPV1** Method: **SW8260**

MS		Sample ID: 1307328-10				Units: UG/KG		Analysis Date: 7/24/2013 16:20		
Client ID: S-18		Run ID: VL130724-2A				Prep Date: 7/24/2013		DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	22.6	4.66	37.3	4.8	61	73-126			30	*
TOLUENE	17.7	4.66	37.3	4.8	47	71-127			30	*
ETHYLBENZENE	13.1	4.66	37.3	4.8	35	74-127			30	*
M+P-XYLENE	25.5	4.66	74.6	4.8	34	79-126			30	*
O-XYLENE	13	4.66	37.3	4.8	35	77-125			30	*
Surr: DIBROMOFLUOROMETHA	48.1		46.6		103	61-134				
Surr: TOLUENE-D8	45.7		46.6		98	57-135				
Surr: 4-BROMOFLUOROBENZE	46.1		46.6		99	52-151				

MSD	Sample ID: 1307328-10				Units: UG/KG		Analysis Date: 7/24/2013 16:42			
Client ID: S-18		Run ID: VL130724-2A				Prep Date: 7/24/2013		DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	24.4	4.88	39	4.8	62	73-126	22.6	8	30	*
TOLUENE	19.1	4.88	39	4.8	49	71-127	17.7	8	30	*
ETHYLBENZENE	14	4.88	39	4.8	36	74-127	13.1	7	30	*
M+P-XYLENE	27.8	4.88	78.1	4.8	36	79-126	25.5	8	30	*
O-XYLENE	14	4.88	39	4.8	36	77-125	13	7	30	*
Surr: DIBROMOFLUOROMETHA	50.2		48.8		103	61-134		4		
Surr: TOLUENE-D8	47.6		48.8		98	57-135		4		
Surr: 4-BROMOFLUOROBENZE	47.8		48.8		98	52-151		4		

The following samples were analyzed in this batch:

1307328-7	1307328-8	1307328-10
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Client: CTL Thompson
 Work Order: 1307328
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130725-2-1** Instrument ID **HPV1** Method: **SW8260**

LCS	Sample ID: VL130725-2				Units: UG/KG		Analysis Date: 7/25/2013 12:20			
Client ID:	Run ID: VL130725-2A				Prep Date: 7/25/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	41.2	5	40		103	73-126			30	
TOLUENE	39.1	5	40		98	71-127			30	
ETHYLBENZENE	38.4	5	40		96	74-127			30	
M+P-XYLENE	77.6	5	80		97	79-126			30	
O-XYLENE	39	5	40		98	77-125			30	
Surr: DIBROMOFLUOROMETHA	50.1		50		100	61-134				
Surr: TOLUENE-D8	48.6		50		97	57-135				
Surr: 4-BROMOFLUOROBENZE	50.5		50		101	52-151				

LCSD	Sample ID: VL130725-2			Units: UG/KG			Analysis Date: 7/25/2013 12:44			
Client ID:	Run ID: VL130725-2A						Prep Date: 7/25/2013		DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	40.1	5	40		100	73-126	41.2	3	30	
TOLUENE	37.9	5	40		95	71-127	39.1	3	30	
ETHYLBENZENE	37.1	5	40		93	74-127	38.4	4	30	
M+P-XYLENE	75.2	5	80		94	79-126	77.6	3	30	
O-XYLENE	38.1	5	40		95	77-125	39	2	30	
Surr: DIBROMOFLUOROMETHA	50.7		50		101	61-134		1		
Surr: TOLUENE-D8	48.1		50		96	57-135		1		
Surr: 4-BROMOFLUOROBENZE	50.1		50		100	52-151		1		

MB	Sample ID: VL130725-2			Units: UG/KG			Analysis Date: 7/25/2013 13:05			
Client ID:		Run ID: VL130725-2A				Prep Date: 7/25/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	ND	5								
TOLUENE	ND	5								
ETHYLBENZENE	ND	5								
M+P-XYLENE	ND	5								
O-XYLENE	ND	5								
Surr: DIBROMOFLUOROMETHA	49.5		50		99	61-134				
Surr: TOLUENE-D8	48		50		96	57-135				
Surr: 4-BROMOFLUOROBENZE	48.9		50		98	52-151				

Client: CTL Thompson
 Work Order: 1307328
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130725-2-1** Instrument ID **HPV1** Method: **SW8260**

MS	Sample ID: 1307328-9			Units: UG/KG			Analysis Date: 7/25/2013 13:51			
Client ID: S-17	Run ID: VL130725-2A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	35.2	5.04	40.4	5.1	87	73-126			30	
TOLUENE	34	5.04	40.4	5.1	84	71-127			30	
ETHYLBENZENE	25.5	5.04	40.4	5.1	63	74-127			30	*
M+P-XYLENE	50.7	5.04	80.7	5.1	63	79-126			30	*
O-XYLENE	24.2	5.04	40.4	5.1	60	77-125			30	*
Surr: DIBROMOFLUOROMETHA	53.9		50.4		107	61-134				
Surr: TOLUENE-D8	53.9		50.4		107	57-135				
Surr: 4-BROMOFLUOROBENZE	41.8		50.4		83	52-151				

MSD	Sample ID: 1307328-9			Units: UG/KG			Analysis Date: 7/25/2013 14:15			
Client ID: S-17	Run ID: VL130725-2A			Prep Date: 7/25/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	24.2	5.02	40.2	5.1	60	73-126	35.2	37	30	++
TOLUENE	18	5.02	40.2	5.1	45	71-127	34	61	30	++
ETHYLBENZENE	12.2	5.02	40.2	5.1	30	74-127	25.5	71	30	++
M+P-XYLENE	23.4	5.02	80.4	5.1	29	79-126	50.7	74	30	++
O-XYLENE	11.5	5.02	40.2	5.1	29	77-125	24.2	71	30	++
Surr: DIBROMOFLUOROMETHA	53.7		50.2		107	61-134		0		
Surr: TOLUENE-D8	50.4		50.2		100	57-135		7		
Surr: 4-BROMOFLUOROBENZE	47.9		50.2		95	52-151		14		

The following samples were analyzed in this batch:

1307328-9

Client: CTL Thompson
Work Order: 1307328
Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130726-4-3** Instrument ID **HPV1** Method: **SW8260_25**

LCS	Sample ID: VL130726-4				Units: UG/L		Analysis Date: 7/26/2013 17:30			
Client ID:		Run ID: VL130726-4A				Prep Date: 7/26/2013		DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	9.72	1	10		97	83-117			20	
Surr: DIBROMOFLUOROMETHA	25.8		25		103	84-118				
Surr: TOLUENE-D8	25.2		25		101	85-115				
Surr: 4-BROMOFLUOROBENZE	24.4		25		98	85-115				

LCSD	Sample ID: VL130726-4				Units: UG/L		Analysis Date: 7/26/2013 17:53			
Client ID:	Run ID: VL130726-4A				Prep Date: 7/26/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	9.33	1	10		93	83-117	9.72	4	20	
Surr: DIBROMOFLUOROMETHA	25.9		25		104	84-118		0		
Surr: TOLUENE-D8	25.8		25		103	85-115		3		
Surr: 4-BROMOFLUOROBENZE	25		25		100	85-115		3		

MB		Sample ID: EX130725-4				Units: UG/L		Analysis Date: 7/26/2013 18:41			
Client ID:		Run ID: VL130726-4A				Prep Date: 7/26/2013		DF: 10			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual	
BENZENE	ND	10									
Surr: DIBROMOFLUOROMETHA	256		250		102	84-118					
Surr: TOLUENE-D8	258		250		103	85-115					
Surr: 4-BROMOFLUOROBENZE	251		250		100	85-115					

MB	Sample ID: VL130726-4				Units: UG/L		Analysis Date: 7/26/2013 18:17			
Client ID:		Run ID: VL130726-4A				Prep Date: 7/26/2013		DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	ND	1								
Surr: DIBROMOFLUOROMETHA	25.8		25		103	84-118				
Surr: TOLUENE-D8	25.9		25		104	85-115				
Surr: 4-BROMOFLUOROBENZE	24.6		25		99	85-115				

The following samples were analyzed in this batch:

1307328-40



1307521

GC/MS Volatiles:

The samples were analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

All acceptance criteria were met.

Oil and Grease:

The samples were prepared and analyzed according to SW-846, 3rd Edition procedures based on Method SW-9071 and utilizing the current revision of SOP 640.

All acceptance criteria were met.

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1307521

Client Name: CTL Thompson

Client Project Name: 4060 CLR Erie

Client Project Number: FC05859.001-205

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
GP-16 (10')	1307521-1		SOIL	19-Jul-13	12:15
GP-16 (15')	1307521-2		SOIL	19-Jul-13	12:20
GP-16 (20')	1307521-3		SOIL	19-Jul-13	12:30



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202/6

PROJECT NAME	4060 CLR Erie	SAMPLER	Dana Harris	DATE	7/19/13	Form 202/6	WORKORDER #	1307328
PROJECT NO.	FC 05859.001-205	SITE ID	-	TURNAROUND	Standard/1 wk.		PAGE	1 of 4
COMPANY NAME	CTL Thompson	EDD FORMAT	-				DISPOSAL	
SEND REPORT TO	Dana Harris	PURCHASE ORDER	-				By Lab or	Return to Client
ADDRESS	351 Linden St. #140	BILL TO COMPANY	SAA					
CITY/STATE/ZIP	Fort Collins, CO 80524	INVOICE ATTN TO						
PHONE	970-206-9455	ADDRESS						
FAX		CITY/STATE/ZIP						
E-MAIL	dharris@ctlthompson.com	PHONE						
		FAX						
		E-MAIL						

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC
①	GP-9 (5')	S	7/19/13	0805	2		
②	GP-10 (5')	S	7/19/13	0810	2		
③	GP-11 (5')	S	7/19/13	0815	2		
④	GP-12 (5')	S	7/19/13	0820	2		
⑤	GP-13 (5')	S	7/19/13	0825	2		
⑥	GP-14 (5')	S	7/19/13	0830	2		
⑦	GP-15 (5')	S	7/19/13	0835	2		
⑧	GP-16 (5')	S	7/19/13	0840	2		
⑨	S-17	S	7/19/13	0845	2		
⑩	S-18	S	7/19/13	0850	2		

*Time Zone (Circle): EST CST MST PST Matrix: O=oil S=sol NS=non-soil solid W=water L=liquid E=extract F=filter

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

Comments:

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035



ALS Laboratory Group

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TF: (907) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202-8

PROJECT NAME	4060 CLR Erie	SAMPLER	Dana Harris	DATE	7/19/13	TURNAROUND	DATE	7/19/13	WORKORDER #	1307328
PROJECT No.	FC05859.001-205	SITE ID		EDD FORMAT					PAGE	2 of 4
COMPANY NAME	CTL Thompson	PURCHASE ORDER		BILL TO COMPANY					DISPOSAL	By Lab or Return to Client
SEND REPORT TO		INVOICE ATTN TO		ADDRESS						
ADDRESS		CITY / STATE / ZIP		PHONE						
CITY / STATE / ZIP		FAX		E-MAIL						
Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC			
(11)	GP-9 (10')	S	7/19/13	0810	2		HOLD			
(12)	GP-9 (15')	S	7/19/13	0820	2		HOLD			
(13)	GP-9 (20')	S	7/19/13	0830	2		HOLD			
(14)	GP-10 (10')	S	7/19/13	0855	2		HOLD			
(15)	GP-10 (15')	S	7/19/13	0905	2		HOLD			
(16)	GP-10 (20')	S	7/19/13	0915	2		HOLD			
(17)	GP-11 (10')	S	7/19/13	0935	2		HOLD			
(18)	GP-11 (15')	S	7/19/13	0945	2		HOLD			
(19)	GP-11 (20')	S	7/19/13	0955	2		HOLD			
(20)	GP-12 (10')	S	7/19/13	1005	2		HOLD			

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	QC PACKAGE (check below)
	LEVEL II (Standard OC)
	LEVEL III (Std OC + forms)
	LEVEL IV (Std OC + forms + raw data)
Preservative Key:	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202-6

PROJECT NAME	4060 CLR ENE	SAMPLER	Dave Harris	DATE	7/19/13	TURNAROUND		WORKORDER #	1307328
PROJECT NO.	FC05851.001-205	SITE ID						PAGE	3 of 4
EDO FORMAT								DISPOSAL	By Lab or Return to Client
PURCHASE ORDER									
BILL TO COMPANY									
INVOICE ATTN TO									
ADDRESS									
CITY / STATE / ZIP									
PHONE									
FAX									
E-MAIL									
Lab ID	Field ID	Matrix	Sample Date/Time	Sample Time/Date	# Bottles	Pres.	QC		
(21)	GP-12 (15')	S	1015	7/19/13	2				
(22)	GP-12 (20')	S	1025	7/19/13	2				
(23)	GP-13 (10')	S	1045	7/19/13	2				
(24)	GP-13 (15')	S	1055	7/19/13	2				
(25)	GP-13 (20')	S	1105	7/19/13	2				
(26)	GP-14 (10')	S	1115	7/19/13	2				
(27)	GP-14 (15')	S	1125	7/19/13	2				
(28)	GP-14 (20')	S	1135	7/19/13	2				
(29)	GP-15 (10')	S	1145	7/19/13	2				
(30)	GP-15 (15')	S	1155	7/19/13	2				

*Time Zone (Circle): EST CST MST PST Matrix O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filler

For metals or anions, please detail analytes below.

Comments:	
QC PACKAGE (check below)	
LEVEL II (Standard QC)	
LEVEL III (Std QC + forms)	
LEVEL IV (Std QC + forms + raw data)	
Preservative Key:	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NH4SO4 7-Other 8-4 degrees C 9-50/55

SIGNATURE	PRINTED NAME	DATE	TIME
<i>[Signature]</i>	Dave Harris	7/19/13	0935
	Lauren Schmitt	7/20/13	0940
RELINQUISHED BY			
RECEIVED BY			
RELINQUISHED BY			
RECEIVED BY			
RELINQUISHED BY			
RECEIVED BY			



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Form 202B

PROJECT NAME	4068 CLR E&E	SAMPLER	Dave Harris	DATE	7/19/13	PAGE	4 of 4	WORKORDER	1307328
PROJECT No.	FC05859.001-205	SITE ID		TURNAROUND		DISPOSAL			
COMPANY NAME	CTL Thompson	EDO FORMAT							
SEND REPORT TO		PURCHASE ORDER							
ADDRESS		BILL TO COMPANY							
CITY / STATE / ZIP		INVOICE ATTN TO							
PHONE		ADDRESS							
FAX		CITY / STATE / ZIP							
E-MAIL		PHONE							
		FAX							
		E-MAIL							

Lab ID	Field ID	Matrix	Sample Depth Time	Sample Time Date	* Bottles	Pres.	QC
(31)	GP-15 (20')	S	1200	7/19/13	2		
(32)	GP-16 (10')	S	1215	7/19/13	2		
(33)	GP-16 (15')	S	1230	7/19/13	2		
(34)	GP-16 (20')	S	1270	7/19/13	2		
(35)	GP-9	W	1330	7/19/13	4		
(36)	GP-11	W	1400	7/19/13	4		
(37)	GP-14	W	1415	7/19/13	4		
(38)	GP-15	W	1425	7/19/13	4		
(39)	BN-19	NS	1730	7/19/13	2		

added per Dave Harris email 7/31/13

Oil & Grease
PCBs
TCLP Benzene
BTEX
8260
907/11/14

40

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

For metals or anions, please detail analytes below.

Comments:	(41) TB
QC PACKAGE (check below)	
LEVEL II (Standard OC)	
LEVEL III (Std OC + forms)	
LEVEL IV (Std OC + forms + raw data)	
Preservative Key:	1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035

RELINQUISHED BY	RECEIVED BY	SIGNATURE	PRINTED NAME	DATE	TIME
			Dave Harris	7/20/13	0935
			Lauren Schmitz	7/20/13	0940
RELINQUISHED BY	RECEIVED BY				
RELINQUISHED BY	RECEIVED BY				
RELINQUISHED BY	RECEIVED BY				



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

1307521 / 7/13/13

Client: CTL Thompson

Workorder No: 1307328

Project Manager: ARW

Initials: LAS Date: 7/20/13

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<u>NO</u>
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO
3. Are Custody seals on sample containers intact?	<u>NONE</u>	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<u>YES</u>	NO
5. Are the COC and bottle labels complete and legible?		<u>YES</u>	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO
7. Were airbills / shipping documents present and/or removable?	<u>PROP OFF</u>	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	<u>N/A</u>	YES	<u>NO</u>
9. Are all aqueous non-preserved samples pH 4-9?	<u>N/A</u>	YES	NO
10. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO
11. Were all samples placed in the proper containers for the requested analyses?		<u>YES</u>	NO
12. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<u>YES</u>	NO
14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	<u>N/A</u>	<u>YES</u>	NO
15. Do any water samples contain sediment? Amount Amount of sediment: ____ dusting ____ moderate ____ heavy	<u>N/A</u>	YES	<u>NO</u>
16. Were the samples shipped on ice?		<u>YES</u>	NO
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <u>#2</u> #4 RAD ONLY		<u>YES</u>	NO
Cooler #: <u>1</u> <u>2</u> <u>3</u>			
Temperature (°C): <u>4.8</u> <u>1.2</u> <u>3.0</u>			
No. of custody seals on cooler: <u>0</u>			
External µR/hr reading: <u>N/A</u>			
Background µR/hr reading: <u>10</u>			
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <u>NA</u> (If no, see Form 008.)			

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

*please see page 2

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: C. Wolf 7/20/13



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CLE

Workorder No: 1304828

Project Manager: ARW

Initials: LS Date: 7/20/13

Additional Information:

(*) 6 Trip Blank not listed on COC. Arrived in cooler #1 added to W.O. as 1307328-41 (2 vials)

NOTE:

No pH adjustments shall be made without prior consent of Project Manager. After pH adjustments, hold metals and radchem samples ≥ 24 hrs. before analysis.

Was the pH of any sample adjusted by the laboratory? (YES (See Table below) / NO

pH Excursion:

[illegible]

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 7/20/13

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (10')
Legal Location:
Collection Date: 7/19/2013 12:15

Date: 05-Aug-13
Work Order: 1307521
Lab ID: 1307521-1
Matrix: SOIL
Percent Moisture: 14.9

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/30/2013	PrepBy: SDW
BENZENE	ND		5.7	UG/KG	1	7/30/2013 17:30
TOLUENE	ND		5.7	UG/KG	1	7/30/2013 17:30
ETHYLBENZENE	ND		5.7	UG/KG	1	7/30/2013 17:30
M+P-XYLENE	ND		5.7	UG/KG	1	7/30/2013 17:30
O-XYLENE	ND		5.7	UG/KG	1	7/30/2013 17:30
Surr: DIBROMOFLUOROMETHANE	104		61-134	%REC	1	7/30/2013 17:30
Surr: TOLUENE-D8	94		57-135	%REC	1	7/30/2013 17:30
Surr: 4-BROMOFLUOROBENZENE	101		52-151	%REC	1	7/30/2013 17:30
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/31/2013	PrepBy: BCH
OIL AND GREASE	ND		120	MG/KG	1	8/1/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (15')
Legal Location:
Collection Date: 7/19/2013 12:20

Date: 05-Aug-13
Work Order: 1307521
Lab ID: 1307521-2
Matrix: SOIL
Percent Moisture: 3.4

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/30/2013	PrepBy: SDW
BENZENE	ND		4.7	UG/KG	1	7/30/2013 17:53
TOLUENE	ND		4.7	UG/KG	1	7/30/2013 17:53
ETHYLBENZENE	ND		4.7	UG/KG	1	7/30/2013 17:53
M+P-XYLENE	ND		4.7	UG/KG	1	7/30/2013 17:53
O-XYLENE	ND		4.7	UG/KG	1	7/30/2013 17:53
Surr: DIBROMOFLUOROMETHANE	101		61-134	%REC	1	7/30/2013 17:53
Surr: TOLUENE-D8	96		57-135	%REC	1	7/30/2013 17:53
Surr: 4-BROMOFLUOROBENZENE	99		52-151	%REC	1	7/30/2013 17:53
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/31/2013	PrepBy: BCH
OIL AND GREASE	ND		100	MG/KG	1	8/1/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (20')
Legal Location:
Collection Date: 7/19/2013 12:30

Date: 05-Aug-13
Work Order: 1307521
Lab ID: 1307521-3
Matrix: SOIL
Percent Moisture: 6.2

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
GC/MS VOLATILES			SW8260		Prep Date: 7/30/2013	PrepBy: SDW
BENZENE	ND		5.2	UG/KG	1	7/30/2013 18:15
TOLUENE	ND		5.2	UG/KG	1	7/30/2013 18:15
ETHYLBENZENE	ND		5.2	UG/KG	1	7/30/2013 18:15
M+P-XYLENE	ND		5.2	UG/KG	1	7/30/2013 18:15
O-XYLENE	ND		5.2	UG/KG	1	7/30/2013 18:15
Surr: DIBROMOFLUOROMETHANE	100		61-134	%REC	1	7/30/2013 18:15
Surr: TOLUENE-D8	95		57-135	%REC	1	7/30/2013 18:15
Surr: 4-BROMOFLUOROBENZENE	98		52-151	%REC	1	7/30/2013 18:15
OIL & GREASE, GRAVIMETRIC			SW9071		Prep Date: 7/31/2013	PrepBy: BCH
OIL AND GREASE	ND		110	MG/KG	1	8/1/2013

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (20')
Legal Location:
Collection Date: 7/19/2013 12:30

Date: 05-Aug-13
Work Order: 1307521
Lab ID: 1307521-3
Matrix: SOIL
Percent Moisture: 6.2

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers

Radiochemistry:

U or ND - Result is less than the sample specific MDC.	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	L - LCS Recovery below lower control limit.
Y2 - Chemical Yield outside default limits.	H - LCS Recovery above upper control limit.
W - DER is greater than Warning Limit of 1.42	P - LCS, Matrix Spike Recovery within control limits.
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	N - Matrix Spike Recovery outside control limits
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	NC - Not Calculated for duplicate results less than 5 times MDC
G - Sample density differs by more than 15% of LCS density.	B - Analyte concentration greater than MDC.
D - DER is greater than Control Limit	B3 - Analyte concentration greater than MDC but less than Requested MDC.
M - Requested MDC not met.	
LT - Result is less than requested MDC but greater than achieved MDC.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.

Diesel Range Organics:

ALS Environmental -- FC

SAMPLE SUMMARY REPORT

Client: CTL Thompson
Project: FC05859.001-205 4060 CLR Erie
Sample ID: GP-16 (20')
Legal Location:
Collection Date: 7/19/2013 12:30

Date: 05-Aug-13
Work Order: 1307521
Lab ID: 1307521-3
Matrix: SOIL
Percent Moisture: 6.2

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
G - A pattern resembling gasoline was detected in this sample. D - A pattern resembling diesel was detected in this sample. M - A pattern resembling motor oil was detected in this sample. C - A pattern resembling crude oil was detected in this sample. 4 - A pattern resembling JP-4 was detected in this sample. 5 - A pattern resembling JP-5 was detected in this sample. H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest. L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest. Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products: - gasoline - JP-8 - diesel - mineral spirits - motor oil - Stoddard solvent - bunker C						

ALS Environmental -- FC

Date: 8/5/2013 10:19:

Client: CTL Thompson

QC BATCH REPORT

Work Order: 1307521

Project: FC05859.001-205 4060 CLR Erie

Batch ID: EX130731-6-1 Instrument ID: Balance Method: SW9071

LCS	Sample ID: EX130731-6				Units: MG/KG			Analysis Date: 8/1/2013		
Client ID:	Run ID: EX130731-6A				Prep Date: 7/31/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2060	100	2060		100	80-120			20	

LCSD	Sample ID: EX130731-6				Units: MG/KG		Analysis Date: 8/1/2013			
Client ID:	Run ID: EX130731-6A				Prep Date: 7/31/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2040	100	2060		99	80-120	2060	1	20	

MB	Sample ID: EX130731-6				Units: MG/KG			Analysis Date: 8/1/2013		
Client ID:	Run ID: EX130731-6A				Prep Date: 7/31/2013			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	100	100								

MS	Sample ID: 1307521-2				Units: MG/KG		Analysis Date: 8/1/2013			
Client ID: GP-16 (15')		Run ID: EX130731-6A				Prep Date: 7/31/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2090	102	2110	100	99	80-120			20	

MSD	Sample ID: 1307521-2				Units: MG/KG		Analysis Date: 8/1/2013			
Client ID: GP-16 (15')		Run ID: EX130731-6A				Prep Date: 7/31/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
OIL AND GREASE	2090	102	2100	100	100	80-120	2090	0	20	

The following samples were analyzed in this batch:

1307521-1	1307521-2	1307521-3
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Client: CTL Thompson
 Work Order: 1307521
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130730-2-1** Instrument ID **HPV1** Method: **SW8260**

LCS	Sample ID: VL130730-2				Units: UG/KG		Analysis Date: 7/30/2013 16:19			
Client ID:		Run ID: VL130730-2A				Prep Date: 7/30/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	43.6	5	40		109	73-126			30	
TOLUENE	40.1	5	40		100	71-127			30	
ETHYLBENZENE	39.2	5	40		98	74-127			30	
M+P-XYLENE	78.3	5	80		98	79-126			30	
O-XYLENE	39.9	5	40		100	77-125			30	
Surr: DIBROMOFLUOROMETHA	51.9		50		104	61-134				
Surr: TOLUENE-D8	48		50		96	57-135				
Surr: 4-BROMOFLUOROBENZE	51.4		50		103	52-151				

LCSD	Sample ID: VL130730-2			Units: UG/KG			Analysis Date: 7/30/2013 16:43			
Client ID:	Run ID: VL130730-2A			Prep Date: 7/30/2013			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	43.2	5	40		108	73-126	43.6	1	30	
TOLUENE	40	5	40		100	71-127	40.1	0	30	
ETHYLBENZENE	39.1	5	40		98	74-127	39.2	0	30	
M+P-XYLENE	79.9	5	80		100	79-126	78.3	2	30	
O-XYLENE	40.3	5	40		101	77-125	39.9	1	30	
Surr: DIBROMOFLUOROMETHA	51.9		50		104	61-134		0		
Surr: TOLUENE-D8	48.5		50		97	57-135		1		
Surr: 4-BROMOFLUOROBENZE	52.1		50		104	52-151		1		

MB	Sample ID: VL130730-2			Units: UG/KG			Analysis Date: 7/30/2013 17:06			
Client ID:	Run ID: VL130730-2A						Prep Date: 7/30/2013		DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	ND	5								
TOLUENE	ND	5								
ETHYLBENZENE	ND	5								
M+P-XYLENE	ND	5								
O-XYLENE	ND	5								
Surr: DIBROMOFLUOROMETHA	50.9		50		102	61-134				
Surr: TOLUENE-D8	47.7		50		95	57-135				
Surr: 4-BROMOFLUOROBENZE	50.8		50		102	52-151				

Client: CTL Thompson
 Work Order: 1307521
 Project: FC05859.001-205 4060 CLR Erie

QC BATCH REPORT

Batch ID: **VL130730-2-1** Instrument ID **HPV1** Method: **SW8260**

MS	Sample ID: 1307521-3				Units: UG/KG		Analysis Date: 7/30/2013 18:38			
Client ID: GP-16 (20')			Run ID: VL130730-2A			Prep Date: 7/30/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	41.4	5.12	40.9	5.2	101	73-126			30	
TOLUENE	37.4	5.12	40.9	5.2	91	71-127			30	
ETHYLBENZENE	36.7	5.12	40.9	5.2	90	74-127			30	
M+P-XYLENE	73.4	5.12	81.9	5.2	90	79-126			30	
O-XYLENE	37.4	5.12	40.9	5.2	91	77-125			30	
Surr: DIBROMOFLUOROMETHA	53.3		51.2		104	61-134				
Surr: TOLUENE-D8	48.4		51.2		95	57-135				
Surr: 4-BROMOFLUOROBENZE	51.7		51.2		101	52-151				

MSD	Sample ID: 1307521-3				Units: UG/KG		Analysis Date: 7/30/2013 19:02			
Client ID: GP-16 (20')			Run ID: VL130730-2A			Prep Date: 7/30/2013			DF: 1	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD	RPD Limit	Qual
BENZENE	41.7	5.15	41.2	5.2	101	73-126	41.4	1	30	
TOLUENE	37.4	5.15	41.2	5.2	91	71-127	37.4	0	30	
ETHYLBENZENE	35.5	5.15	41.2	5.2	86	74-127	36.7	3	30	
M+P-XYLENE	72.2	5.15	82.3	5.2	88	79-126	73.4	2	30	
O-XYLENE	36	5.15	41.2	5.2	88	77-125	37.4	4	30	
Surr: DIBROMOFLUOROMETHA			52.4		51.5	102	61-134		2	
Surr: TOLUENE-D8			48.9		51.5	95	57-135		1	
Surr: 4-BROMOFLUOROBENZE			51.1		51.5	99	52-151		1	

The following samples were analyzed in this batch:

1307521-1	1307521-2	1307521-3
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**REPORT OF MINE SUBSIDENCE STUDY
PROPOSED RANCHWOOD SENIOR COMMUNITY
ERIE, COLORADO
PSI REPORT NUMBER 532-75015**

Prepared For

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April 15, 2007

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1.0 INTRODUCTION

As authorized, Professional Service Industries, Inc. (PSI) has conducted a mine subsidence study for a site proposed for a senior living and health care development in Erie, Colorado. This work was conducted in accordance with our proposal number 532-650049, revised February 26, 2006 which was accepted by Mr. Terry K. Baumeister of Baumeister Guthery L.C. The report, which follows, presents a summary of project information furnished to us, a description of our research and field work, and our conclusions and recommendations relating to the proposed development at the site.



2.0 PROJECT INFORMATION

Based upon our discussions with Mr. Terry Baumeister of Baumeister Guthery, L. C., we understand that a site located northwestern of the intersection of East County Line Road and Leon A. Wurl Parkway in Erie, Colorado is under consideration for the development of a senior living community (see Figure 1 in the Appendix). The site consists of an L-shaped parcel and measures approximately 1,500 feet in the east-west direction and 1,800 feet in the north-south direction. The site is currently a cultivated field. An irrigation ditch bisects the site in a northwest to southeast direction. Overall, site grades fall generally to the east approximately 50 feet over the property limits.

The development proposed for the site includes a primary independent/assisted living center facility in the north central portion of the site. Four outlot parcels planned for future medical offices are located along the east portion of the site. The southwest corner of the property is planned for two future restaurant developments. Two other outlot areas located in the central west and northwest portion of the site are planned for future as yet to be determined development. The remainder of the site will be developed with access drives, paved parking lots, and detention basins.

The Erie and nearby Lafayette areas were extensively mined for coal beginning in the mid 1800s and continuing until the first half of the 20th Century. As a result of the collapse of these old mines over time, the ground surface has experienced subsidence in many areas and can pose a risk to structures built above and within a short lateral distance of undermined areas. The site under consideration for this development is underlain by three coal mines.

The purposes of the current study were as follows:

- Evaluate the lateral extent of existing mines within the site limits through research and field study.
- Characterize the nature of materials above and within the mined zones with a particular emphasis on the size and height of remaining voids within the subsurface profile which may be prone to future collapse.
- Quantify the potential risks of construction within the site relative to future subsidence and subsidence patterns.
- Develop general guidelines for mitigation of subsidence for proposed development.

3.0 RESEARCH

Prior to conducting on-site exploration activities, we researched existing publications, maps, and other available information relating to past mining activity within the site limits. The documents referenced included, but were not limited to the following:

1. ***Coal Mine Subsidence and Land Use in the Boulder-Weld Coalfield***, Boulder and Weld Counties, Colorado, by Amuedo, Ivey, et al., Colorado Geological Survey, 1975.
2. ***Annotated Bibliography of Subsidence Studies over Abandoned Coal Mines in Colorado***, compiled by Hatton and Turney, Information Series 22, Colorado Geological Survey, 1989.
3. ***Report of Mine Subsidence Study, Regency Centers Site***, prepared by PSI, Inc. November 8, 2006.
4. ***Preliminary Geotechnical Engineering Study***, Proposed Shopping Center, Northwest Corner, Leon A. Wurl Parkway And East County Line Road, Erie, Colorado, prepared by Kumar & Associates, Inc., August 19, 2005.
5. ***Preliminary Mine Subsidence Investigation, Proposed Retail Center***, prepared by Western Environment and Ecology, Inc., June 18, 2004.
6. ***Mine Subsidence Investigation, Lumry Estate Property***, prepared by Western Environment and Ecology, Inc., dated November 15, 1994.
7. ***Mine Subsidence Investigation, Lumry Estate Property***, prepared by Western Environment and Ecology, Inc., dated November 15, 1996.

A review of our research findings are presented in the following subsections of this report.

3.1 Site Geology

The site of the proposed development is located within the Denver-Julesburg Basin, a broad area of relatively flat-bedded sedimentary deposits extending to depths of a few hundred feet at the western terminus of the Front Range to several thousands of feet further to the east. The uppermost geologic unit present in the Erie area consists of the Cretaceous Aged Laramie Formation. This formation is composed of interbedded sandstones, claystones, and localized coal seams, and extends to depths of up to about 600 feet.

The primary coal deposits present within the limits of the site are detailed in the following section. The coal seams encountered in each mine were at one time stratigraphically continuous with each other, but due to subsequent growth faulting during continued deposition (listric normal faults occurring well over 50,000 year in the past) the coal seams have been offset from each other. This growth faulting, thus effectively separates the coal mine workings of each mine from each other.

3.2 Mining Activity

Based upon our review of mine maps contained within the above listed references, three mines operated within the limits of the property in the mid to latter part of the 19th Century.

Stewart Mine

The Stewart Mine is located primarily along the northwest portion of the site. This mine reportedly employed the room and pillar method for coal extraction with rooms and intervening pillars were oriented slightly east of north. Mine coal seam thickness was approximately 4 feet, 4 inches. Information with regard to specific depths to mined coal seams is inconclusive, but overburden thicknesses are historically documented to be on the order of 100 feet above the production seam. Access to this mine was from a vertical shaft located to the north of the subject site.

Lister Mine

The Lister Mine is located primarily along the central and east portions site. This mine extracted coal from the Garfield Upper Seam. As with the Stewart Mine, the Lister Mine reportedly employed the room and pillar method for coal extraction with rooms and intervening pillars oriented slightly east of north. The overburden thickness above the production coal seam depth for the Lister Mine is historically documented as approximately 80 to 95 feet. The average thickness of coal removed is approximately 5.5 feet. Access to this mine was from a vertical shaft on the property. However, the location of this shaft is no longer visible.

Garfield Mine

Portions of the Garfield mine underlie the southern part of the site. The Garfield Mine was located a short distance to the west of East County Line Road and north of the present Leon A. Wurl Parkway. Within the eastern portions of this mine, coal was reportedly extracted from both the Garfield Upper Seam and the Garfield Lower Seams. Access to the mine was by means of a vertical shaft located offsite near the southern property line, about 650 feet west of East County Line Road.

The "A" Seam, which is about 3 to 4 feet thick and located at a depth of about 35 to 40 feet below site grades was not documented as mined. The Garfield Upper Seam is about 4 feet thick and located at a depth of about 60 to 90 feet below grade, and the Garfield Lower Seam is about 4-1/2 to 6 feet in thickness, and located about 85 to 115 feet below site grades.

Coal within these two seams was also reportedly removed using the "room and pillar" method. Mine maps suggest that the rooms and pillars associated with the Garfield Mine were oriented slightly east of due north. Historic mine maps suggest that the pillars were largely removed prior to closure of this mine and that the roofs of the mine are largely collapsed.

These mines were reportedly closed prior to 1900. A composite map indicating the approximate locations and extent of the mines is presented on Figure 2 in the Appendix.

3.3 Coal Mine Subsidence

Surface subsidence due to underground mining is a common occurrence, and has been observed in many areas within the Boulder-Weld County Coal Field area. Subsidence generally takes two forms. In the first, strata overlying the mines either deform or fracture, sloughing downward into the open "rooms". The surface reflection of such movement is generally smaller in magnitude than the vertical height of the underground opening, but projects outward well beyond the limits of the mine. The shape of the surface subsidence is dependent upon the size of the underground opening, the degree to which rock or soil "bulks" (decreases in density as a result of collapse), the depth of the mine below the ground surface, and the stiffness of the overlying strata. Typically, shallower mines tend to exhibit more severe and localized evidence of subsidence than do mines at greater depth.

The second subsidence phenomenon is the formation of "sinkholes". Sinkholes are typically circular or elongated surface depressions that typically form within a very short period of time and can cause substantial damage to overlying structures or utilities supported at grade. Sinkholes typically form as a result of the progressive collapse of underground voids, or through the erosion of soils into voids underground. In either case, the near surface geologic strata form an arch and support underground voids for some period of time. As the void progresses upward due to sloughing or subsurface erosion, the arch weakens and finally collapses. Sinkholes are typically associated with loosely filled abandoned mine shafts, but may also occur where mines are overlain by thin or weak rock or by substantial thicknesses of soil.

In the Erie area, a substantial number of studies have been conducted to assess the risk of future ground subsidence resulting from the collapse or filling of voids. In general, these studies have found that "rooms" created by mining activities have generally collapsed over the years and that remaining voids are typically only a few inches in height and of limited lateral extent. It is thought that the claystones present above and below the coal seams expanded into the open voids over time as a result of both stress relief and through swell as they were exposed to free water. Regardless of the cause, the risk of future ground subsidence has been substantially mitigated through the natural bulking of collapsed materials into subsurface voids, followed by expansion of claystones above and below mined seams.

In the mid 1970's the Colorado Geological Survey, conducted an extensive review of mining activity and associated ground subsidence issues within Boulder and Weld Counties. As part of this review, various criteria were considered in the assessment of the potential for future subsidence and permissible land use above abandoned mines. Among these criteria included the depth to coal seams, the thickness of seams, age of the mine and past reported subsidence activity, among others. The results of these studies were presented in their 1975 publication, *Coal Mine Subsidence and Land Use in the Boulder-Weld Coalfield*. Relative risks assigned three categories as summarized below:

1. **Severe** – Sites located in areas with this designation are prone to significant and sudden subsidence and are likely to cause significant damage to or failure of buried utilities and overlying structures.
2. **Moderate** – These sites are prone to subsidence that may occur gradually, but could result in significant damage to overlying structures.
3. **Low** – Sites with this designation pose the risk of some long term subsidence, but may be suitable for construction with appropriate engineering design features and allowances for on-going maintenance and repair.

The entire Boulder-Weld Coalfield area was appraised relative to the criteria noted above and a map was developed to present the relative risk factors for specific areas. Based upon our review of this map, the site lies within an area designated as Low Risk as defined above.

3.4 Previous Studies

The site and portions of the site has been the subject of several past geotechnical and geologic studies, the reports of which are listed as references 3, 4, 5, and 6 at the beginning of this section. As part of these studies, the site and adjacent parcels were explored by means of 21 deep and 6 relatively shallow borings. Borings conducted for the Kumar and Associates (Kumar) study were located on an adjacent parcel of land located south of the subject site and were all terminated in near surface claystone and sandstone bedrock materials well above the mined intervals. The deeper borings, were performed by PSI, Inc. (7 borings completed in 2006) and also Western Environment and Ecology (4 borings completed in 1994, and 10 additional completed in 1996).

The borings for Western Environment and Ecology were advanced in conjunction with a mine subsidence study and included lithologic logs and caliper tests to evaluate the height of remaining voids. Five of the borings were advanced within the subject site. The remaining nine borings were advanced in parcels adjacent to the subject site. These deeper borings typically found that mined areas had largely collapsed. No open voids were found in the explored locations. Caliper tests typically only revealed minor enlargement of the drilled holes within the mined intervals. A loss of drilling water was noted in Borings BH-8 and BH-9 suggesting that the materials currently present within the mined intervals are somewhat loose and porous.

The PSI borings were advanced in conjunction with a coal mine subsidence study for an adjacent parcel. Of the 7 deep borings advanced for this study, three, B-5, B-5a and B-6 penetrated mined areas. The remaining borings were drilled in unmined areas or through apparent pillars. Boring B-6 found disturbed claystone bedrock within an apparent mined interval at a depth of 76.5 to 81.5 below existing grade, with no apparent voids. In boring B-5, an apparent access tunnel was penetrated and augers were noted to advance rapidly a vertical distance of about 3 to 4 feet beginning at a depth of about 82 feet below grade. Boring B-5a was offset about 5 feet to the east and the material within the softer zone beneath a depth of 82 feet was sampled and tested with the split barrel sampler. The mined interval was found to be filled with coal fragments and highly disturbed claystone bedrock that had degraded to a stiff soil like material. No open voids were noted within the mined interval.

Groundwater was checked in each of the boreholes shortly after drilling and after a 1 to 4 day stabilization period. Groundwater was typically found at depths of about 28 to 33 feet below existing grades.

The locations of the deeper borings from these previous studies are presented on Figure 3 in the Appendix.

4.0 SITE EXPLORATION

Our field exploration program conducted for this project was executed in two phases. First, a program of surface wave geophysical testing was conducted in order to verify or refute the extent of mining activity within the site, and to search for evidence of subsurface voids or zones of soft or loose materials associated with past mining activity. Second, a program of deep soil test borings was conducted to calibrate and expand upon the results of the geophysical testing to provide information for an analysis of the risk and potential magnitude of future subsidence. Details relating to our field exploration program are presented in the following sections.

4.1 Geophysical Testing

For the purposes of generally characterizing the subsurface profile within the limits of the site, we employed the Refraction Microtremor (ReMi) method, which is a form of Multi Channel Analysis of Surface Waves (MASW). The ReMi method is described in Louie, 2001 (Louie, J. N., 2001, Faster, Better: Shear-wave velocity to 100 meters depth from refraction microtremor arrays: Bulletin of the Seismological Society of America, v. 91, p. 347-364). The method uses standard P-wave recording equipment and ambient noise to produce average one-dimensional shear-wave profiles down to depths of up to 100 meters. No specific energy source is required to develop or record ambient background noise.

A wavefield transformation data processing technique, and an interactive Rayleigh-wave dispersion modeling tool exploits the most effective aspects of the microtremor, spectral analysis of surface waves. The slowness-frequency wavefield transformation is particularly effective in allowing accurate selection of Rayleigh-wave phase-velocity dispersion curves despite the presence of waves propagating across the linear array at high apparent velocities, higher-mode Rayleigh waves, body waves, air waves, and incoherent noise.

4.1.1 Testing Program and Analysis Procedures

Sixteen array locations were used to evaluate conditions within this site. Three of the lines were oriented parallel to County Line Road in the vicinity of Outlots 6 through 10, and were spaced approximately one hundred feet apart. Five of the lines were oriented southwest to northeast, in the approximate location of the proposed independent/assisted living center facility. Two additional lines were oriented southeast to northwest in the vicinity of Outlot 2. The remaining six lines were located in the southwest portion of the site, running north/south in the vicinity of Outlots 1 and 3. Each of the lines was 345 feet long. Locations of seismic lines are shown on Figure 3.

The seismic lines incorporated 24 geophone locations along each array. Data were recorded in 20 second sample intervals, with a 2 millisecond sampling rate per channel. In all, over one hundred and fifty recordings were made and evaluated for this study. All lines used a geophone spacing of 15 feet. Once collected, the data were checked for their fidelity. To assure that a robust profile was being made, both individual recordings and multiple summed (stacked) recordings were evaluated.

The first step in processing the raw data is to produce a velocity spectrum of the recorded data. This process involves computing a surface wave, phase velocity dispersion spectral ratio image by p-tau (slant spectra) and Fourier transforms across the array. This process is described in Louie, 2001. The resulting spectrum is in the slowness-frequency (p-f) domain. The p-f transformation helps segregate the Rayleigh wave arrivals from other seismic arrivals.

The normal mode dispersion can be seen as distinct from the aliasing and wave-field transformation truncation artifact trends in the spectra. Selection of the surface wave dispersion curve is done along the envelope of the lowest phase velocities. The data processing includes interactively forward-modeling the normal mode dispersion data using the selections shown on the p-f plots. The modeling process iterates on phase velocity at each period (or frequency), to provide a shear velocity profile as a function of depth beneath the site. The process and resulting velocity profiles are even able to identify velocity inversions within the subsurface profile.

Two dimensional velocity profiles were created for each of the lines. This was accomplished by processing, interpreting and creating models for about twenty subsets of each line, and then combining them into a single profile. The purpose of the two dimensional profiles was to provide details of the shear wave velocities across the array length to depths of over 100 feet. It should be noted that due to the nature of the analysis, it is not possible to interpret conditions at the extreme ends of the seismic array. As a consequence, the results omit the 60 feet from each end of the lines.

4.1.2 Geophysical Testing Results and Evaluation

The results of the geophysical testing are presented on individual profiles that indicate variations in shear wave velocities along and below the ground surface along the length of the array by means of various colors. By way of interpretation, materials with higher shear wave velocities (claystone and coal) are indicated by red, yellow and yellow-green shades. Materials with lower shear wave velocities (soil and fractured or bulked rock) are indicated by light to dark blue shades. Very low shear wave velocities, representing very loose soils and other materials with some voids, are indicated by pink shades.

Individual profiles with our interpretation of material types and a legend presenting the colors associated with various shear wave velocities are presented on Figures 7 through 22 in the Appendix. Fence diagrams of select groupings of profiles are presented on Figures 23 and 24.

A geophysical profile developed for a normal, unmined area would typically include a relatively flat and level dark blue to pink colored stratum to depths of about 20 to 30 feet representing overburden soils, followed by light blue, green, and yellow colored strata, representing sedimentary bedrock.

In general the geophysical testing program conducted within this site revealed only limited zones of low shear wave velocity at depth. Additionally, the geophysical data did not detect any zones of very soft or loose materials within or immediately above mined intervals. This suggests that collapse of the mines is generally complete and that there are few, if any, open voids of significant lateral extent.

In general, the geophysical testing program confirmed that the site is underlain by fully or partially collapsed access tunnels rather than aerially extensive mined rooms. This is consistent with the available historical mine map.

4.2 Drilling Program

Following completion of the site geophysical testing program, the obtained data was reviewed, and a representative number of locations were selected for further exploration using drilling procedures. In general, boring locations were selected where geophysical records suggested the presence of intact, unmined strata, access tunnels or large mined-out areas. Exploration was focused on areas that are proposed to be developed with buildings as these were deemed more critical to overall acceptance of the site.

4.2.1 Field Exploration

To calibrate the results of our geophysical program and to provide additional data for our evaluation of the site, we drilled a total of six soil test borings within the site in the approximate locations indicated on Figure 3. Borings were located in the field by taping distances from seismic survey line stakes.

Borings were advanced by means of 4 inch diameter solid stem augers. At selected intervals, the soil and bedrock materials were sampled and tested by means of the Standard Penetration Test. In the test, either a standard split barrel sampler, or Modified California Sampler were driven into the subsurface strata using a 140 pound hammer dropping a vertical distance of 30 inches. The number of blows required to drive the sampler 12 inches is known as the Standard Penetration Resistance or N-value and is an indication of the consistency of the soil and rock. In general, overburden soils and the upper portion of the bedrock were sampled at 10 to 20 foot intervals. At depths beginning at about 60 to 65 feet, sample intervals were reduced to better define the condition of the subsurface strata and to detect unmined seams of coal, if present. All borings were advanced to approximate depths of 100 to 120 feet. Logs of the borings are presented in graphical form on Figure 4. Notes and the Legend for the logs are presented on Figures 5 and 6.

4.2.2 Exploration Results

The soil test borings encountered overburden soils from the ground surface to a depth of about 14 to 44 feet below current grades. The soils typically were found to consist of silty and clayey sands with some localized seams of clean sand and gravel. Beneath the overburden soils, sandy claystone bedrock was penetrated by all of the borings. The bedrock was found to be relatively hard, consistently exhibiting N-values in excess of 100 blows per foot. Neither open voids nor soft zones were encountered during the exploratory drilling activities.

Groundwater was encountered in the borings at depths ranging from approximately 27 to 65 feet beneath the existing ground surface during drilling operations. It should be noted that it is possible for the groundwater table to fluctuate during the year depending upon climatic and rainfall conditions and changes to surface topography and drainage patterns. Additionally, discontinuous zones of perched water may exist, or develop,

within the overburden materials. The groundwater levels presented in this report are the levels that were measured at the time of our field activities. We recommend that the Contractor determine the actual groundwater levels at the site at the time of the construction activities.

5.0 OBSERVATIONS/ANALYSIS

As noted in the Research section of this report, a number of studies have been performed in the past both by state regulatory agencies and private consulting firms in an effort to characterize subsidence risk of areas underlain by abandoned coal mine in the northern Front Range area. A summary of observations determined by previous and current site specific subsidence studies follows:

- Of the 27 deep borings advanced within or adjacent to the site, only three borings (PSI-6, PSI-5 and offset boring PSI-5A as denoted on Figure 3) were characterized as exhibiting soft drilling conditions at depths of 76.5 to 81.5 and 82 to 86 feet below existing grades, respectively. The remaining 25 deep borings advanced did not encounter soft drilling conditions or open voids.
- The ReMi data obtained did not reveal the presence of large, extensive voids underlying the site that might collapse in the future and pose a significant hazard to overlying structures.
- Historic documentation does not include descriptions significant previous or currently undergoing subsidence within the site area (sinkholes, depressions, closed basins, etc.), including the single family residences located in the northern portion of the Sunwest Subdivision, which is inferred as being underlain by portions of the Stewart mine workings.

Based upon the data obtained by means of the geophysical testing program, as well as the information from the borings drilled during this and previous studies, it is apparent that the mines within this site have substantially or completely in-filled from bulked overlying materials and floor heave from expansive claystone bedrock since they were closed in the latter part of the 19th Century.

It is probable that some voids or zones of loose soil-like materials remain within the mined seams such as was encountered in test borings PSI-5 and PSI-5A, drilled within an adjacent site. The largest of these loose zones appear to be associated with access tunnels where the overlying claystone bedrock is sufficiently strong and intact to partially bridge the limited lateral spans. In other parts of the mine, where pillars were largely removed, collapse is nearly complete with only thin zones of loose soil or small voids in the mined interval.

The major risk to development within this site is the potential for any remaining open voids to collapse over time and result in subsidence of the ground surface. The sections, which follow, present an overview of our analyses of potential void collapse and the resulting effects of such collapse projecting to the ground surface.

5.1 Void Size

It is likely that some of the access tunnels or mined areas have not completely collapsed, are largely filled with soil, but may contain open voids that are not detectable

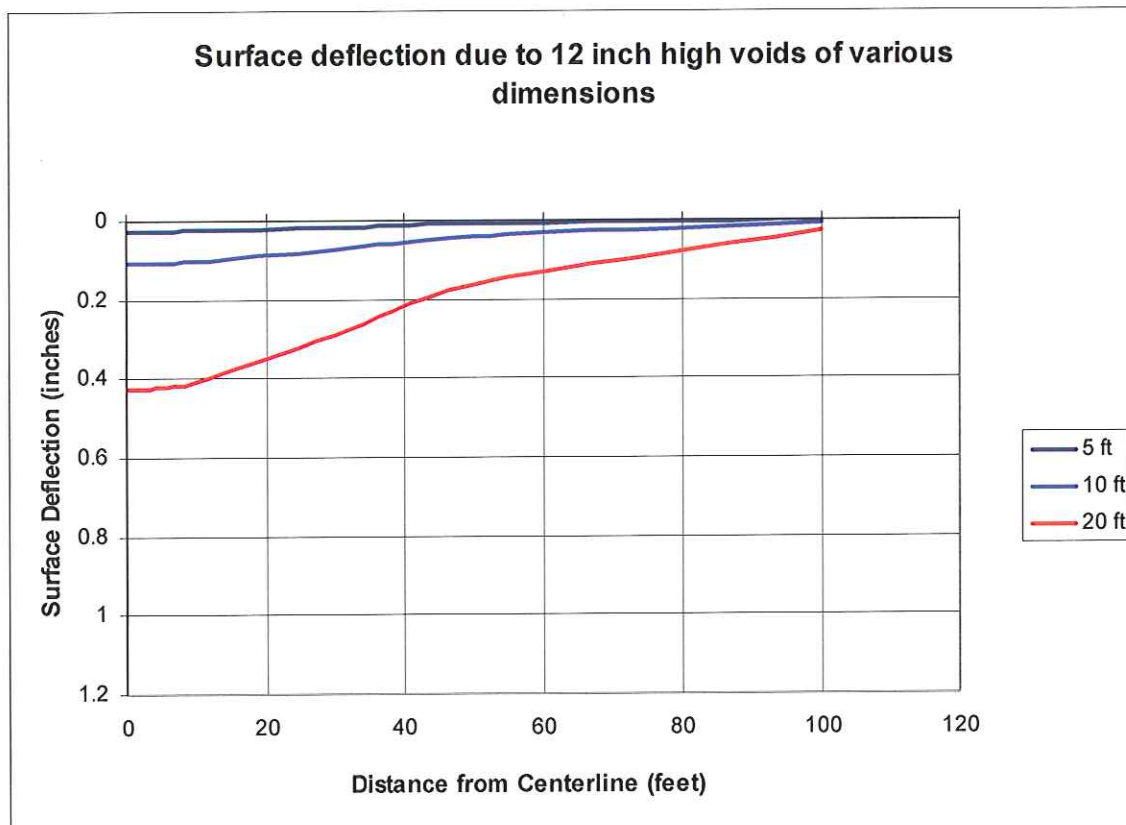
by geophysical methods. For this condition, we evaluated the effects associated with the collapse of 1 foot high voids with lateral dimensions ranging from 5 to 20 feet.

5.2 Evaluation Procedures

Given the age of the mines within this site and the significant collapse noted to date, we have not employed traditional mine collapse/subsidence methodologies in our study. Rather, we have used a numerical model intended to define the potential effects of underground openings on the known overlying strata. The evaluation considered the effects of the collapse of isolated voids and their effects on ground subsidence. These analyses are presented in the following sections.

5.2.1 Subsidence resulting from Void Collapse

In areas that have been substantially undermined, the overlying rock strata have partially collapsed and cannot be considered continuous for support of overburden soils over voids. For isolated voids of limited lateral extent within these mined areas, we employed conventional stress distribution models developed by Westergaard to evaluate surface subsidence assuming voids will eventually collapse completely. The following graph presents a summary of the results of our analyses of surface subsidence considering the total collapse of square voids 1 foot in height.



As may be noted, for a 20 foot by 20 foot void, 1 foot in height, a total settlement of the ground surface of about ½ inch would be anticipated above the center of the void. A differential settlement of about 0.15 inches over 20 feet would be expected at the point of maximum curvature. This translates to a distortion of 0.000625 or 1/1600. For the 20 foot wide tunnel having a void height of 1 foot, a maximum deflection of about 1 inch would occur at the ground surface. The maximum distortion with be about 0.3 inches in 20 feet or about 1/800.

The following table, adapted from the U S Navy Design Manual NAVFAC DM7.01 presents the allowable range of distortion of buildings that may result from normal building settlements or ground subsidence:\

<i>Distortion (settlement/column spacing)</i>	<i>Description</i>
1/650	Limit for multistory rigid concrete frame structures
1/300	Limit where first cracking in panel walls is to be expected
1/150	Limit where structural damage of buildings is to be feared

Based upon this table, the subsidence and resulting distortion of the ground surface from the range of voids considered would be well within the allowable tolerance for typical structures.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of our review of existing information, our field studies, and associated analyses, we conclude that the subject site is suitable for development provided that the buildings consider the risks of some future subsidence from the continued collapse of existing voids. Our evaluation suggests that existing voids within the site are likely of limited lateral and vertical extent and should not pose the risk of significant future localized or widespread subsidence. However, due to the past use of the site and the limitations of exploratory techniques, future collapse of existing voids and related ground subsidence cannot be completely discounted. The following sections of this report present recommendations to reduce the risk of future subsidence and to design buildings that will be less prone to damage, should subsidence occur.

6.1 Site Grading

As noted in previous sections of this report, most subsurface openings have been partially or totally filled with fractured or swelling claystone from above and below the mined intervals. Some voids likely remain, but are relatively stable in their current condition. Significant grading activities could result in changes in the state of stress within the bedrock zone or at the level of mines, where collapse rock predominates. Such changes in stress could cause existing voids to collapse and result in a renewed sequence of ground subsidence events. Consequently, to the extent possible, we recommend that site excavation and filling be minimized within the site limits. Specifically, cuts and fills should generally be limited to 10 feet in areas known to be underlain by mine works.

The access shaft for the Garfield Mine is located within the southwestern corner of the property. It is not known how the shaft was closed. We recommend that this area be excavated to the level of bedrock, which is about 30 feet below current grades, and the shaft opening examined. The access shaft for the Lister mine is inferred to be located in the northwest portion of the site, but the exact location is not known. Previous to site grading, the grading contractor should be aware that the abandon shaft may be encountered. It may be necessary to employ special procedures, such as compaction grouting, soil reinforcement, or other technique to properly seal shafts and allow for support of overlying structures.

6.2 Building Sizes and Structural Systems

Ground subsidence generally does not pose a significant risk to structures unless the differential movements exceed that which is allowable for structures of various types. As was noted in the previous section of this report, future ground subsidence is expected to be relatively minor and should be within tolerable limits for most structures. However, the settlements associated with subsidence will be in addition to normal building settlements, and the combined total and differential settlements may cause cosmetic damage to structures. To reduce the potential for the damaging effects of ground subsidence, we recommend that buildings constructed within undermined areas be limited in size. For this site, we recommend that all buildings, except the large retirement center, incorporate a maximum dimension of 100 feet. Longer buildings may

be built as part of this complex, but should incorporate construction joints at a maximum 100 foot spacing to allow individual sections to settle independently of each other.

All buildings should incorporate an interior steel frame structural system. Such structures are relatively flexible and can tolerate significant differential movements prior to experiencing distress. Concrete masonry units may be used as exterior load bearing walls. However, they should be supported on relatively rigid strip footing foundations incorporating short reinforced stem walls. Such walls should be capable of spanning localized differential ground movements. Based upon our analyses and incorporating a reasonable factor of safety, we recommend that walls be designed to allow for up to ½ inch of differential movement in a 50 foot span.

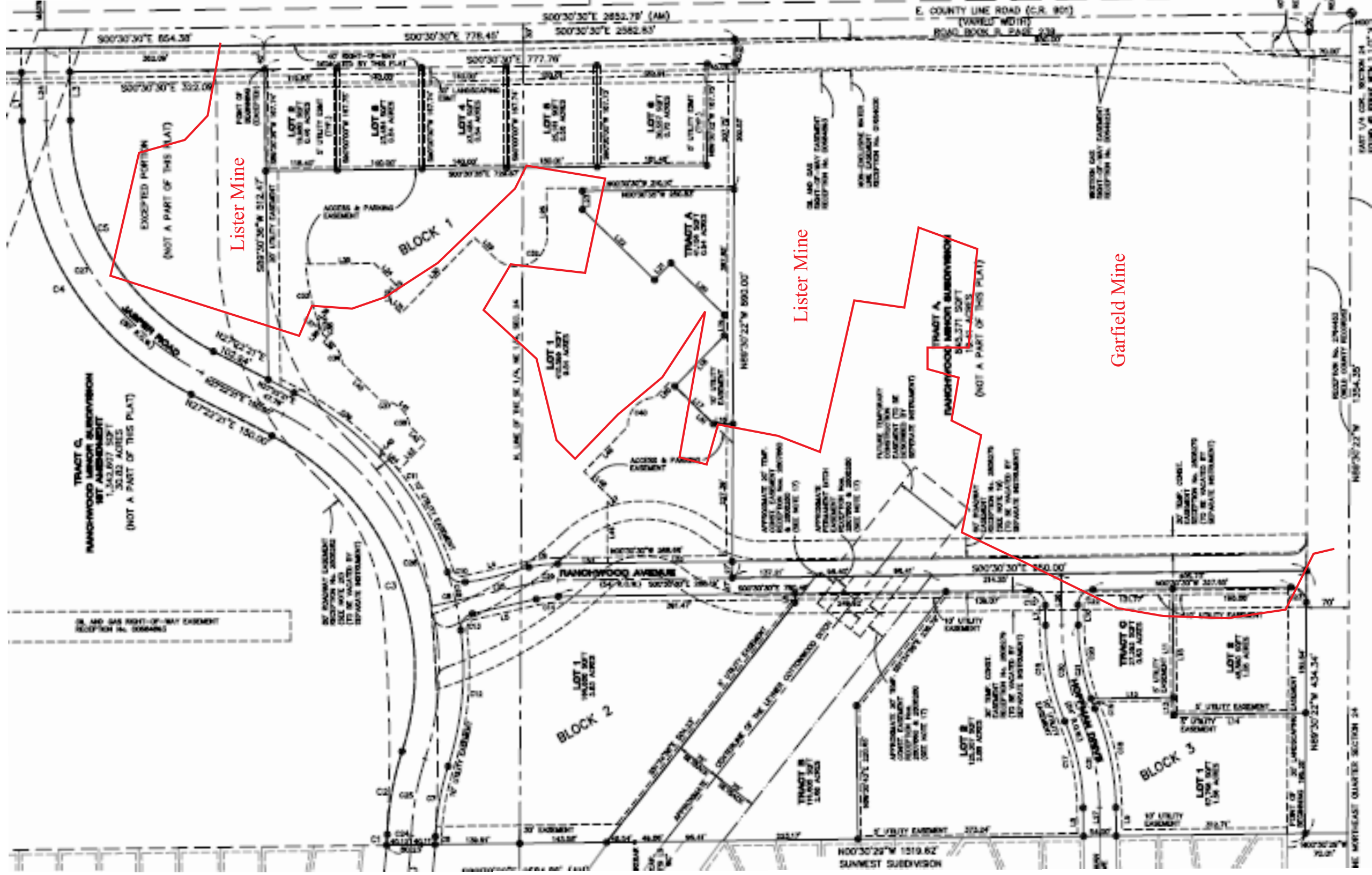
6.3 Additional Study

As the design of the retirement development moves forward, consideration needs to be given to the unique subsurface conditions present within this site relative to their effects on site grading, structural design, and other factors. A final geotechnical study that may involve additional field exploration and evaluation should be conducted for the final site and building configurations.

7.0 LIMITATIONS

PSI warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

This report has been prepared for the exclusive use of Baumeister Guthery L.C. for the specific application to the proposed Ranchwood Senior Community Development complex in Erie, Colorado.



Scale in feet
0 500

WESTERN ENVIRONMENT
AND ECOLOGY, INC.
2217 West Powers Avenue
Littleton, Colorado 80120

FIGURE 1
Ranchwood Preliminary Plat
Erie, Colorado

Native Tree and Vegetation Survey: Not applicable, there are no trees on the site.

Geotech Study WESTERN ENVIRONMENT AND ECOLOGY, INC

June 18, 2004

Jeff Reed
Regency Centers
1873 South Bellaire Street, Suite 600
Denver, Colorado 80222

Subject: Preliminary Mine Subsidence Investigation, Proposed Retail Center Section 24, Township 1 North, Range 69 West, Erie, Colorado. Western Environment and Ecology, Inc. Project Number 358-001-01.

Dear Mr. Reed:

Western Environment and Ecology, Inc. (Western Environment) has prepared the following Preliminary Mine Subsidence Investigation for Regency Centers (Regency) proposed grocery anchored retail development located in Section 24 of Township 1 North, Range 69 West, Erie, Colorado (Figure 1). This letter presents the results of seventeen borings completed on or adjacent to the property from 1987 to 2003. These borings were performed for the Erie Eight Limited Partnership (ATEC, 1987), Charles R. Travis (Western Environment, 1996), Community Development Group LLC (Western Environment, 2004) and Doug Lyle (Western Environment, 2003). This investigation was authorized following your approval of Western Environments proposal Number 04-055, dated May, 27th, 2004. Additionally, the results of a meeting between yourself, and Tom Medsker representing Regency Centers and Gary Behlen Public Works Director for the Town of Erie held on May 26, 2004 are incorporated in the report.

Western Environment performed a study on the subject property entitled "Mine Subsidence Investigation, Lumry Estate Property" dated November 15, 1996 (revised July 15, 1997). The following utilizes the results of this investigation and incorporates boring and core logs, geotechnical test results from adjacent sites, and a coal pillar stability analysis. Particular emphasis is placed on determining the long term stability of the remaining pillars and evaluating the maximum roof spans that could remain. The results presented in this letter, following your review and approval, will be integrated into a final project report that will include data from additional borings.

Three abandoned mines are known to exist beneath the Regency Project. These mines are referred to in files maintained by the Colorado Geological Survey and the Colorado Division of Mines as the Garfield #1, Garfield #2, and the Lister Mines. The Lister Mine began operations in 1894 and continued through 1902. Total production was placed at 81,429 tons with a maximum yearly production of 17,122 tons in 1899. The production shaft is shown to occur north of the Regency Project. No surface feature associated with this shaft can be identified. However, soil discoloration and debris associated with mining activities is observed at the inferred shaft location. The average coal thickness was five feet six inches. The last owner of record was the Lister Coal Company.

The Garfield #1 workings were accessed from the Garfield Shaft No.1 located on the Regency Project (Figure 2). Geological Survey records indicate that production began in 1883 and continued through 1897. Total production was shown to be 122,711 tons. The original mine

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map specified that production occurred from the "Upper Seam". However, the results of the two borings currently completed on the Regency Center Project (Western Environment, 1996) did not identify two levels of mining. This could indicate that the Garfield #1 and Garfield #2 Mines extracted coal from the same seam, the existing borings missed the "upper workings, or the Garfield #1 Mine map is inaccurate. The last owner of the Garfield # 1 Mine is the Garfield Coal Company.

The Garfield #2 Mine produced from 1892 through 1905 when it officially closed on June 5th. Total production was recorded to be 181,444 tons. Extraction occurred through a 84 foot double compartment shaft located approximately 600 feet east of the project.

Five distinct geologic units were encountered during drilling on the Regency and adjacent properties. The first and uppermost unit is a sandy clay soil approximately 5 feet thick. The composition of this material is extremely variable across the site.

The next lower unit, which has a gradational contact with the surficial soils, consists of light brown, medium to fine-grained clayey sand, possibly of aeolian origin. This sand occurs between 5 and 20 feet in depth and averages approximately 5 to 8 feet thick. Its composition, like the surficial soil, is highly variable across the site. The engineering characteristics of this unit will need evaluation due to the potential for consolidation and loss of bearing capacity upon saturation. Beneath the aeolian sand, are gravels ranging from 10 to 20 feet in thickness. These gravels are water saturated and vary in diameter from approximately 1/4 inch to 1 inch.

The next unit encountered is the clays, silts, fine-grained sands and coals of the Cretaceous-age Laramie Formation. The contact between the Laramie and the recent deposits occurs between 15 and 40 feet in depth. The first coal encountered, the Upper Garfield seam, was between 65 to 90 feet in depth. The average thickness of this seam was approximately 5 feet. The Lower Garfield seam was penetrated between 95 to 125 feet. This seam also averaged approximately 5 feet. In the northern portion of the Regency property, the Lister Mine seam was encountered between 70 and 80 feet in depth. This seam correlates with the Upper Garfield seam.

The lowest stratigraphically significant unit was the Laramie/ Fox Hills Contact. It's depth, in those holes which intersected the contact, ranged between 125 to 180 feet. The upper Fox Hills Formation is characterized by light gray fine to very fine-grained quartzose sandstone.

The following Table presents the depth to the top of the Upper Garfield Seam developed from the four different investigations.

Table 1
Depth and Elevation to Top of Garfield Mine Upper Seam
Regency Centers, Erie Project

HOLE NUMBER	DEPTH TO UPPER GARFIELD SEAM	ELEVATION OF UPPER SEAM
BH-3	90'	5003'
BH-7	86'	5000'
BH-8*	64'	5004"

BH-9*	70'	4997'
BH-14	65'	4995'
X-1	93'	4999'
X-3	92	4993'
X-5	80'	4996'
LP-1	70'	4993'
LP-2	78'	4978'
G-1	70'	4985'
G-2	75'	4987'
G-8	65'	4992'
G-11	67'	4986'
G-17	65'	4988'
G-18	78'	4980'
G-19	80'	4977'

* these borings occur on the Regency Center Project

Western Environment acquired NX core samples from three borings completed on the adjacent Erie Commons project and from the Wildflower Subdivision in Frederick, Colorado. The holes were cored from between 30 to 100 feet through the mined interval. In addition to the lithologic and geophysical logs for these borings, detailed core descriptions were prepared and are attached. Thirty samples of claystone, sandstone and coal were submitted to Advanced Terra Testing Inc. in Lakewood, Colorado and Soils and Materials Consultants, Inc. in Arvada, Colorado. These samples were selected for unconfined compression testing and moisture/density analysis. Twenty two of the samples were chosen for unconfined compression testing. Laboratory data sheets are attached to this report.

To develop a comprehensive data set of geotechnical results, Western Environment chose to present the information documented in Dr. Gordon Matheson's paper entitled "Observations on the Location of Chimney Subsidence Sinkhole Development Along the Colorado Front Range" (1986), and the results of core sample analysis recently completed on the Community Development Group, Erie Commons Project (Western Environment, 2004) and the Wildflower Subdivision (Western Environment, 2004). The following table provides a list of the average results from the three referenced investigations.

Table 2, Average Rock (Wet) Density Comparison

	Matheson (1986)	Erie Commons (2004)	Wildflower (2004)
Claystone	141 pcf	134 pcf	135 pcf
Sandstone	144 pcf	166 pcf	135 pcf
Coal	83 pcf	83 pcf	91 pcf

Table 3, Average Unconfined Compressive Strength

	Matheson (1987)	Erie Commons (2004)	Wildflower (2004)
Claystone	775 psi	1093 psi	696 psi
Sandstone	1450 psi	not tested	2111 psi
Coal	2640 psi	greater than 1377 psi*	1670 psi

* The sample strength exceeded the compression frame capacity

Based upon the comparison of these data, Western Environment chose to use the average density for sandstone and claystone of **140 pcf** as the density of the roof rock in the Boulder/Weld Coal Field. As more data are developed, a ratio of sandstone, claystone and coal densities may provide a more accurate confining pressure value.

Unconfined compressive strength data appears to vary somewhat between the different investigations. However, it is our opinion the variance is a result of sample size, not significant differences in rock strength. Based upon this variability, Western Environment chose to use the average of the values presented above for claystone (**854 psi**) and sandstone (**1,780 psi**).

In his paper entitled "Pillar Design and Coal Strength" (Mark and Barton, 1997) Dr. Christopher Mark compared the results of over 4000 unconfined (uniaxial) compressive strength test results to case studies of coal mine pillar performance. This investigation included the analysis of pillar performance utilizing widely accepted pillar strength formulas (Bieniawski 1968) that incorporate uniaxial strength data from laboratory samples. In his conclusions Dr. Mark states "**that laboratory testing should not be used to determine coal pillar strength**". This conclusion is made because coal is "notoriously difficult to test due to mirco-fractures, cleats, bedding planes, partings shears and small faults." Furthermore, even though the range of compressive strengths vary greatly (Salamon 1991, Galvin 1995, and Mark 1990), the back calculated in-situ coal strength falls between the very narrow range of 780 psi and 1,070 psi. and that **900 psi** should be the default value for coal (Mark and Barton 1997).

The estimation of rock mass (pillar) strength is not a straight forward comparison of unconfined compressive strength data and cross sectional pillar dimension. Matheson (1986) chose to "back calculate" a range of rock mass strengths from recorded floor failures of varying rock types. This method is further described by Terzaghi and Peck (1948) and Vesic (1970). The results reported by Matheson conclude "**roof failure is the most critical failure mode** followed by floor failure" for Boulder/Weld mines. Dr. Matheson continues "**The mine pillars should be the most stable...** which

is consistent with verbal descriptions provided by miners”.

The Pittsburgh Research Center of the National Institute for Occupational Safety and Health developed the Analysis of Retreat Mining Pillar Stability (ARMPS) computer program. This program was specifically prepared to aid in planning for retreat methods of coal production. Simple input values are required to calculate “stub” pillar size maintaining a safety factor of 1.0 while utilizing a default uniaxial strength value of 900 psi. The results can be conservative because it is likely that the actual “stubs” could be smaller than the calculated size, realizing that the “working” safety factor would be less than 1.0.

The mining patterns of the Garfield and Lister mines would indicate that the retreat mining method was attempted. Therefore, Western Environment has chosen to utilize this program in back-calculating pillar and roof stability of the Garfield and Lister Mines. Western Environment first determined the average chain pillar width and the average room pillar width from measurements of the original mine maps. This resulted in the average chain pillar and room pillar having a dimension of 30' X 60' and 15' X 114' respectively.

To determine the minimum size of the “stubs” occurring following retreat mining, Western Environment sequentially reduced the cross cut spacing input for the ARMPS from the average room width and length until a safety factor of approximately 1.0 was achieved. The other documented input values, including seam thickness (5.5'), depth of cover (70') and overburden load (140 pcf), were used. This resulted in the dimension of the stubs (the smallest possible pillars left in-place) being 3' X 15'. Western Environment does not conclude that the actual mining of the Garfield and Lister Mines resulted in these “stub” sizes. However, we do argue that pillars of this size would remain stable under the loading conditions present at the site, particularly due to the documented roof collapse that would reduce pillar stress and provide support. The attached Figures 3 presents a conceptual layout of the Garfield/Lister Mines using the measured pillar dimensions and the ARMPS calculated “stub” size.

Unfortunately no records exist as to the dimensions of the “stubs” produced during retreat mining of the Garfield and Lister Mines. However, Tomlinson (1933) indicates that in active Boulder/Weld mines, stub size varies from 5' X 15' to 15' X 36'. The calculated minimum stub dimensions from the ARMPS program appears consistent with this contemporary record

Therefor, assuming that pillar failure is both geo-technically unlikely (Matheson, 1986), theoretically unlikely (ARMPS), and from accounts of the miners (Tomlinson, 1933) empirically unlikely, the most plausible remaining failure mode would be roof falls. Again Matheson (1987) indicates that with “assumed tensile strengths” roof spans for safety factors of near 1.0 would be approximately 12.0'. Tomlinson (1933) also reports room widths ranging from 14 to 18 feet. In his 1998 publication “The Role of Overburden Integrity in Pillar Failure” Dr. van der Merwe states “overburden in sedimentary rocks is vertically jointed and therefor **tensile strength can be ignored**”. He therefor concludes that “**roof failure will occur when horizontal compressive stress exceeds the unconfined compressive strength of the rock.**”

To determine potential maximum roof spans Western Environment back calculated widths until a safety factor of 1 occurs. The attached Figure 4 simplistically relates the vertical load from 70 feet of overburden, at a density of 140 pcf, to horizontal stress at a span width of 18 feet. The resulting compression stress of 911 psi, creates a safety factor of 0.94% using the claystone uniaxial strength data developed for the project (854 psi). This roof span is consistent with predications in the Matheson study and within the range of 14.0 to 18.0 foot room widths reported by Tomlinson (1933).

Using the above data that indicated that the greatest span that could remain is approximately 18', and the minimum stable room pillar dimension is 3' X 15', the maximum potential width for isolated roof failure would be 51.0' (18' + 15' + 18'). Graphically integrating these values, using the actual reported thickness of coal (5.5'), with the British National Coal Board (BNCB) Graphical Strain

Profiling method, the maximum "worst case" subsidence induced surface strain would be 1.03%. This value by its self would preclude any construction on the site. However, all of the borings completed on the site or adjacent projects indicated that **collapse was complete with no open voids.**

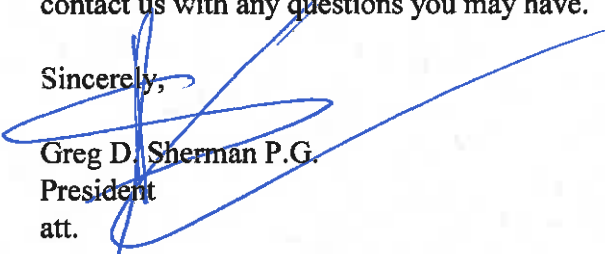
The condition that no void space remains is common for abandoned mines in the Boulder/Weld Field. To provide a conservative evaluation of potential "worst case" subsidence induced surface strain, Western Environment has in the past used the BNCB strain profiling system (Sherman 1986). This method of strain prediction was developed for on-going long wall mining operations. To make the method applicable to abandoned room and pillar and retreat mines, several modifications and assumptions were made.

The first modification is to define the thickness of the void space. The standard method is to use the actual mineable thickness of coal. However, as we indicated, drill holes completed on this and adjacent projects show collapse to be complete. Therefore, to proceed with a "worst case" theoretical analysis, the following assumption was made; any increase in hole diameter greater than 9.0" on a 5.5" boring will be treated as an open void. The amount of "theoretical" void for all holes intercepting the mine was then averaged. This results in a theoretical void space for 9 of the 17 borings referenced in this report that intersected the mine of **0.40 feet**. Using this value the maximum subsidence induced surface strain is **0.028%**. According to BNCB research, this amount of strain would cause less than appreciable damage to a structure of **70' or less in length** (Figure 6).

On May 26, 2004, yourself, and Tom Medsker representing Regency Centers, Gary Behlen Public Works Director for the Town of Erie and Greg Sherman of Western Environment were present at a meeting to discuss potential development of this site. The meeting resulted in an understanding of the unique geologic conditions of this property and the willingness of the Town to accommodate subsidence resistant structural designs. It was also determined that this report would result a site design that would incorporate these preliminary conclusions and provide a basis for the decision to continue investigations or abandoned the project. The attached Figure 6 presents a proposed project plan that both avoids undermining and locates smaller structures where current data indicates subsidence effects may be reduced. Also shown on Figure 5 are the location of proposed borings required to verify mine location and conditions.

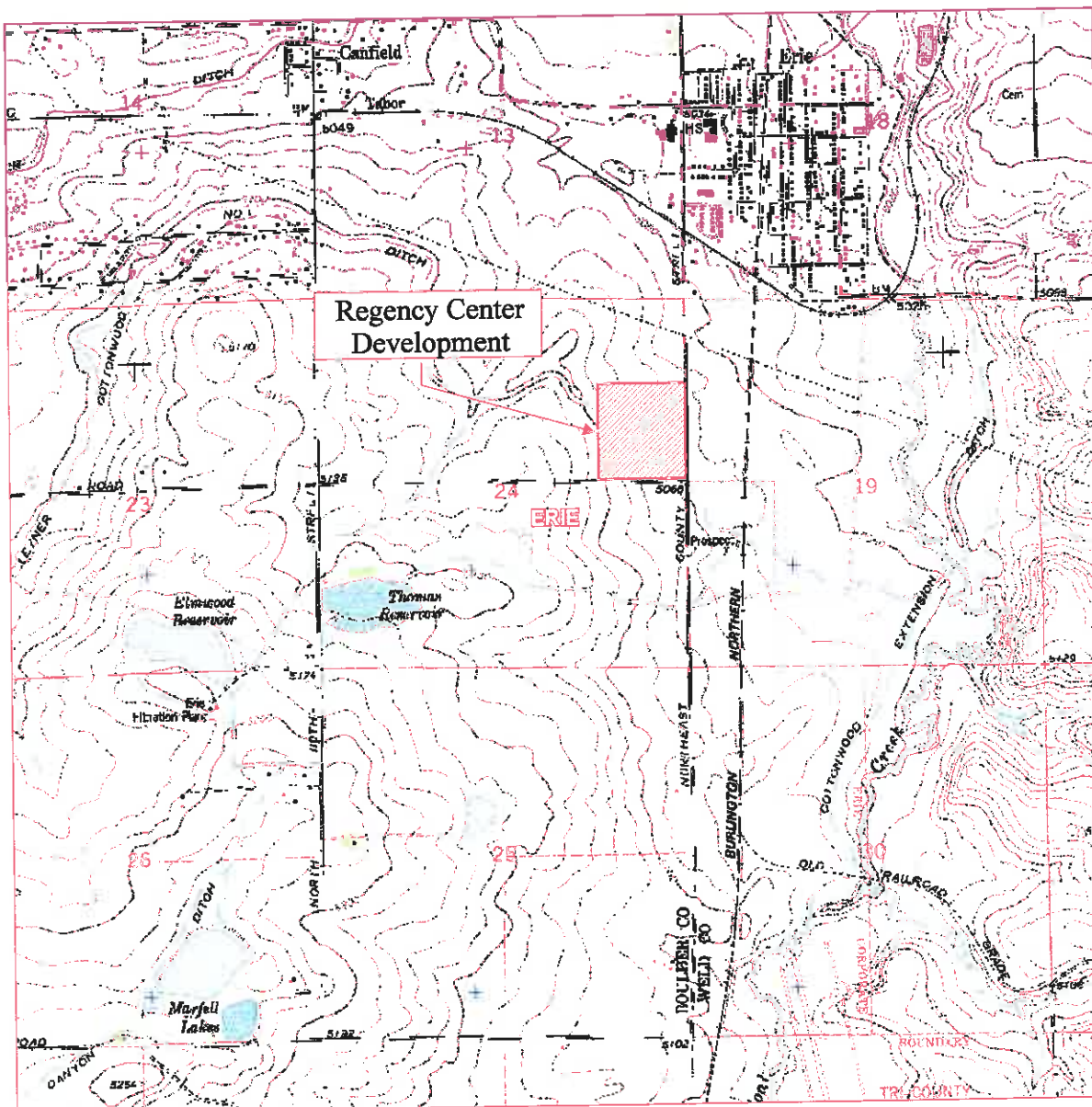
We look forward toward increasing our geotechnical data base with the results from future investigations. Thank you again for your suggestions and participation in this investigation. Please contact us with any questions you may have.

Sincerely,


Greg D. Sherman P.G.
President
att.

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USGS, Erie
Colorado Quadrangles, 1979
From DeLorme 3-D Topoquads, 1999

Scale 1 Inch = 2,500 feet

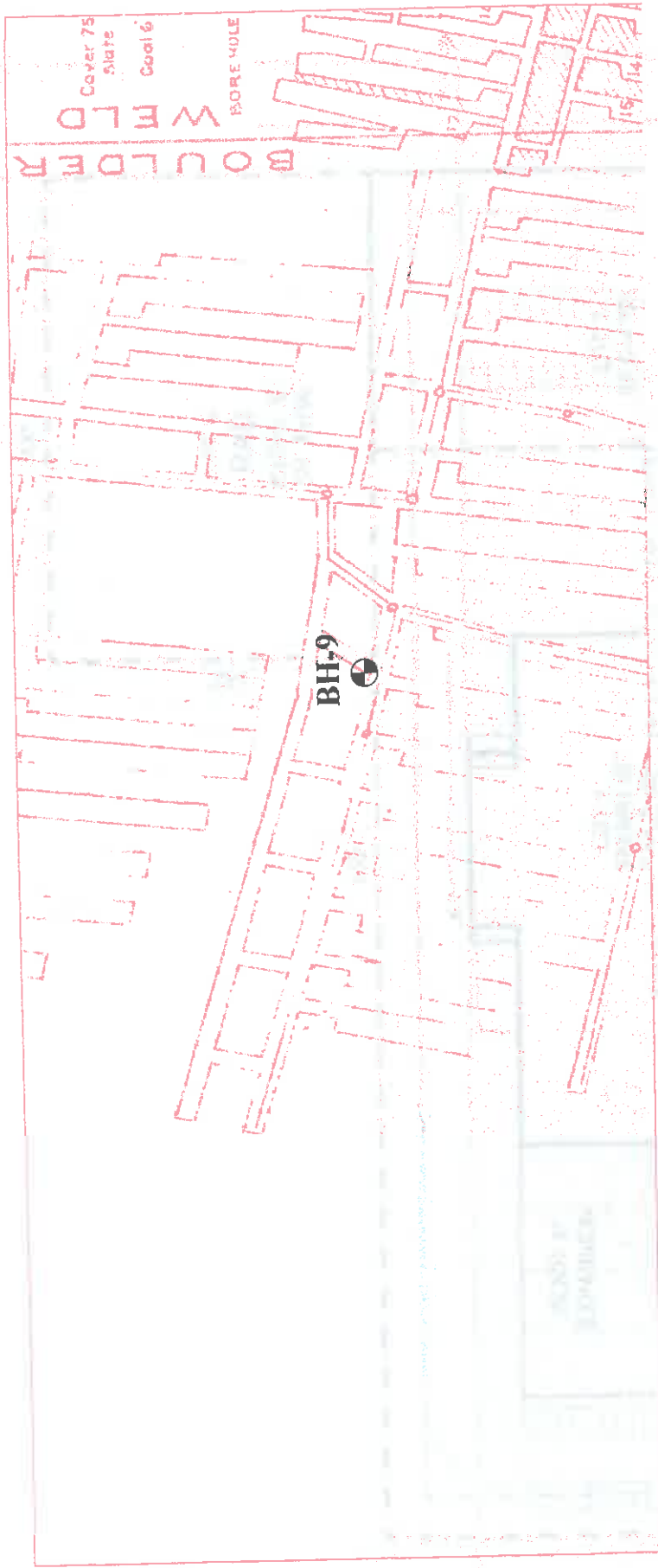
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**WESTERN ENVIRONMENT
AND ECOLOGY, INC.**

2217 West Powers Avenue
Littleton, Colorado 80120

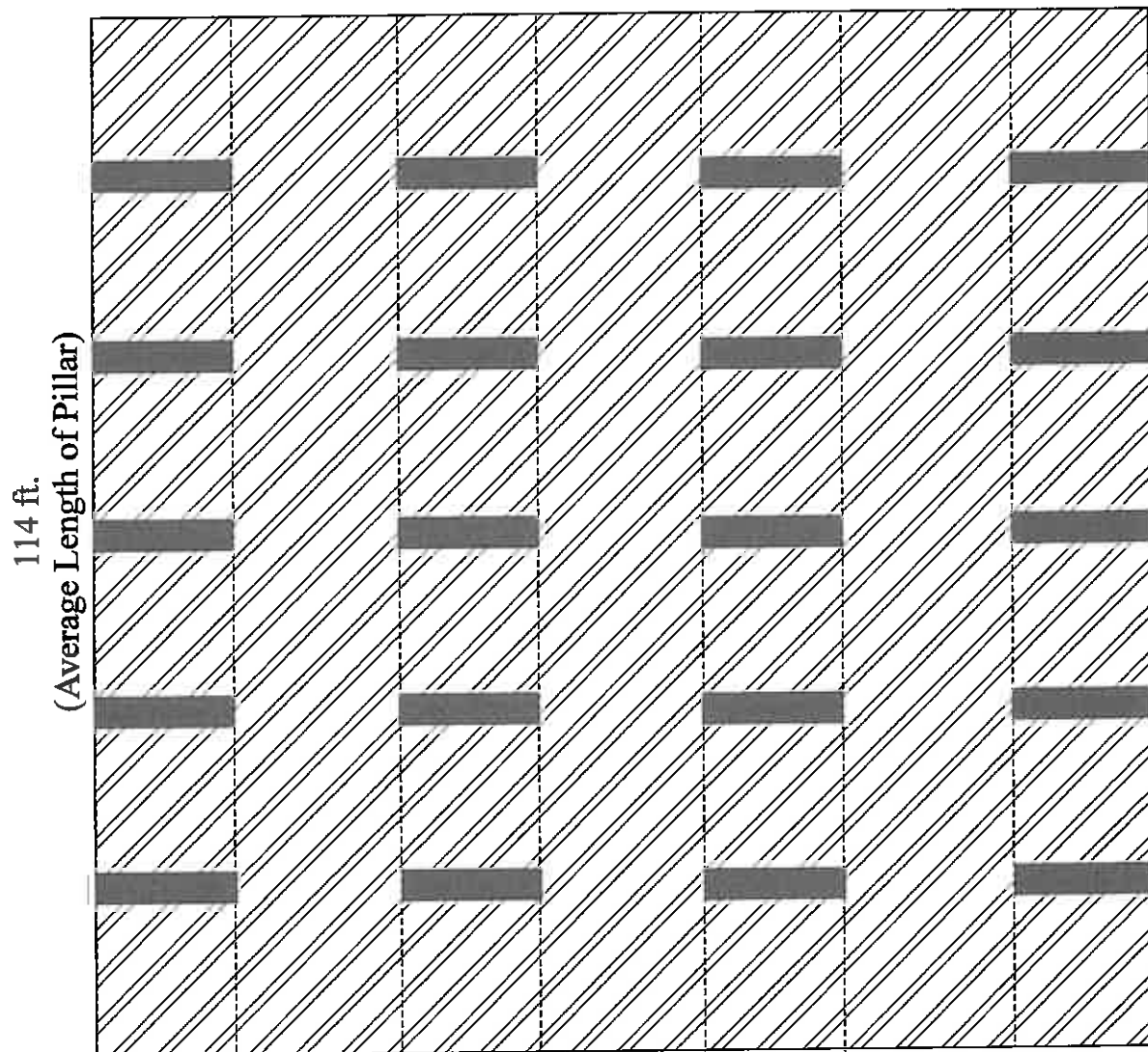
Figure 1
Site Location Map
Regency Center
Erie, Colorado



N

FIGURE 2
Site Map
 Regency Center
 Erie, Colorado

**WESTERN ENVIRONMENT
 AND ECOLOGY, INC.**
 2217 West Powers Avenue
 Littleton, Colorado 80120



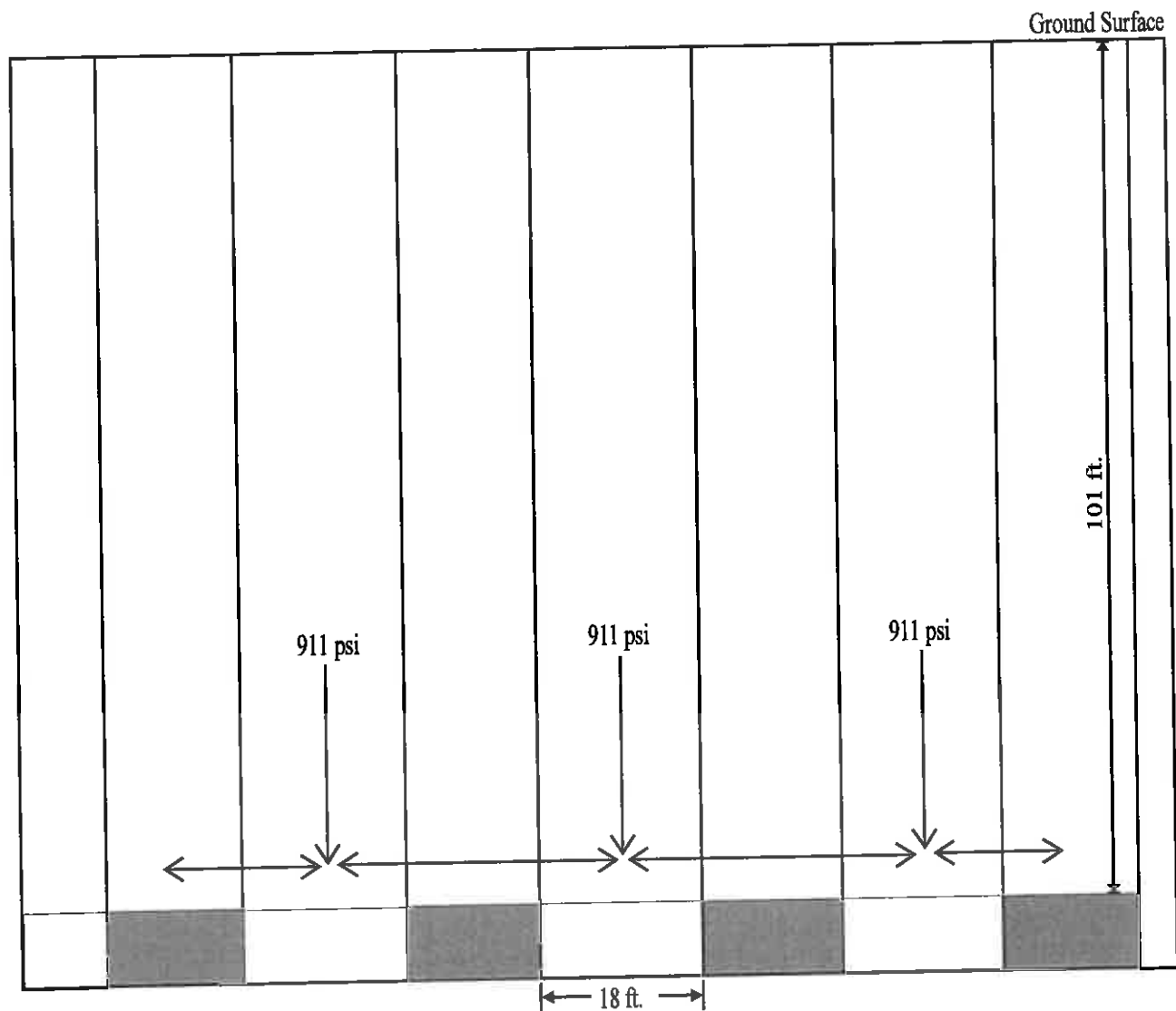
Pillar Width 18.0 ft.
(Average)

ARMPS Calculated
"Stub" Pillar
Size 3.0 X 15.0 ft.

Scale 1" = 20'

**WESTERN ENVIRONMENT
AND ECOLOGY, INC.**
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Littleton, Colorado 80120

Figure 3
Conceptional Mine Layout
Garfield/Lister Mine
Erie, Colorado



Unconfined Compressive Strength of Claystone 854 psi
 Horizontal Stress @ 70.0' = $140 \text{ lbs/ft}^3 \times 70.0 \text{ ft} \times 18 \text{ ft} / 144 \text{ in/ft}^2 = 911 \text{ psi}$

Scale 1" = 20'
 10 0 10 20

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 AND ECOLOGY, INC.**
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 Littleton, Colorado 80120

Figure 4
 Horizontal Stress Relationship
 Garfield/Lister Mine
 Erie, Colorado

**PREVIOUS BOREHOLE
BH-9**



LEON A. WURL PARKWAY (140 FT. ROW)

 **PROPOSED DRILL LOCATION**

Scale 1" = 100'



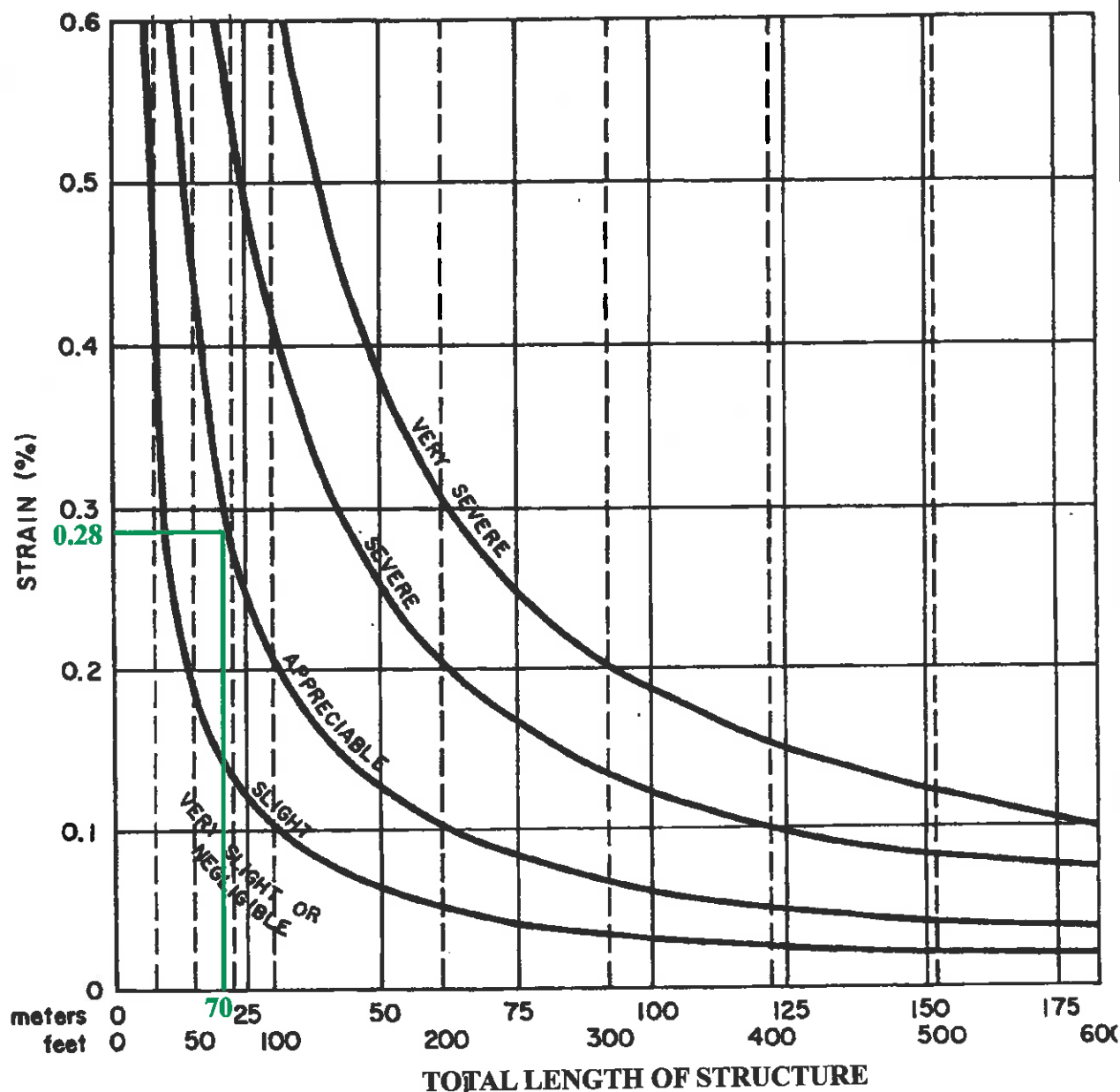
50 0 50 100



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AND ECOLOGY, INC.**

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Littleton, Colorado 80120

FIGURE 5
Proposed Site Configuration Map
Regency Center
Erie, Colorado



CLASS OF DAMAGE
VERY SLIGHT OR NEGLIGIBLE
SLIGHT
APPRECIABLE
SEVERE
VERY SEVERE

DESCRIPTION OF TYPICAL DAMAGE
SLIGHT CRACKS SHOWING IN WALLS AND CEILINGS INSIDE BUILDINGS, BUT NOT VISIBLE ON OUTSIDE.
SLIGHT CRACKS SHOWING INSIDE THE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE.
SLIGHT CRACKS SHOWING BOTH OUTSIDE AND INSIDE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE. DRAINS, SEWERS, AND GAS PIPES FRACTURE.
DRAINS, SEWERS, AND GAS PIPES FRACTURE. OPEN FRACTURES THROUGH WALLS OF BUILDING. WINDOW AND DOOR FRAMES DISTORTED. FLOORS NOTICEABLY SLOPING, WALLS LEANING OR BULGING NOTICEABLY. SOME LOSS OF BEARING OF BEAMS ON WALLS. PORTICOES AND FLOORS BUCKLE.
WORSE THAN ABOVE AND REQUIRING PARTIAL OR COMPLETE REBUILDING. ROOF AND FLOOR BEAMS LOSE BEARING AND WALLS LEAN BADLY AND NEED EXTERNAL SUPPORT. WINDOWS BROKEN AND DISTORTED. SEVERE SLOPES, BUCKLING AND BULGING OF ROOFS AND WALLS OCCUR.

(FROM N.C.B.)

**WESTERN ENVIRONMENT
AND ECOLOGY INC.**
2217 West Powers Avenue
Littleton, Colorado 80120

Figure 6
Strain Percent to Length of Structure
Regency Center
Erie, Colorado

ARMPS module build: 5.0.25
 Project File: C:\Program Files\NIOSH\Analysis of Retreat Mining Pillar Stability\Regency 1.ARM
 Input Units: (ft) (psi)

[PROJECT TITLE]
 Regency Centers, Erie

[PROJECT DESCRIPTION]
 Smallest Room Pillar Analysis

[DEVELOPMENT GEOMETRY PARAMETERS]
 Entry Height.....5.5 (ft)
 Depth of Cover.....70 (ft)
 Crosscut Angle.....90 (deg)
 Entry Width.....15 (ft)
 Number of Entries.....3
 Crosscut Spacing.....18 (ft)
 Center to Center Distance #1.....30 (ft)
 Center to Center Distance #2.....30 (ft)

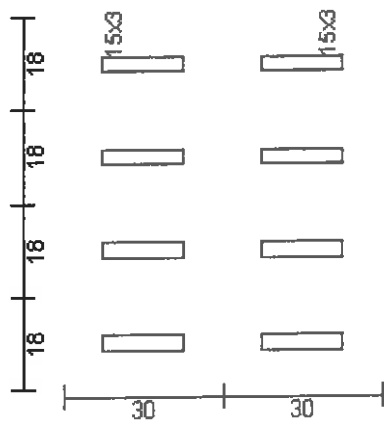
[DEFAULT PARAMETERS]
 In Situ Coal Strength.....900 (psi)
 Unit Weight of Overburden.....140 (pcf)
 Breadth of AMZ.....41 (ft)
 AMZ set automatically

[RETREAT MINING PARAMETERS]
 Loading Condition.....ACTIVE GOB
 Extend of Active Gob.....0 (ft)
 Abutment Angle of Active Gob.....21 (deg)

[ARMPS STABILITY FACTORS]

DEVELOPMENT.....1.01
ACTIVE GOB.....1.01

ARMPS: Actual Pillar Dimensions (width*length, ft). Entries shown from left to right.



ARMPS module build: 5.0.25
Project File: C:\Program Files\NIOSH\Analysis of Retreat Mining Pillar Stability\Regency 1.ARM
Input Units: (ft) (psi)

[PROJECT TITLE]
Regency Centers, Erie

[PROJECT DESCRIPTION]
Average Room Pillar Analysis

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height.....5.5 (ft)
Depth of Cover.....70 (ft)
Crosscut Angle.....90 (deg)
Entry Width.....15 (ft)
Number of Entries.....3
Crosscut Spacing.....114 (ft)
Center to Center Distance #1.....30 (ft)
Center to Center Distance #2.....30 (ft)

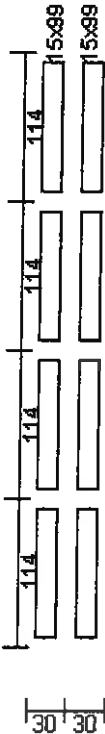
[DEFAULT PARAMETERS]
In Situ Coal Strength.....900 (psi)
Unit Weight of Overburden.....140 (pcf)
Breadth of AMZ.....41 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition.....ACTIVE GOB
Extend of Active Gob.....0 (ft)
Abutment Angle of Active Gob.....21 (deg)

[ARMPS STABILITY FACTORS]

DEVELOPMENT.....	11.70
ACTIVE GOB.....	11.70

ARMPS: Actual Pillar Dimensions (width*length, ft). Entries shown from left to right.



DRILLED WITH: AIR ☐ WATER ☒ HOLE NO. X-1
 T.D. 120' LOCATION: See Boring Location Plan
 BIT SIZE 5 1/8"
 SAMPLE LOG BY C. Bittner PROJECT Country Meadows
 DATE 2/2/87 COUNTY Boulder STATE Colorado

DEPTH	LITHOLOGY	CARBON	PYRITE	SULFIDE	ALTERATION	SAMPLE DESCRIPTION		T: Trace 1: Minor 2: Moderate 3: Abundant
						L: Limestone (Lml) SOx: Surf Oxidation Rd: Reduced Ad: Reduction P: Pyrite (Pyr) T: Transition Zone Id: Feldspar	POx: Primary Oxid SSOx: Basic of Surf Oxid SOx: Secondary Oxid Tn: Transition Zone Id: Feldspar	
0						Tan Clayey SAND		
20						Tan and gray Silty CLAYSTONE with gravel to 25' weathered to 50'		
30								
40								
50						COAL		
50						Gray Silty CLAYSTONE		
50						Light gray very fine grained SANDSTONE, hard		
70						COAL		
70						Light gray very fine grained SANDSTONE		
80						COAL		
80						Light gray very fine grained SANDSTONE, hard		
90								
100						Lost circulation at 91'		
100						No sample		
20								
30						Total Depth 120'		
40								
50								
60								
70								
80								
90								
100								

CRILLED WITH: AIR ☐ WATER ☒ HOLE NO. X-3
T.O. 200' LOCATION: See Boring Location Plan
BIT SIZE 5 1/8"
SAMPLE LOG BY C. Bittner PROJECT Country Meadows
DATE 2/2/87 COUNTY Boulder STATE Colorado

DEPTH	LITHOLOGY	CARBON PYRILE UTVIR UTVIR	Alteration Primary Oxidation Secondary Oxidation	SAMPLE DESCRIPTION		T: Ticks	
				L: Limestone (Lml) SOX: Surf Oxidation Rd: Reduced Rd1: Reduction P: Pyrite (Pyl) P: Pyrite Tarnish	(Amounts in Percent, %) POX: Primary Oxid SSOX: Base of Surf Oxid SOX: Secondary Oxid Tn: Transition Zone Hd: Feldspar	1: Minor 2: Moderate 3: Abundant	C: Carbon K: Koolin Ch: Chert
0				Tan Clayey SAND			
				GRAVEL			
20				Tan Silty CLAYSTONE weathered to 40'			
				Tan very fine grained SANDSTONE			
30				Tan and gray Silty CLAYSTONE			
40							
50				Dark gray carbonaceous Silty CLAYSTONE			
				COAL			
60				Dark gray carbonaceous Silty CLAYSTONE			
				COAL			
70				Gray Silty CLAYSTONE			
				with COAL			
80				Light gray very fine grained SANDSTONE, hard			
				Gray Silty CLAYSTONE			
90				Partial loss of circulation at 90'			
100				COAL			
				Gray Silty CLAYSTONE			
10				COAL			
20				Light gray very fine grained SANDSTONE, hard			
				Gray CLAYSTONE			
30							
40				COAL			
50				Light gray very fine grained SANDSTONE, hard			
				COAL			
60				Light gray very fine grained SANDSTONE			
				COAL			
70				Light gray very fine grained SANDSTONE			
80				Light gray fine to medium grained SANDSTONE, hard			
90							
100							

Total Depth 200'



DRILLED WITH: AIR ☐ WATER ☒ HOLE NO. X-5

T.D. 110' LOCATION See Boring Location Plan

BIT SIZE 5 1/8"

SAMPLE LOG BY C. Bittner PROJECT Country Meadows

DATE 2/16/87 COUNTY Boulder STATE Colorado

DEPTH	LITHOLOGY	CARBON PYRITE OTHER	Alteration %			SAMPLE DESCRIPTION (Amounts in Percent, %)	T: Trace 1: Minor 2: Moderate 3: Abundant
			Pyritization	Oxidation	Reduction		
0						Tan Clayey SAND	
20						GRAVEL	
30						Gray Silty CLAYSTONE weathered to 30'	
40							
50						Light gray very fine grained SANDSTONE	
50						Gray Silty CLAYSTONE	
50						Light gray very fine grained SANDSTONE	
70							
80						Gray Silty CLAYSTONE	
80						Lost circulation at 80"	
90						No sample	
100							
10							
20						Total Depth 110'	
30							
40							
50							
60							
70							
80							
90							
00							

HOLE NUMBER	BH-3	LOCATION	NE1/4 S.24. T.1N., R.69W.	STATE:	Colorado
DRILLED BY	Bideau Drilling	LOGGED BY	Brian E Crandall	TOTAL DEPTH	180'
DATE	November 29, 1994	BIT SIZE	5 1/8"	DRILLED WITH	Mud
DEPTH	SAMPLE DESCRIPTION				
5	SAND, light brown				
10	SAND, light brown				
15	CLAY, sandy, light brown				
20	CLAY, sandy, light brown				
25	CLAY, sandy, light brown				
30	CLAY, sandy, light brown				
35	CLAY, sandy, light brown				
40	GRAVEL				
45	CLAYSTONE, gray				
50	CLAYSTONE, gray				
55	CLAYSTONE, gray				
60	CLAYSTONE, dark gray to black				
65	CLAYSTONE, dark gray to black				
70	COAL (A SEAM)				
75	CLAYSTONE, dark gray				
80	CLAYSTONE, dark gray				
85	CLAYSTONE, dark gray				
90	CLAYSTONE, dark gray with some COAL (GARFIELD UPPER SEAM)				
95	CLAYSTONE, dark gray				
100	CLAYSTONE, dark gray				
105	CLAYSTONE, dark gray				
110	CLAYSTONE, dark gray				
115	CLAYSTONE, dark gray with some COAL (GARFIELD LOWER SEAM)				
120	CLAYSTONE, gray				
125	CLAYSTONE, gray				
130	CLAYSTONE, gray				
135	CLAYSTONE, gray				
140	CLAYSTONE, gray				
145	CLAYSTONE, gray with some COAL				
150	CLAYSTONE, gray				
155	CLAYSTONE, WITH COAL (TYSON/STEWART MAIN SEAM)				
160	CLAYSTONE, gray				
165	CLAYSTONE, gray				
170	SANDSTONE, light gray				
175	SANDSTONE, light gray				
180	SANDSTONE, light gray				
185	TOTAL DEPTH 180'				
190					
195					
200					

HOLE NUMBER	BH-7	LOCATION	NE1/4 S.24. T.1N., R.69W.	STATE:	Colorado
DRILLED BY	Bideau Drilling	LOGGED BY	Brian E Crandall	TOTAL DEPTH	190'
DATE	October 15, 1996	BIT SIZE	5 1/8"	DRILLED WITH	Mud
DEPTH	SAMPLE DESCRIPTION				
5	SAND, light brown				
10	SAND, light brown				
15	SAND, light brown				
20	CLAYSTONE, light brown				
25	SANDSTONE, light brown				
30	SANDSTONE, light brown				
35	SANDSTONE, light brown				
40	SANDSTONE, light brown				
45	SANDSTONE, light brown				
50	CLAYSTONE, light brown to gray				
55	CLAYSTONE, light brown to gray				
60	COAL / CLAYSTONE, light brown to gray (A SEAM)				
65	CLAYSTONE, gray				
70	COAL / CLAYSTONE, gray				
75	SANDSTONE, light gray				
80	CLAYSTONE, light gray				
85	CLAYSTONE, light gray / COAL (GARFIELD UPPER SEAM) MINED INTERVAL				
90	CLAYSTONE, light gray / COAL				
95	CLAYSTONE, dark gray				
100	CLAYSTONE, dark gray				
105	CLAYSTONE, gray / COAL				
110	SANDSTONE, gray				
115	CLAYSTONE, dark gray / COAL (GARFIELD LOWER SEAM)				
120	SANDSTONE, light gray				
125	CLAYSTONE, light gray				
130	CLAYSTONE, light gray				
135	CLAYSTONE, light gray				
140	CLAYSTONE, dark gray				
145	CLAYSTONE, gray				
150	SANDSTONE, light gray				
155	COAL (TYSON/STEWART SEAM)				
160	COAL / CLAYSTONE, dark gray				
165	CLAYSTONE, dark gray				
170	CLAYSTONE, dark gray				
175	CLAYSTONE, dark gray				
180	SANDSTONE, light gray				
185	SANDSTONE, light gray				
190	SANDSTONE, LIGHT GRAY				
195	TOTAL DEPTH 190'				
200	CALIPER LOG CONDUCTED FROM 190' TO SURFACE - SEPARATE PAGE				

HOLE NUMBER	BH-3	LOCATION	NE1/4 S.24, T.1N., R.69W.	STATE:	Colorado
DRILLED BY	Bideau Drilling	LOGGED BY	Brian E Crandall	TOTAL DEPTH	100'
DATE	October 16, 1996	BIT SIZE	5 1/8"	DRILLED WITH	Mud
DEPTH	SAMPLE DESCRIPTION				
5	SAND, clayey, light brown				
10	SAND, light brown, coarse				
15	SAND, light brown, coarse				
20	SAND, light brown, coarse				
25	SAND, light brown, coarse				
30	SAND, light brown, coarse, gravel 1/2" diameter				
35	SAND, light brown				
40	CLAYSTONE, gray				
45	CLAYSTONE, gray				
50	CLAYSTONE, gray				
55	CLAYSTONE, gray				
60	CLAYSTONE, gray				
65	CLAYSTONE, gray				
70	LOST CIRCULATION NO SAMPLES ACQUIRED MINED INTERVAL				
75	GARFIELD UPPER SEAM				
80					
85					
90					
95					
100					
105	TOTAL DEPTH 100'				
110	CALIPER LOG CONDUCTED - SEPARATE PAGE				
115					
120					
125					
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175					
180					
185					
190					
195					
200					

HOLE NUMBER	BII-9	LOCATION	NE1/4 S.24. T.1N. R.69W.	STATE:	Colorado
DRILLED BY	Bideau Drilling	LOGGED BY	Brian E Crandall	TOTAL DEPTH	100'
DATE	October 16, 1996	BIT SIZE	5 1/8"	DRILLED WITH	Mud
DEPTH	SAMPLE DESCRIPTION				
5	SAND, light brown, COARSE				
10	SAND, light brown, coarse				
15	SAND, light brown, coarse, gravel 1/2" diameter				
20	SAND, light brown, coarse				
25	SAND, light brown, coarse				
30	CLAYSTONE, light brown to gray / COAL (A SEAM)				
35	CLAYSTONE, gray				
40	CLAYSTONE, gray				
45	CLAYSTONE, gray				
50	CLAYSTONE, gray				
55	CLAYSTONE, gray				
60	CLAYSTONE, gray				
65	CLAYSTONE, gray				
70	CLAYSTONE, gray / trace of COAL (GARFIELD UPPER SEAM)				
75	CLAYSTONE, gray				
80	CLAYSTONE, gray / COAL (GARFIELD LOWER SEAM) MINED INTERVAL				
85	CLAYSTONE, gray				
90	CLAYSTONE, gray				
95	CLAYSTONE, gray				
100	CLAYSTONE, gray				
105	TOTAL DEPTH 100'				
110	CALIPER LOG CONDUCTED - SEPARATE PAGE				
115					
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185					
190					
195					
200					

HOLE NUMBER	BH-14	LOCATION	NE1/4 S.24. T.1N., R.69W.	STATE:	Colorado
DRILLED BY	Bideau Drilling	LOGGED BY	Greg D. Sherman	TOTAL DEPTH	160'
DATE	June 3, 1997	BIT SIZE	5 1/8"	DRILLED WITH	Mud
DEPTH	SAMPLE DESCRIPTION				
5	SAND, light brown				
10	SAND, light brown				
15	SAND, light brown				
20	SAND, light brown				
25	CLAY, light brown with SAND				
30	CLAY, light brown with SAND				
35	GRAVEL, medium to coarse				
40	CLAYSTONE, medium gray				
45	CLAYSTONE, medium gray				
50	CLAYSTONE, medium gray				
55	COAL				
60	SANDSTONE, light gray, very fine, with CLAYSTONE				
65	SANDSTONE, light gray, very fine, with CLAYSTONE				
70	COAL with CLAYSTONE, medium gray				
75	COAL with CLAYSTONE, medium gray				
80	CLAY, medium gray				
85	SANDSTONE, light gray				
90	SANDSTONE, light gray				
95	CLAYSTONE, medium gray				
100	COAL				
105	SANDSTONE, light gray				
110	SANDSTONE, light gray				
115	CLAYSTONE, medium gray				
120	CLAYSTONE, medium gray				
125	CLAYSTONE, medium gray				
130	CLAYSTONE, medium gray				
135	CLAYSTONE, medium gray				
140	COAL				
145	COAL LOST CIRCULATION 148', RETURN 149'				
150	COAL LOOSE DRILLING 147- 153'				
155	COAL				
160	COAL				
165	TOTAL DEPTH 160 FEET				
170					
175					
180					
185					
190					
195					
200					

CALIPER LOG C-3

DEPTH INCHES

200 5
199 5
198 5
197 5
196 5
195 5
194 5
193 5
192 5
191 5
190 5
189 5
188 5
187 5
186 5
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182 5
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- 180 5
179 5
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- 176 5
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DEPTH INCHES

151 5
150 5
149 5
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DEPTH INCHES

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DEPTH INCHES

53 5
52 5
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41 5
40 5

CALIPER LOG B-7

DEPTH INCHES

190 5
189 5
188 5
187 5
186 5
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DEPTH INCHES

141 5
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DEPTH INCHES

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47 5
46 5
45 5
44 5

DEPTH INCHES

43 7
42 5
41 6
40 6
39 7
38 8
37 8
36 7
35 6
34 5
33 5
32 5
31 5
30 5
29 5
28 5
25 5
24 5
23 5
22 5
21 5
20 5

CALIPER LOG B-8

DEPTH INCHES

100 5
 99 5
 98 5
 97 5
 96 5
 95 5
 94 5
 93 5
 92 5
 91 5
 90 5
 89 5
 88 5
 87 5
 86 5
 85 5
 84 5
 83 5
 82 5
 81 5
 80 5
 79 5
 78 5
 77 5
 76 5
 75 5
 74 5
 73 5
 72 5
 71 5
 70 5
 69 5
 68 5
 67 5
 66 5
 65 5
 64 5
 63 5
 62 6
 61 6
 60 6.5
 59 6
 58 6
 57 7
 56 7
 55 7
 54 7.5
 53 10
 52 7.5

DEPTH INCHES

51 6.5
 50 6.5
 49 7.25
 48 6.25
 47 6.5
 46 6.5
 45 7
 44 7
 43 6.25
 42 9
 41 8.25
 40 7.5
 39 7.5
 38 7.5
 37 7
 36 7
 35 6
 34 6
 33 6
 32 8
 31 10
 30 7
 29 7
 28 7
 25 7
 24 7
 23 7
 22 6
 21 5
 20 5

CALIPER LOG B-9

DEPTH INCHES

93 5
92 5
91 5
90 5
89 5
88 5
87 5
86 5
85 5
84 5
83 5
82 5
81 5
80 5
79 5
78 5
77 5
76 5
75 5
74 5
73 7
72 7
71 5
70 6.75
69 5
68 5
67 5
66 5
65 5
64 5
63 5
62 5
61 5
60 5
59 5
58 5
57 5
56 5
55 5
54 5
53 5
52 5
51 5
50 5
49 5
48 5
47 5
46 6

DEPTH INCHES

45 6
44 5
43 5
42 5
41 5
40 5
39 5
38 6
37 6
36 5
35 5
34 5
33 5
32 5
31 5
30 5

CALIPER LOG B-14

DEPTH	INCHES
148	7.0
147	7.0
146	7.5
145	6.0
144	6.0
143	6.0
142	6.0
141	6.0
140	6.0
139	6.0
138	6.0
137	6.0
136	6.0
135	6.0
134	6.0
133	6.0
132	6.0
131	6.0
130	6.0
129	6.0
128	6.0
127	6.0
126	6.0
125	6.0
124	6.0
123	6.0
122	6.0
121	6.0
120	6.0

HOLE NUMBER: G-1	LOCATION: Sec 19, T1N, R68W	PROJECT NUMBER: 134-001-02
DRILLED BY: Bideaux Drilling	LOGGED BY: John Goggins	TOTAL DEPTH: 140' SURFACE ELEVATION 5055'
DATE: 1/19/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	GRAVEL, 1/4" TO 1/2"	
25	GRAVEL, 1/4" TO 1/2"	
30	CLAYSTONE, gray	
35	CLAYSTONE, gray	
40	CLAYSTONE, gray	
45	CLAYSTONE, gray	
50	CLAYSTONE, carbonaceous	
55	CLAYSTONE, gray	
60	CLAYSTONE, dark gray	
65	CLAYSTONE, dark gray	
70	COAL	GARFIELD UPPER SEAM
75	COAL	
80	CLAYSTONE, dark gray	
85	CLAYSTONE, dark gray	
90	CLAYSTONE, dark gray	
95	COAL	GARFIELD LOWER SEAM
100	CLAYSTONE, dark gray	
105	CLAYSTONE, dark gray	
110	CLAYSTONE, dark gray	
115	CLAYSTONE, dark gray	
120	CLAYSTONE, dark gray	
125	SANDSTONE, Fox Hills	
130	SANDSTONE, Fox Hills	
135	SANDSTONE, Fox Hills	
140	SANDSTONE, Fox Hills	
145	SANDSTONE, Fox Hills	
150	SANDSTONE, Fox Hills	
155	SANDSTONE, Fox Hills	
160	SANDSTONE, Fox Hills	
165	SANDSTONE, Fox Hills	
170	SANDSTONE, Fox Hills	
175	SANDSTONE, Fox Hills	
180	SANDSTONE, Fox Hills	
185	TOTAL DEPTH OF HOLE 180 FEET.	
190	NO CALIPER DEFLECTION	
195		
200		

HOLE NUMBER: G-2	LOCATION: Sec 19, T1N, R68W	PROJECT NUMBER: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH 160' SURFACE ELEVATION 5062'
DATE: 1/19/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	GRAVEL, 1/4" TO 1/2"	
25	GRAVEL, 1/4" TO 1/2"	
30	CLAYSTONE, brown	
35	CLAYSTONE, brown	
40	CLAYSTONE, brown	
45	CLAYSTONE, gray	
50	CLAYSTONE, gray	
55	CLAYSTONE, gray	
60	CLAYSTONE, gray	
65	CLAYSTONE, gray	
70	CLAYSTONE, gray	
75	CLAYSTONE, carbonaceous	GARFIELD UPPER SEAM
80	CLAYSTONE, gray	
85	CLAYSTONE, gray	
90	CLAYSTONE, gray	
95	CLAYSTONE, gray	
100	CLAYSTONE, gray	
105	CLAYSTONE, gray	
110	CLAYSTONE, gray	
115	CLAYSTONE, gray	
120	CLAYSTONE, gray	
125	CLAYSTONE, carbonaceous	
130	CLAYSTONE, carbonaceous	
135	CLAYSTONE, gray	
140	SANDSTONE, Fox Hills	
145	SANDSTONE, Fox Hills	
150	SANDSTONE, Fox Hills	
155	SANDSTONE, Fox Hills	
160	SANDSTONE, Fox Hills	
165	TOTAL DEPTH OF HOLE 160 FEET.	
170	NO CALIPER DEFLECTION	
175		
180		
185		
190		
195		
200		

HOLE NUMBER: G-8	LOCATION: Sec 19, T1N, R68W	PROJECT NUMBER: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH: 140' SURFACE ELEVATION 5057'
DATE: 1/20/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	GRAVEL, 1/4" TO 1/2"	
25	GRAVEL, 1/4" TO 1/2"	
30	CLAYSTONE, gray	
35	CLAYSTONE, gray	
40	CLAYSTONE, gray	
45	CLAYSTONE, gray	
50	CLAYSTONE, gray	
55	CLAYSTONE, gray	
60	CLAYSTONE, carbonaceous	
65	COAL GARFIELD UPPER SEAM	
70	CLAYSTONE, gray	
75	CLAYSTONE, gray	
80	CLAYSTONE, gray	
85	CLAYSTONE, gray	
90	CLAYSTONE, gray, carbonaceous	
95	COAL GARFIELD LOWER SEAM	
100	CLAYSTONE, gray	
105	CLAYSTONE, gray	
110	CLAYSTONE, gray	
115	CLAYSTONE, gray	
120	COAL	
125	SANDSTONE, brown	
130	SANDSTONE, Fox Hills	
135	SANDSTONE, Fox Hills	
140	SANDSTONE, Fox Hills	
145	TOTAL DEPTH OF HOLE 140 FEET.	
150	NO CALIPER DEFLECTION	
155		
160		
165		
170		
175		
180		
185		
190		
195		
200		

HOLE NUMBER: G-11	LOCATION: Section 19, T 1 N, R 68 W	PROJECT NO.: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH: 120' SURFACE ELEVATION 5053'
DATE: 2/20/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR _ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND/ GRAVEL 1/4 inch - 1/2 inch	
20	SAND/ GRAVEL 1/4 inch - 1/2 inch	
25	SAND/ GRAVEL 1/4 inch - 1/2 inch	
30	SAND/ GRAVEL 1/4 inch - 1/2 inch	
35	SAND/ GRAVEL 1/4 inch - 1/2 inch	
40	SANDSTONE/ light gray	
45	SANDSTONE/ light gray	
50	SANDSTONE/ light gray	
55	SANDSTONE/ light gray	
60	LOST CIRCULATION @ 62 feet	
65	NO SAMPLE	
70	NO SAMPLE	
75	NO SAMPLE BOTTOM OF MINE @ 75 feet	
80	NO SAMPLE	
85	NO SAMPLE	
90	NO SAMPLE	
95	NO SAMPLE	
100	NO SAMPLE	
105	NO SAMPLE	
110	NO SAMPLE	
115	NO SAMPLE	
120	NO SAMPLE	
125		
130		
135	TOTAL DEPTH @ 120 FEET. CIRCULATION WAS LOST @ 65 FEET.	
140	MAXIMUM CALIPER DEFLECTION - 7.5 @ 63 FEET.	
145		
150		
155		
160		
165		
170		
175		
180		
185		
190		
195		
200		

HOLE NUMBER: G-17	LOCATION: S 19, Township 1 North, Range 68 West	PROJECT NO.: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH: 140' SURFACE ELEVATION 5053'
DATE: 2/20/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	SAND, brown	
25	CLAYSTONE, gray	
30	CLAYSTONE, gray	
35	CLAYSTONE, gray	
40	CLAYSTONE, gray	
45	CLAYSTONE, gray	
50	CLAYSTONE, gray	
55	CLAYSTONE, gray	
60	CLAYSTONE, gray	
65	COAL	GARFIELD UPPER SEAM
70	CLAYSTONE, gray	
75	CLAYSTONE, carbonaceous	
80	CLAYSTONE, gray	
85	CLAYSTONE, gray	
90	CLAYSTONE, gray	
95	CLAYSTONE, gray	
100	CLAYSTONE, carbonaceous	
105	COAL	GARFIELD LOWER SEAM
110	CLAYSTONE, gray	
115	CLAYSTONE, gray	
120	CLAYSTONE, gray	
125	SANDSTONE, gray	
130	SANDSTONE, Fox Hills	
135	SANDSTONE, Fox Hills	
140	SANDSTONE, Fox Hills	
145	TOTAL DEPTH OF HOLE 140 FEET. CIRCULATION WAS NOT LOST.	
150	NO CALIPER DEFLECTION.	
155		
160		
165		
170		
175		
180		
185		
190		
195		
200		

HOLE NUMBER: G-18	LOCATION: S 19, Township 1 North, Range 68 West	PROJECT NO.: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH: 140' SURFACE ELEVATION 5058'
DATE: 2/20/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
25	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
30	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
35	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
40	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
45	CLAYSTONE, gray	
50	CLAYSTONE, gray	
55	CLAYSTONE, gray	
60	CLAYSTONE, gray	
65	SANDSTONE, carbonaceous	
70	CIRCULATION LOST @ 63 FEET	
75	NO SAMPLE	
80	NO SAMPLE	
85	NO SAMPLE	
90	NO SAMPLE	
95	NO SAMPLE	
100	NO SAMPLE	
105	NO SAMPLE	
110	NO SAMPLE	
115	NO SAMPLE	
120	NO SAMPLE	
125	NO SAMPLE	
130	NO SAMPLE	
135	NO SAMPLE	
140	NO SAMPLE	
145	TOTAL DEPTH OF HOLE 140 FEET. CIRCULATION WAS LOST @ 63 FEET	
150	MAXIMUM CALIPER DEFLECTION - 8.3 INCHES @ 72 FEET.	
155		
160		
165		
170		
175		
180		
185		
190		
195		
200		

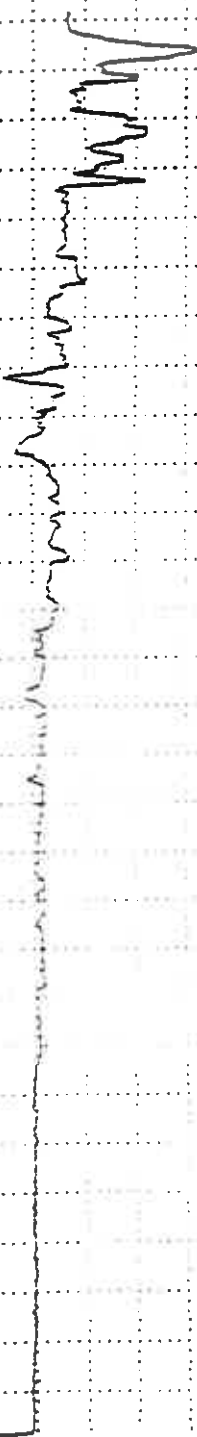
HOLE NUMBER: G-19	LOCATION: S 19, Township 1 North, Range 68 West	PROJECT NO.: 134-001-02
DRILLED BY: Bideau Drilling	LOGGED BY: John Goggin	TOTAL DEPTH: 140' SURFACE ELEVATION 5057'
DATE: 2/20/99	BIT SIZE: 5 1/8"	DRILLED WITH: AIR __ MUD _X_
DEPTH	SAMPLE DESCRIPTION	
5	SAND, brown	
10	SAND, brown	
15	SAND, brown	
20	SAND/ GRAVEL, 1/4 inch - 1/2 inch	
25	CLAYSTONE, gray	
30	CLAYSTONE, gray	
35	CLAYSTONE, gray	
40	CLAYSTONE, gray	
45	CLAYSTONE, gray	
50	CLAYSTONE, gray	
55	CLAYSTONE, gray	
60	CLAYSTONE, gray	
65	CLAYSTONE, gray	
70	COAL GARFIELD UPPER SEAM	
75	CLAYSTONE, gray	
80	CLAYSTONE, gray	
85	CLAYSTONE, gray	
90	SANDSTONE, gray	
95	SANDSTONE, gray	
100	SANDSTONE, carbonaceous	
105	SANDSTONE, carbonaceous	
110	SANDSTONE, carbonaceous	
115	COAL GARFIELD LOWER SEAM	
120	CLAYSTONE, gray	
125	COAL	
130	SANDSTONE, Fox Hills	
135	SANDSTONE, Fox Hills	
140	SANDSTONE, Fox Hills	
145	TOTAL DEPTH OF HOLE 140 FEET. CIRCULATION WAS NOT LOST	
150	NO CALIPER DEFLECTION	
155		
160		
165		
170		
175		
180		
185		
190		
195		
200		

Well G1, January 18, 1999

Caliper
Inches

8"

0
20
40
60
80
100
120
140



Caliper
Inches

8"

Well G1, January 18, 1999

Well G2, January 21, 1999

Caliper
Inches

10

0

20

40

60

80

100

120

140

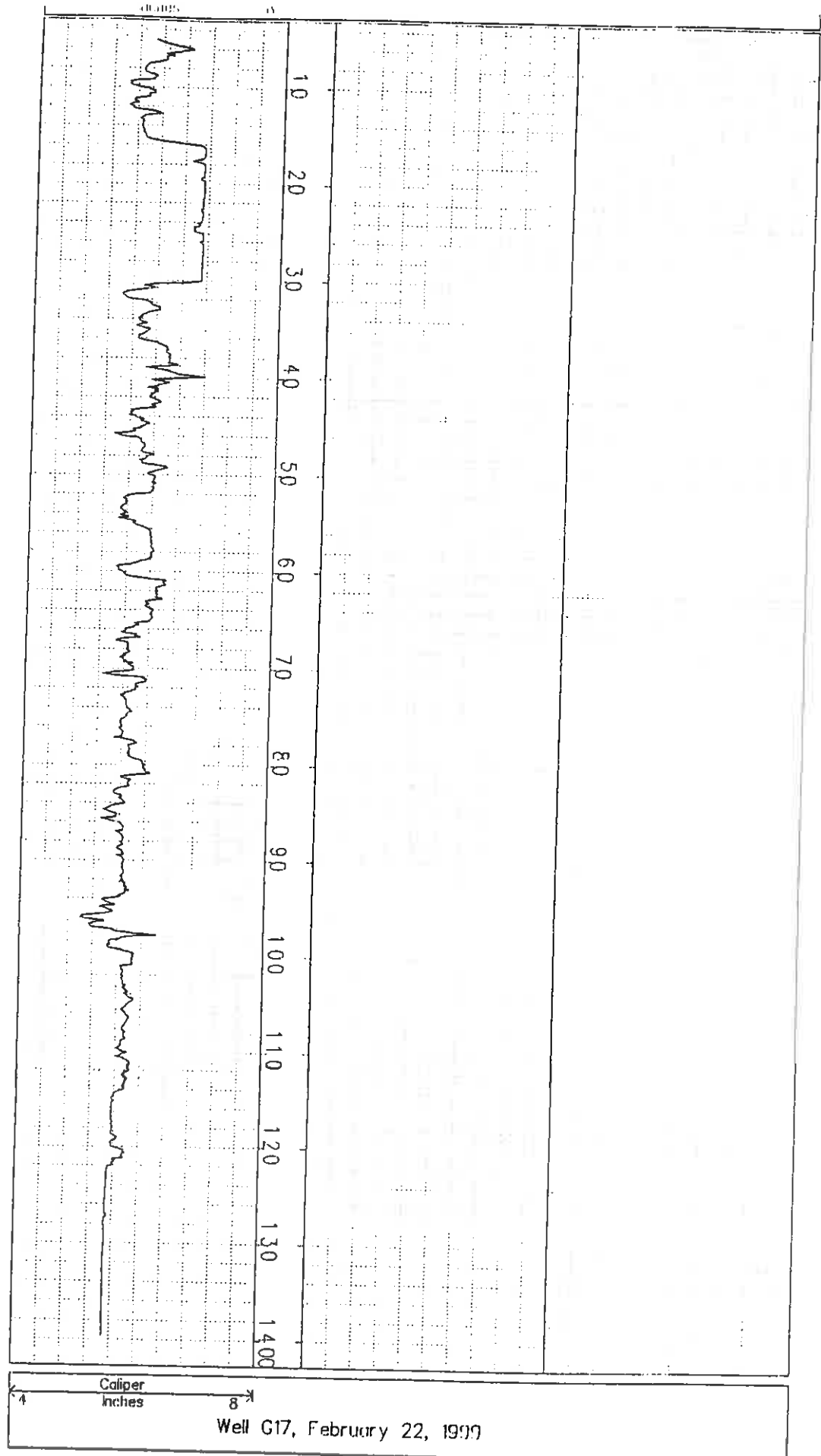
Caliper
Inches

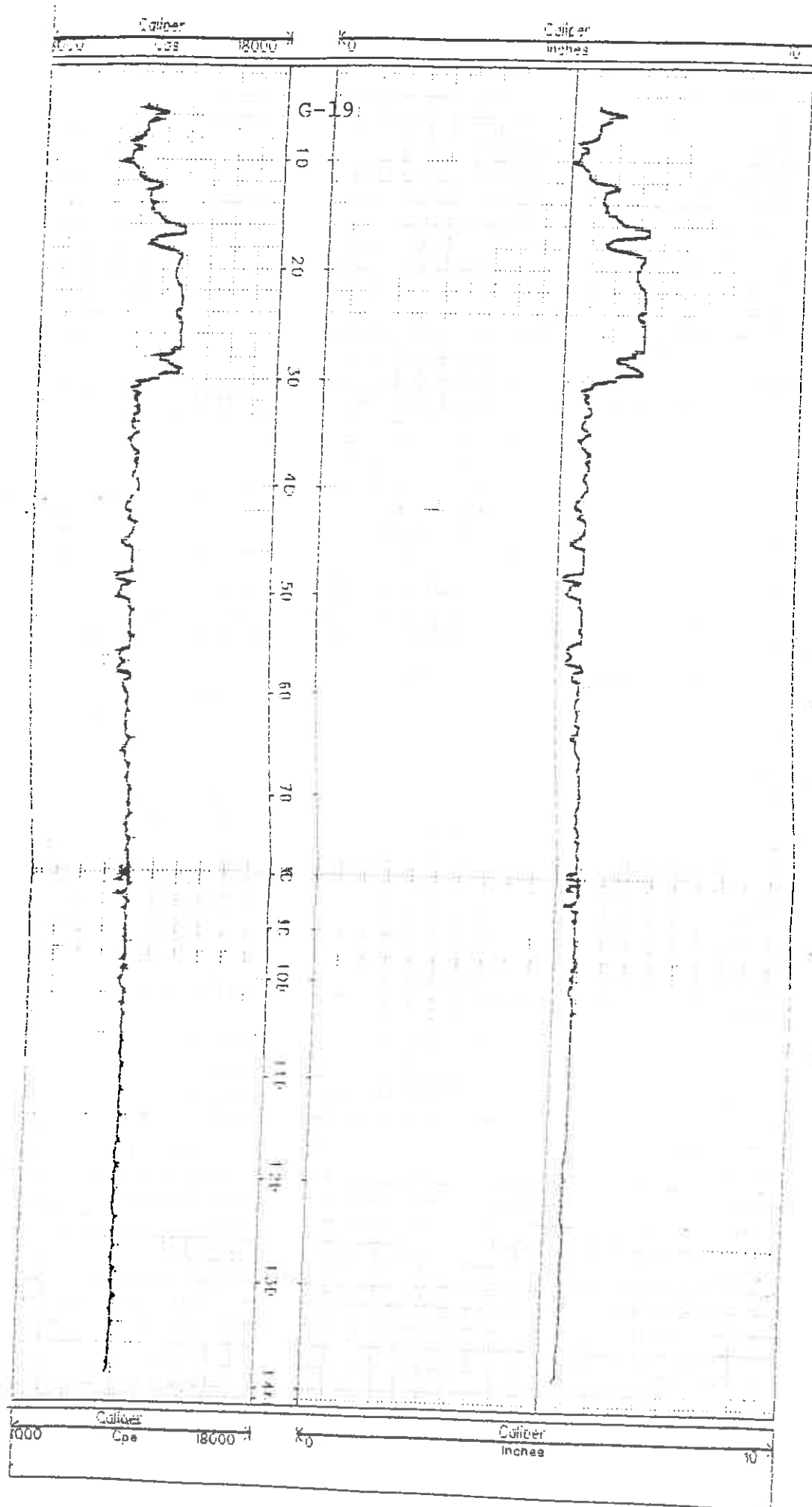
10

Well G3, January 21, 1999

G. 11

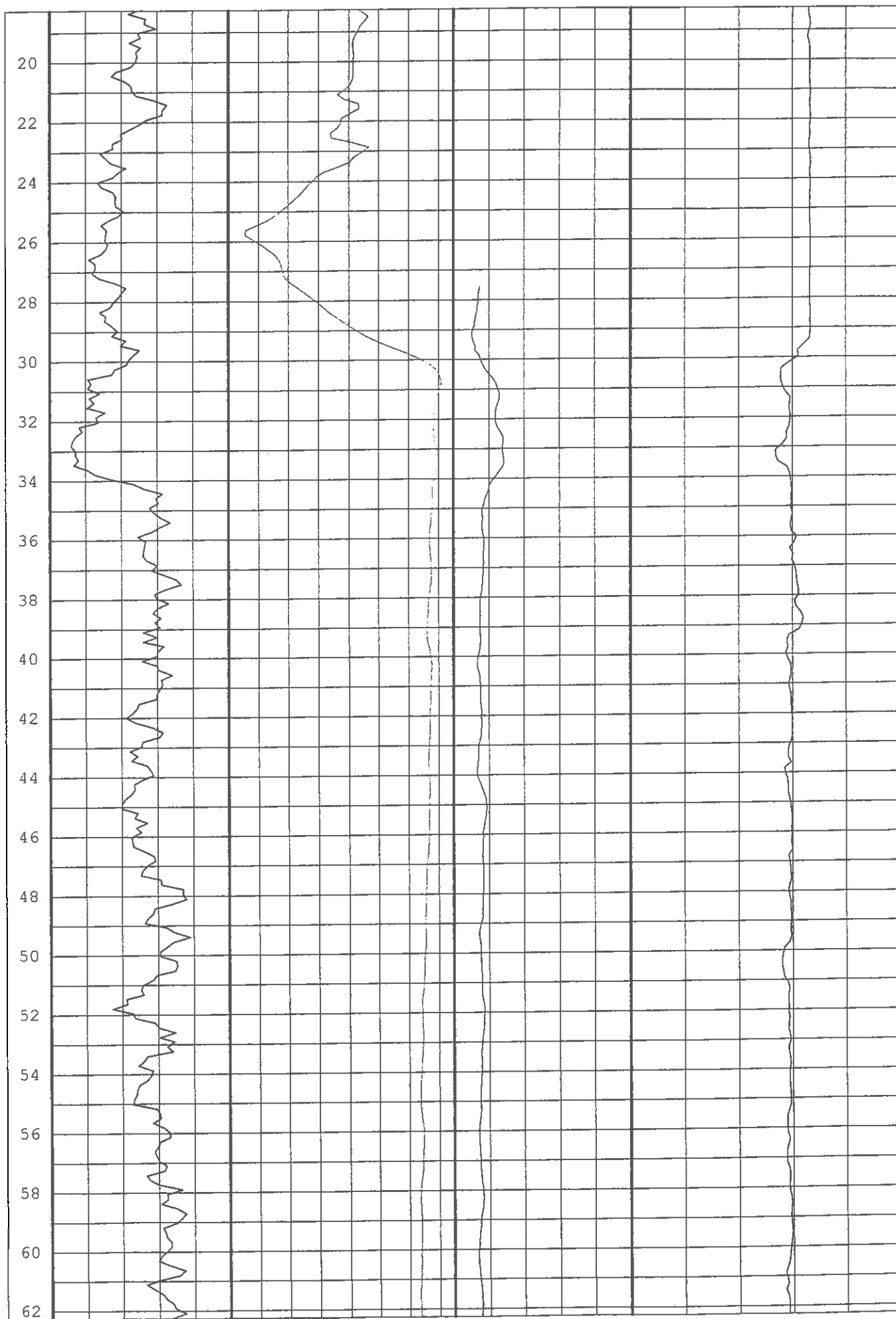
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20
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100

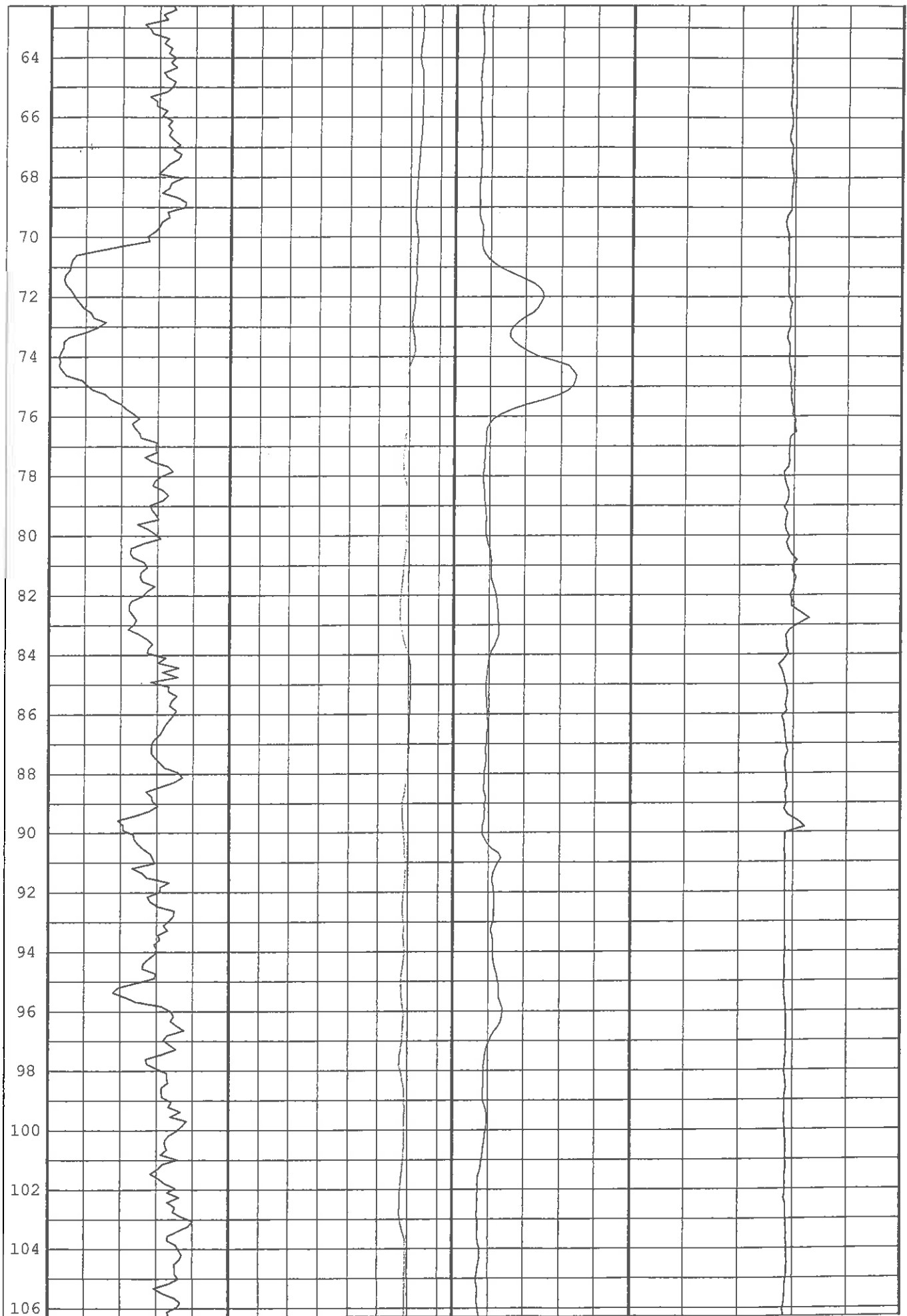


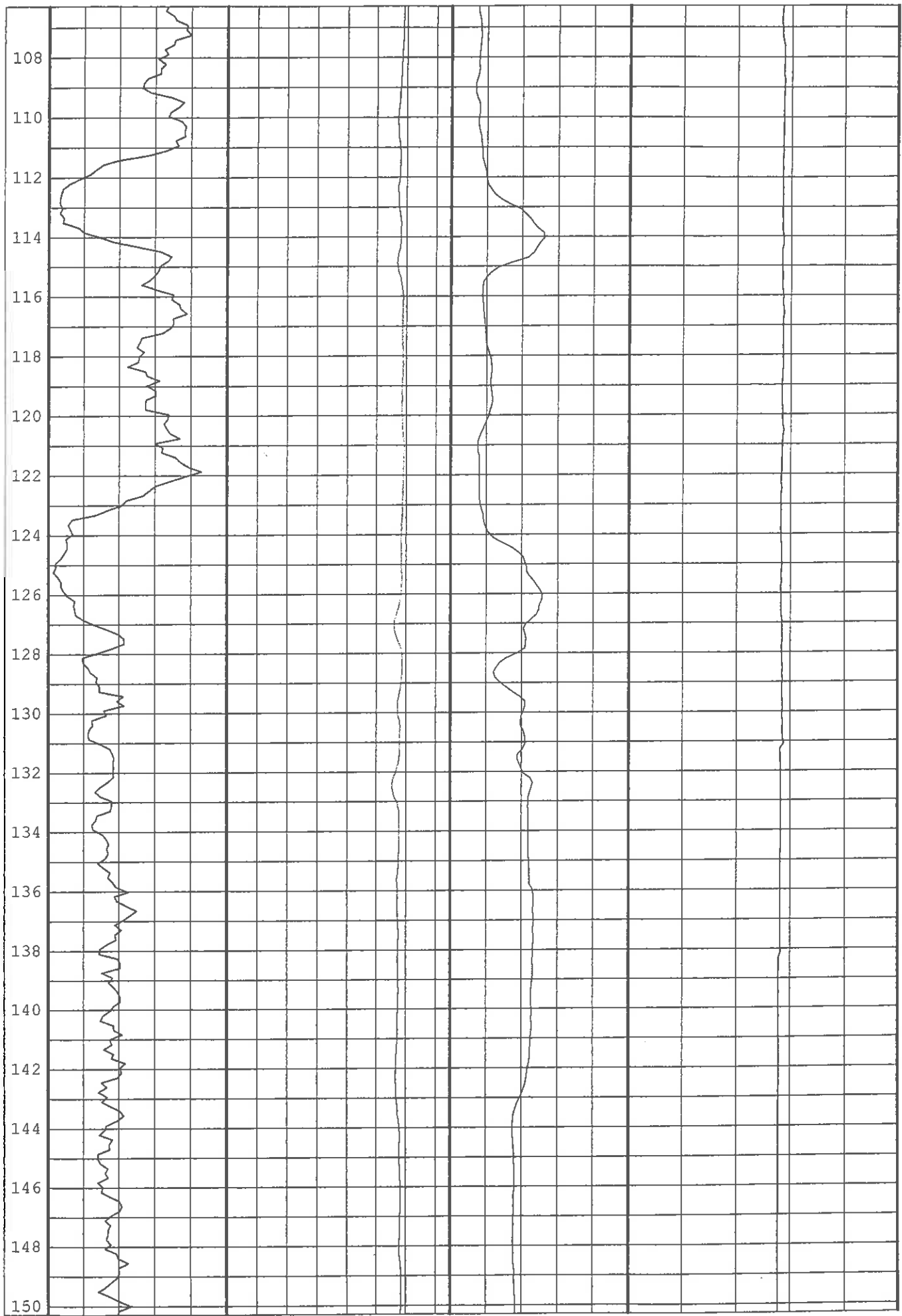


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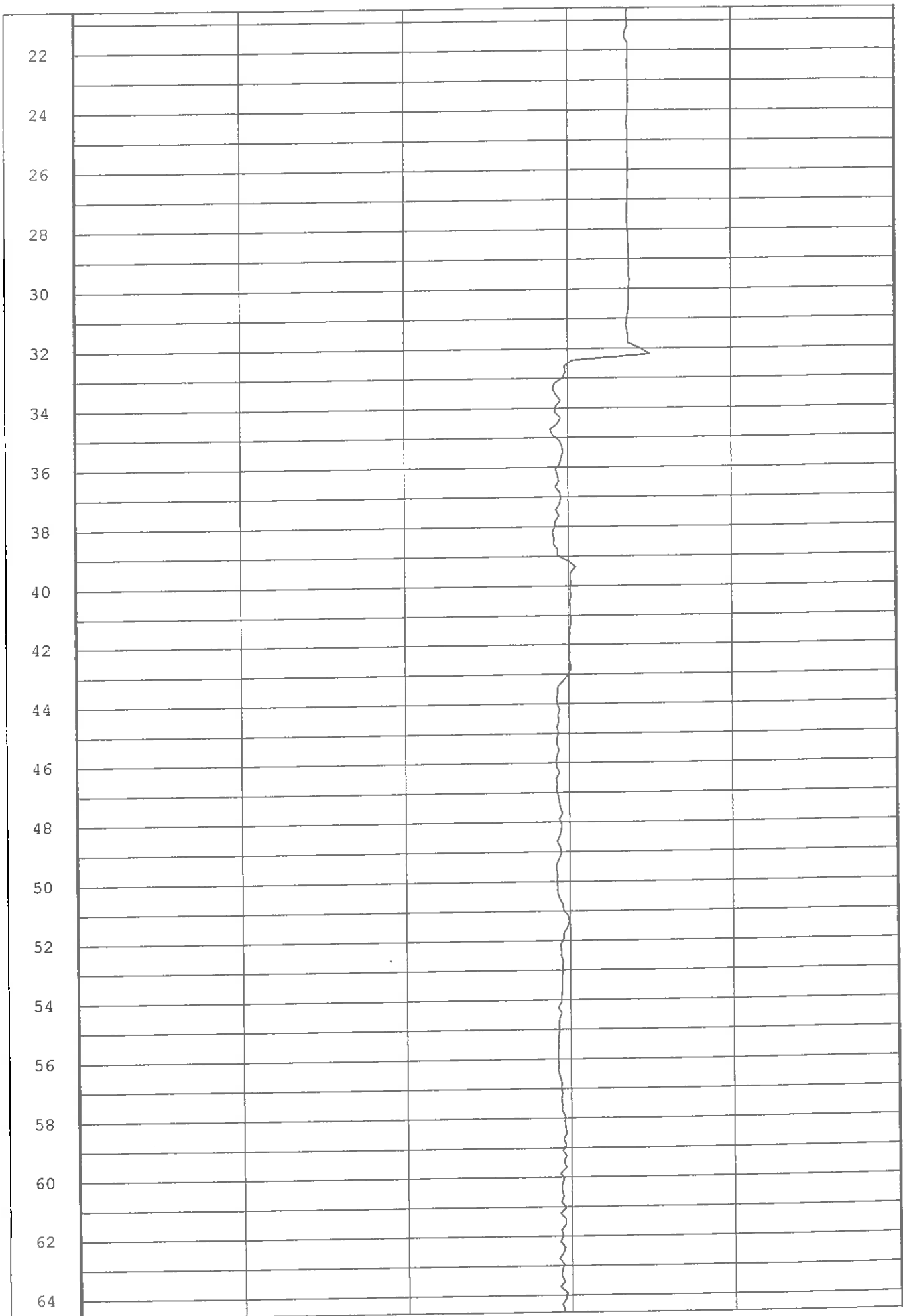


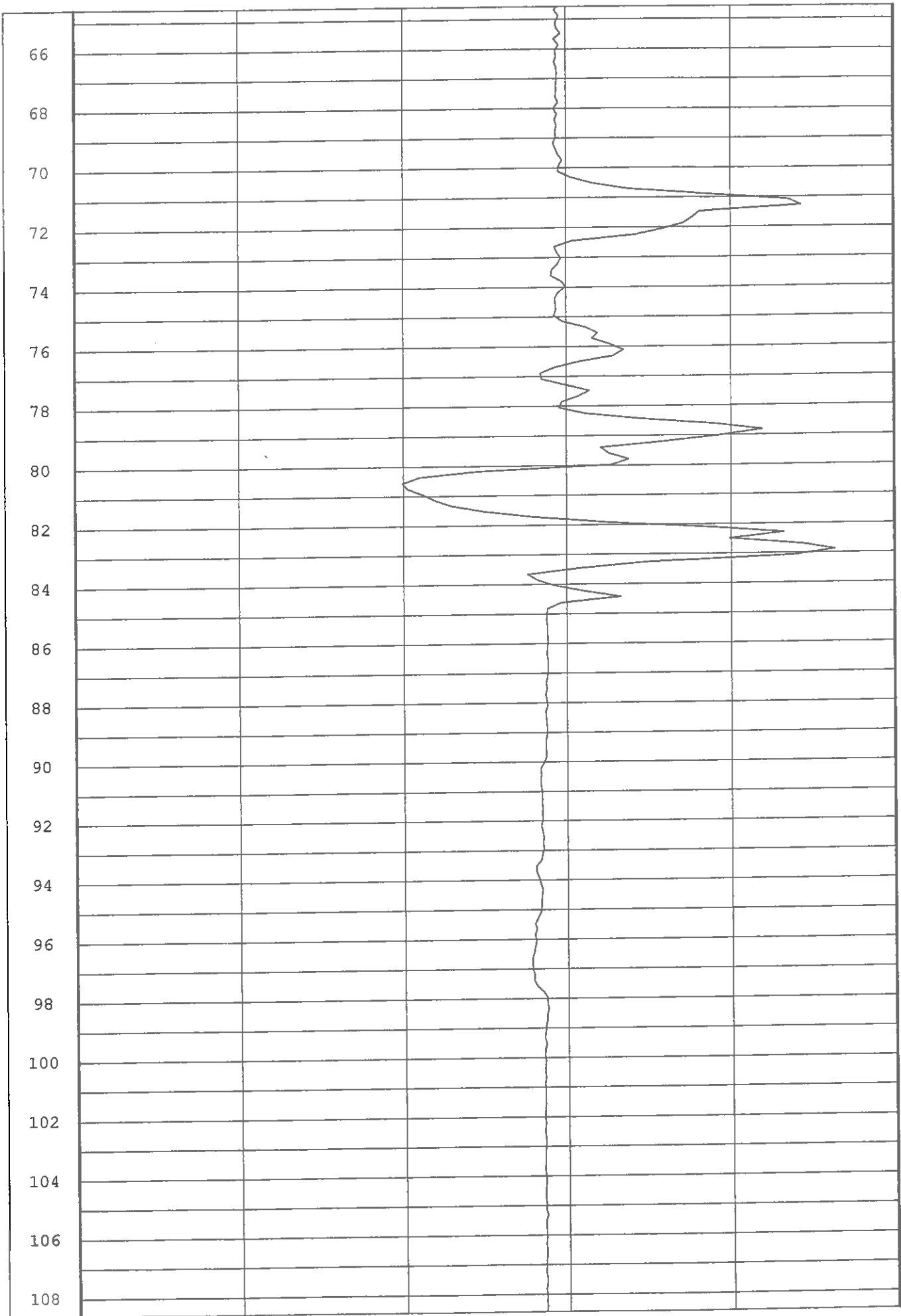


WEE

[illegible]

Depth 1ft:50ft	Caliper					
	0	inches				10
6						
8						
10						
12						
14						
16						
18						
20						





110						
112						
114						

LOG OF BOREHOLE

QA BY DATE 11-12-03
 LOCATION Erie Commons
 COORDINATES N 40° 02.039 W 105° 02.938
 TOTAL DEPTH 160'

DRILLING COMPANY N. R. Bideau
 DATE DRILLED 11-12-03
 DRILLING METHOD Rotary
 LOGGED BY Greg D. Sherman

BOREHOLE/WELL Number L-19
 GROUND SURFACE ELEVATION _____
 WATER LEVEL ENCOUNTERED _____
 STATIC 22'
 DRILLER Steve HELPER _____
 DRILLING FLUID Mud
 CHECKED BY GDS

GEOLOGIST
 COMMENTS Celia Greenman present during drilling

SITE MANAGER

Fracture Log Key 20° Orientation
 O = Open
 M = Mechanical
 H = Healed

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
------------	--------------	-----------	------------------------	--

60	H	---	Medium gray claystone/carbonaceous	Run #1 (60'-65') Recovered 3.0' RQD 95% Recovery 60%
	H	---	some non-oriented wood fragments	
		---	minor amounts of very fine grained	
	O	---	quartzose sand, soft, moist	
61	20° O	---	Dark Gray carbonaceous claystone/ Same as above	
		---	Medium gray claystone, very fine grained quartzose	
		---	sand in 20deg oriented fracture	
62	H	---		
	X	X	Core Loss 1.5	
63	X	X		
64		---	Medium gray claystone, very soft, moist	
	M	---	carbonaceous 63.5 - 63.8	
		...	Light gray very fine grained quartzose sand, poorly	
65		...	cemented, minor biotite fragments	

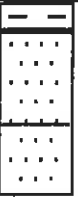
DEPTH (FT)	GRAPHIC LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
65				Run #2 (65'-70') Recovered 3.3'
66			Core Loss	RQD 85% Recovery 66%
67			Medium gray claystone, carbonaceous	Sample at 67.2 - 67.5
68			Very fine grained quartzose sandstone / medium gray claystone	
69			Medium gray claystone	
70			Light gray very fine grained quartzose sandstone with clay, soft, wet. Some carbonaceous material 10 deg bedding orientation	Losing Circulation
71			Medium to light gray very fine grained quartzose sand, slightly calcareous. Hard	Run #3 (70'-79.5') Recovered 8.6'
72			Limonite fracture coating	RQD 90% Recovery 90%
73			Medium gray claystone. Very soft, dry. Trace carbonaceous material	Sample at 71.9 - 72.2 Sample at 72.2 - 72.6

DEPTH (FT)	GRAPHIC LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
73			Same as above	
74				
75	30 H H		Dark gray carbonaceous claystone grading to coal. Minor to trace limonite coating on fractures	
76				
77	60 O		Open fracture with slickensides	
78			Coal Vitreous	
79				Sample 79.1 - 79.4
80	H		Vertical fracture	Run #4 (79.5-89.5) Recovered 3.5' RQD 100% Recovery 35% Sample 80.2 - 80.6
81				

WELL NO L-19

LOG OF BOREHOLE

PAGE 4 OF 4

DEPTH (FT)	GRAPHIC LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
82			Same as above	
83				
84				
85				Loose drilling 85.0'
86			Core loss	Lost circulation 86.5'
87				
88				
89			Dark gray carbonaceous claystone Very fine grained quartzose sandstone Hard slightly wet carbonaceous End of Core	Sample 88.5' - 88.8' Sample 88.8' - 89.0' Sample 89.2' - 89.5'
90				

UNCONFINED COMPRESSIVE STRENGTH
ASTM D 2216

UNCONFINED COMPRESSIVE STRENGTH TEST DATA
ASTM D 2166

CLIENT Western Environmental & Ecology

JOB NO. 2596-01

BORING NO. L-19
DEPTH 72.2-72.6'
SAMPLE NO.
SOIL DESCR.
LOCATION Erie

SAMPLED
DATE TESTED 12-19-03 CAL
SATURATED TEST No
AT FIELD MOIST. Yes
CONF. PRES. PSF 0
TEST TYPE UCS

MOISTURE/DENSITY DATA	BEFORE TEST
Wt. Soil + Moisture (g)	388.6
Wt. Wet Soil & Pan (g)	397.0
Wt. Dry Soil & Pan (g)	342.3
Wt. Lost Moisture (g)	54.7
Wt. of Pan Only (g)	8.4
Wt. of Dry Soil (g)	333.8
Moisture Content %	16.4
Wet Density PCF	131.2
Dry Density PCF	112.7
Init. Diameter (in)	2.144
Init. Area (sq in)	3.610
Init. Height (in)	3.125
Height to Diameter Ratio	1.458
Volume cu Ft.	0.00653

Notes & Comments:

Very Short Sample

Data entered by: SR
Data checked by: CAL
FileName: WEU07227

Date: 12/24/2003
Date: 12/24/03

ADVANCED TERRA TESTING, INC.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

CLIENT	Western Environmental & Ecology	JOB NO.	2596-01
BORING NO.	L-19	SAMPLED	
DEPTH	72.2-72.6'	DATE TESTED	12-19-03 CAL
SAMPLE NO.		SATURATED TEST	No
SOIL DESCR.		AT FIELD MOIST.	Yes
LOCATION	Erie	CONF. PRES. PSF	0
		TEST TYPE	UCS

Init. Ht. (in)	3.125	Init. Area (sq in)	3.610
		Strain Rate (in/min)	0.031

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Prin. Stress Ratio
0.0	0	0.000	0.00	3.610	0	0.00	0.0	0	0	0.00
2.0	80	0.003	0.10	3.614	80	0.00	0.0	0	80	0.00
3.0	120	0.006	0.20	3.618	119	0.00	0.0	0	119	0.00
4.0	160	0.009	0.30	3.621	159	0.00	0.0	0	159	0.00
6.0	239	0.013	0.40	3.625	238	0.00	0.0	0	238	0.00
9.0	359	0.016	0.50	3.628	357	0.00	0.0	0	357	0.00
11.0	439	0.019	0.60	3.632	436	0.00	0.0	0	436	0.00
14.0	558	0.022	0.70	3.636	554	0.00	0.0	0	554	0.00
18.0	718	0.025	0.80	3.639	712	0.00	0.0	0	712	0.00
22.0	877	0.028	0.90	3.643	870	0.00	0.0	0	870	0.00
25.0	997	0.031	1.00	3.647	987	0.00	0.0	0	987	0.00
43.0	1715	0.047	1.50	3.665	1689	0.00	0.0	0	1689	0.00
61.0	2433	0.063	2.00	3.684	2384	0.00	0.0	0	2384	0.00
79.0	3151	0.078	2.50	3.703	3072	0.00	0.0	0	3072	0.00
99.0	3949	0.103	3.30	3.733	3818	0.00	0.0	0	3818	0.00
98.0	3909	0.109	3.50	3.741	3772	0.00	0.0	0	3772	0.00
93.0	3709	0.125	4.00	3.761	3561	0.00	0.0	0	3561	0.00
60.0	2393	0.156	5.00	3.800	2274	0.00	0.0	0	2274	0.00

Data entered by: SR Date: 12/24/2003

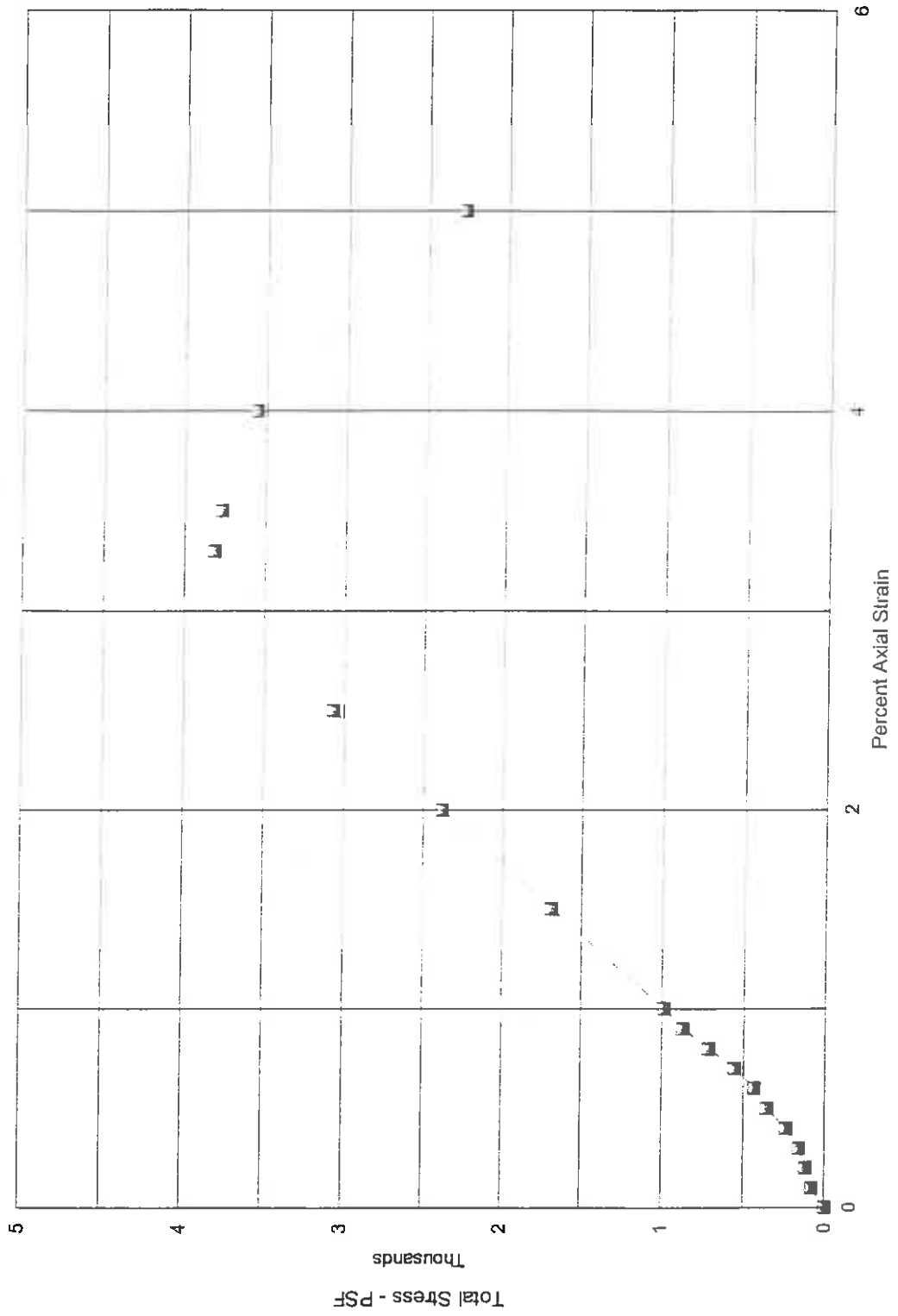
Data checked by: Cue Date: 12/24/03

FileName: WEU07227

ADVANCED TERRA TESTING, INC.

UNCONFINED COMPRESSIVE STRENGTH TEST

L-19, 72.2-72.6'







UNCONFINED COMPRESSIVE STRENGTH TEST DATA
ASTM D 2166

CLIENT Western Environmental & Ecology

JOB NO. 2596-01

BORING NO. L-19
DEPTH 79.1-79.1'
SAMPLE NO.
SOIL DESCR.
LOCATION Erie

SAMPLED
DATE TESTED 12-19-03 CAL
SATURATED TEST No
AT FIELD MOIST. Yes
CONF. PRES. PSF 0
TEST TYPE UCS

MOISTURE/DENSITY DATA	BEFORE TEST
Wt. Soil + Moisture (g)	258.8
Wt. Wet Soil & Pan (g)	267.0
Wt. Dry Soil & Pan (g)	212.7
Wt. Lost Moisture (g)	54.3
Wt. of Pan Only (g)	8.2
Wt. of Dry Soil (g)	204.5
Moisture Content %	26.5
Wet Density PCF	83.2
Dry Density PCF	65.8
Init. Diameter (in)	2.098
Init. Area (sq in)	3.457
Init. Height (in)	3.426
Height to Diameter Ratio	1.633
Volume cu Ft.	0.00685

Notes & Comments:

Short Sample

* Density is with sulfate caps on both ends of the sample and very rough edges on sides of sample. See photograph.

** Moisture is without sulfaset.

*** Prestressed to 2000 lbs on Geomatic wouldn't fail.

**** Loaded to max capacity of 4760 lbs on the MTS 0936. The sample didn't fail, but splintered. (See photograph #2). Per KMR 12-22-03 testing was ended.

***** $4760 \text{ lbs} / 3.457 \text{ in}^2 = 1377 \text{ psi}$.

Data entered by: SR

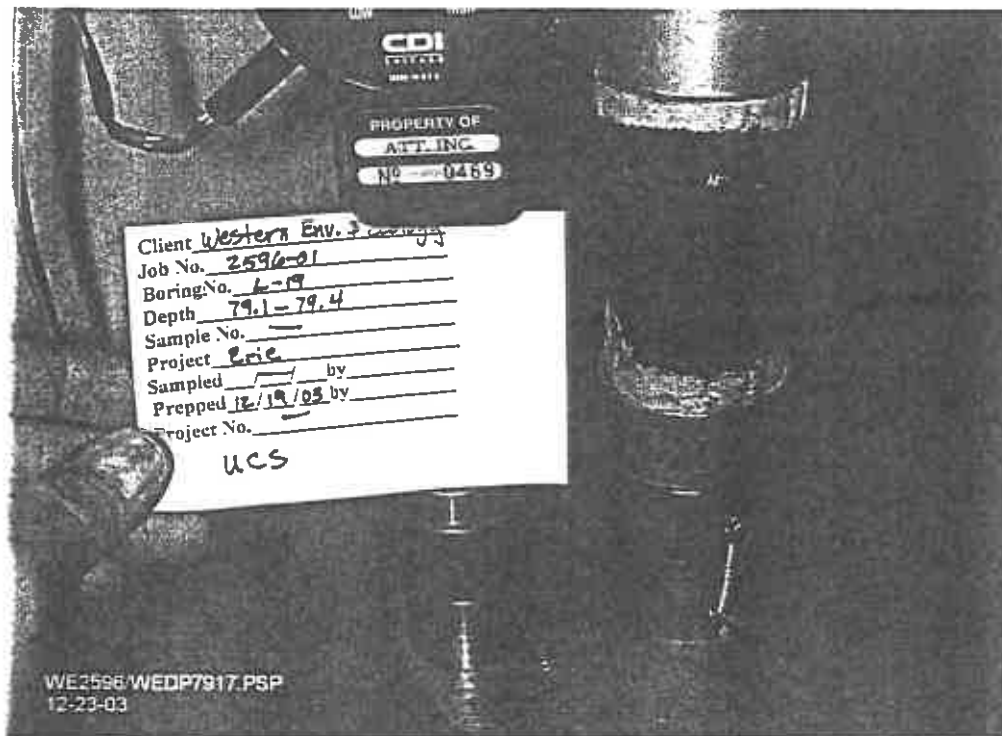
Date: 12/24/2003

Data checked by: al

Date: 1/05/04

FileName: WET0L19

ADVANCED TERRA TESTING, INC.



CDI
CORPORATION
MINNEAPOLIS

PROPERTY OF
ATT. INC.
No. 0469

Client Western Env. & Consulting
Job No. 2596-01
Boring No. 1-19
Depth 79.1 - 79.4
Sample No.
Project Eric
Sampled by
Prepped 12/19/03 by
Project No.

UCS

WE2596 WEDP7917.PSP
12-23-03

Client Western Env. & Ecology
Job No. 2596-01
Boring No. L-19
Depth 79.1 - 79.4
Sample No. —
Project Eric
Sampled — by —
Prepped 12/19/03 by —
Project No. —

UCS

MOISTURE CONTENT & DENSITY
ASTM D 2216 & 2937

Moisture & Density Determinations

ASTM D 2216 & D 2937

CLIENT: Western Environment & Ecology
LOCATION: Erie

JOB NO.: 2596-01

BORING	L-19	L-19	L-19
SAMPLE DEPTH	88.5-88.8'	89.2-89.5'	80.2-80.6'
SAMPLE NO.			
DATE SAMPLED			
DATE TESTED	12/17/03 DMP/SM	12/17/03 SM	12/17/03 SM
SOIL DESCRIPTION			

DENSITY DETERMINATIONS

Sample Height (IN)	1.420	2.370	Density not possible
Sample Diameter (IN)	2.160	2.140	
Wt of Wet Soil (Gms)	195.07	440.90	
Sample Volume (CU Ft)	0.00301	0.00493	
WET DENSITY (PCF)	142.8	197.0	
DRY DENSITY (PCF)	123.9	195.9	

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	357.49	449.15	206.10
Wt. of Dry Soil & Dish (gms)	311.26	446.71	159.84
Net Loss of Moisture (gms)	46.23	2.44	46.26
Wt. of Dish (gms)	8.36	8.27	8.06
Wt. of Dry Soil (gms)	302.90	438.44	151.78
Moisture Content (%)	15.3	0.6	30.5

BORING
SAMPLE DEPTH
SAMPLE NO.
DATE SAMPLED
DATE TESTED
SOIL DESCRIPTION

DENSITY DETERMINATIONS

Sample Height (IN)
Sample Diameter (IN)
Wt of Wet Soil (Gms)
Sample Volume (CU Ft)
WET DENSITY (PCF)
DRY DENSITY (PCF)

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)
Wt. of Dry Soil & Dish (gms)
Net Loss of Moisture (gms)
Wt. of Dish (gms)
Wt. of Dry Soil (gms)
Moisture Content (%)

Data entered by:
Data checked by: 
FileName:

JLS
Date: 12/23/03
WYMDERIE

Date:

12/23/2003

ADVANCED TERRA TESTING, INC.

Moisture & Density Determinations
ASTM D 2216 & D 2937

CLIENT: Western Environment & Ecology
LOCATION: Erie

JOB NO.: 2596-01

BORING	L-19	L-19	L-19	L-19
SAMPLE DEPTH	80.2-80.6'	88.8-89.0'	67.2-67.5'	71.9-72.2'
SAMPLE NO.				
DATE SAMPLED				
DATE TESTED				
SOIL DESCRIPTION				

DENSITY DETERMINATIONS

Sample Height (IN)		1.506	1.759	1.067
Sample Diameter (IN)	DENSITY	2.153	1.926	2.166
Wt of Wet Soil (GMS)	NOT	194.83	177.17	137.06
Sample Volume (CU Ft)	POSSIBLE	0.00317	0.00297	0.00228
WET DENSITY (PCF)		135.4	131.7	132.8
DRY DENSITY (PCF)		123.0	113.1	114.8

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	178.28	202.85	185.36	224.53
Wt. of Dry Soil & Dish (gms)	140.46	185.12	160.39	195.16
Net Loss of Moisture (gms)	37.82	17.73	24.97	29.37
Wt. of Dish (gms)	16.08	8.25	8.19	8.28
Wt. of Dry Soil (gms)	124.38	176.87	152.20	186.88
Moisture Content (%)	30.4	10.0	16.4	15.7

Data entered by:
Data checked by: Cal
FileName:

SR
Date: 1/13/2004
WEMDL19

Date:

01/12/2004

ADVANCED TERRA TESTING, INC.

LOG OF CORE RB-21

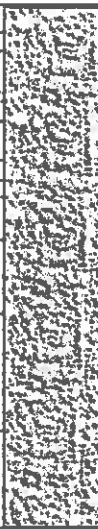
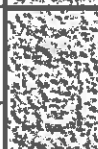
QA BY DATE 1/29/04
 LOCATION Wildflower Subdivision
 COORDINATES N 40°6.171' W 104°59.314
 TOTAL DEPTH 98 feet

DRILLING COMPANY NR Bideau Drilling
 DATE DRILLED 1/30/2004
 DRILLING METHOD Rotary Mud
 LOGGED BY B. Partington
 GEOLOGIST

BOREHOLE/WELL Number RB-21C
 GROUND SURFACE ELEVATION _____
 WATER LEVEL ENCOUNTERED _____
 STATIC _____
 DRILLER Steve HELPER Gary
 DRILLING FLUID Mud
 CHECKED BY G. Sherman
 SITE MANAGER

COMMENTS Hole located adjacent to Rotary Boring RB-21
 ● Geotechnical Samples are referenced as WF-1

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
------------	--------------	-----------	------------------------	--

40	10" M		Sandstone, fine to very fine grained, slightly cemented, dry, soft, non calcareous, light olive brown	Begin Core, 40.0 feet Run 1: 40.0' to 50.0' 81 % Recovery 78% RQD
	8" M			
	H			
	M			
	M			
	M			
	M			
	10" M			
	M			
	M			
41	H		Sandstone, fine to very fine grained, slightly cemented, dry, soft, non calcareous, light olive brown	
	M			
	M			
	M			
42	H		Sandstone, fine to very fine grained, slightly cemented, dry, soft, non calcareous, light olive brown	
	M			
	M			
	M			
43	M		Claystone, medium moist, hard, light olive brown, 2' bedding planes	
	M			
	M			
	M			
44	M		Sandstone, fine to very fine grained, slightly cemented, dry, soft, non calcareous, light olive brown	
	M			
	M			
	M			
45	8" O			

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
45	15° O		Sandstone, fine to very fine grained, slightly cemented, dry, hard, non calcareous, light olive brown	
	M		Claystone, medium moist, hard, light olive brown, 2° bedding planes	
	M			
	O			
	M			
	M			
46	M		Sandstone, fine to medium grained, cemented, dry, hard, non calcareous, light brownish gray, 0° to 10° bedding planes	
	O			
	M			
	M			
	M			
	6° H			
47	6° H		Claystone, medium moist, hard, light olive brown, 0° to 10° bedding planes	
	10° H			
	10° H			
	M		Sandstone, fine to medium grained, moderately cemented, dry, very hard, non calcareous, light olive brown, 0° to 10° bedding planes	
			Claystone, medium moist, hard, light olive brown, 2° bedding planes	
48			Core Loss	
49				
				50.0', end of run 1
50	M		Claystone, medium moist, hard, dark grayish brown, 2° bedding planes	Run 2: 50.0' to 53.0' 43% Recovery ● 23% RQD
	M			
	M			
51	M			
52				
53				53.0', end of run 2

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
53	14° H	Claystone, medium moist, hard, olive brown, 0° to 14° bedding planes		Run 3: 53.0' to 63.0' 100% Recovery 74% RQD
	17° H			
	8° H			
54	H			
	H			
55	H			
	H	Claystone, carbonaceous, medium moist, hard, very dark gray to black, 0° to 14° bedding planes		
	10° H			
	10° H			
	8° H			
56	H			
	10° H			
	O			
	M			
	8° H			
	H			
	H			
	8° H			
57	65° O			
	70° O			
58	60° O			
	15° H			
59	8° H			
	M			
60	M			
	10° H			
61	85° O			

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
61	85° O		Claystone, carbonaceous, medium moist, hard, very dark gray to black, 0" to 14" bedding planes	
	M			
	M			
62			Coal, very fractured and blocky, hard, black	
63				63.0', end of run 3
	M		Claystone, carbonaceous, medium moist, hard, very dark gray to black, horizontal bedding planes	Run 4: 63.0' to 72.8' 99% Recovery 90% RQD
	M			
64	M			
	M			
65	M			
	M			
	M			
66	15° O			
	65° O			
67	M			
	M			
	M			
	M			
68	20° O			
	M			
69	25° O			

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
69	M		Claystone, carbonaceous, medium moist, hard, very dark gray to black, 0" to 10" bedding planes	
	8" M			
	M			
70	H			
	5" M			
	10" M			
	30" O			
71	30" O		Claystone, non-carbonaceous, medium moist, hard, 0" to 5" bedding planes, dark gray	
72				
				72.8', end of run 4
73	35" O			Run 5: 72.8' to 80.7' 100% Recovery 86% RQD
	35" O			
74	M			
	M			
	M			
	M			
75	M			
	M			
			Sandstone, very fine grained, dry, soft, poorly cemented, horizontal bedding planes, dark greenish gray	
76	M			
	M			
77			Claystone, medium moist, hard, horizontal bedding planes, dark greenish gray	

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
77	M		Claystone, medium moist, hard, horizontal bedding planes, dark greenish gray	
			Sandstone, soft, dry, poorly cemented, dark greenish gray	
	M			
	M			
	15° O			
78	15° O			
	M			
	M			
	M			
79	M		Claystone, medium moist, hard, horizontal bedding planes, dark greenish gray	●
	M			
	M			
80				<i>Losing circulation</i>
	M			80.7', end of run 5
	M			Run 6: 80.7' to 85.7' 2.1' less than 4" 3.9' recovered
81	M			
	M			
	M			
	M			
	M			
82	M			●
	M			
	M			
	M			
	M			
	M			
83	M			
	M			
	M			
	M			
84	M			
	M			
	M			
	M			
	M			
85			Core loss	

WELL NO RB-21

LOG OF CORE

PAGE 7 OF 8

DEPTH (FT)	FRACTURE LOG	ROCK TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
85				85.7', end of run 6
86				Run 7: 85.7' to 98.0' 31% Recovery 32% RQD
87				<i>Circulation lost</i>
88				
89			Core not recovered	
90				
91				
92				
93				

LOG OF Core: RB-29

QA BY DATE 1/20/04
 LOCATION Wildflower Subdivision
 COORDINATES N 40° 6.341, W 104° 59.493
 TOTAL DEPTH 103 feet

DRILLING COMPANY N. R. Bideau Drilling
 DATE DRILLED 1/30/2004
 DRILLING METHOD Rotary Mud
 LOGGED BY B. Partington
GEOLOGIST

BOREHOLE/WELL Number RB-29C
 GROUND SURFACE ELEVATION _____
 WATER LEVEL ENCOUNTERED _____
 STATIC _____
 DRILLER Steve HELPER Gary
 DRILLING FLUID Mud
 CHECKED BY G. Sherman
SITE MANAGER

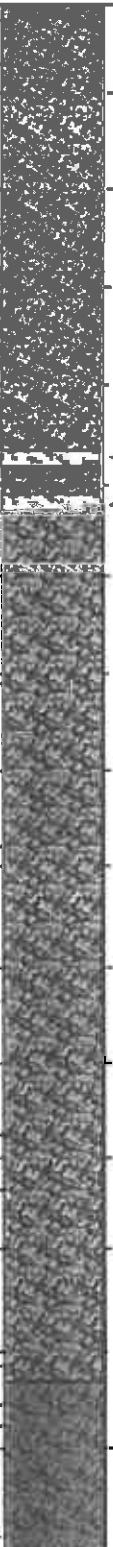
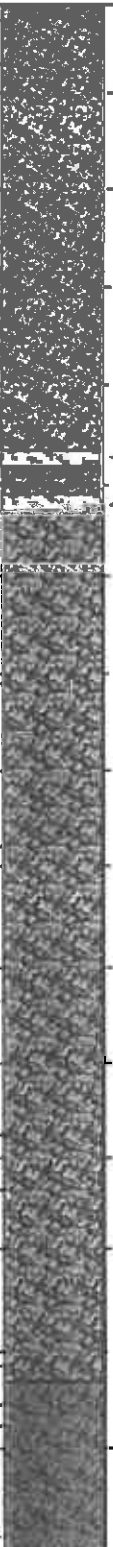
COMMENTS Hole located adjacent to rotary boring RB-29
● Geotechnical samples are referenced as WF-9

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
------------	-------------	-------------	------------------------	--

30				Begin Core, 30.5 feet
31	20° O VI H		Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 2" bedding planes	Run 1: 30.5' to 37.0' 85% Recovery 76% RQD
32	H VI			
33	30° O			
34	10 M 60° O 60° O		Sandstone, fine grained, poorly cemented, dry, soft, non-calcareous, light olive brown	
			Claystone, very sandy, medium moist, hard, greenish gray	
			Sandstone, fine to medium grained, poorly cemented, dry, soft, non calcareous, olive yellow	
35	O			

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
35			Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 10" bedding planes	
			Sandstone, fine grained, poorly cemented, dry, soft, non-calcareous, light olive brown	
36			Core loss	
37			Core loss	37 feet, end of run 1
38			Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 2" bedding planes	Run 2: 37' to 41' 50% Recovery 30% RQD
39			Core loss	
40			Core loss	
41			Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 10" bedding planes	41 feet, end of run 2
42			Sandstone, fine grained, poorly cemented, dry, soft, non-calcareous, light olive brown	Run 3: 41' to 51' 76% Recovery 53% RQD
43				

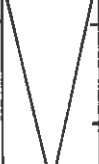
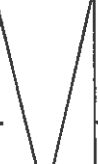
DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
43	M O M		Sandstone, fine grained, poorly cemented, dry, soft, non-calcareous, light olive brown	
44	M O M		Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 10" bedding planes	
			Very hard interbedded cemented claystone, brown	
45	M 50° O M M		Claystone, medium moist, medium hard to hard, greenish gray, occasional iron-stains, 10" bedding planes	
46	10° M H H H		Interbedded concretions	
47	H		Claystone, beginning to transition into carbonaceous claystone, dark olive changing into very dark gray	
48			Core loss	
49	H		Claystone, carbonaceous, hard, medium moist, very dark gray, 2" bedding planes	
50	5" M H			
51				51', end of run 3

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
51	M		Claystone, carbonaceous, hard, medium moist, very dark gray, 2" bedding planes	Run 4: 51' to 58.4' 100% Recovery 82% RQD
	M			
52	M			
	M			
	70° O			
53	H			
	M			
	M			
	M			
	M			
		Interbedded sandstone lenses, 0.1' thick, poorly cemented, fine grained, soft, olive brown		
54				58.4', end of run 4
	5° M			
55	H			
	20° O			
56	2° M			
	M			
57	5° M			
58	H			
	M			
	M			
		Claystone, carbonaceous, hard, moist, black, 2" bedding planes	Run 5: 58.4' to 69.0' 75% Recovery 82% RQD	
	85° O			
59	M			

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
67			Core loss	
68	5" M		Claystone, carbonaceous, hard, black, 2" bedding planes	
	M			
	M			
69	M			69.0', end of run 5
	M			Run 6: 69.0' to 75.8'
	M			98% Recovery
	M			84% RQD
70	M			●
	M			
	10" M			
71				
72				
73	M			
	M			
74	8" M		Coal / Claystone, interbedded, hard, moist, black	
	8" M			
	8" M			
			Core loss	
			Coal, very fractured and blocky, hard, black	
75				

WELL NO RB-29**LOG OF CORE**PAGE 7 OF 10

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
75			Claystone, carbonaceous, hard, black	
	15° O			75.8', end of run 6
76	10° O			Run 7: 75.8' to 86.0'
	M			69% Recovery
	M			74% RQD
	M			
77	15° O			
	M			
	M			
78	30° O			
	M			
79				
	H			
80	M			
	M			
	85° O			
81				
	M			
	M			
82	M			
	M			
			Coal, very fractured and blocky, hard, black	
			Eureka Mine Main Seam	
83				

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
83			Coal, very fractured and blocky, hard, black	
84				
85				
86			Coal, very fractured and blocky, hard, black	86.0, end of run 7
87				Run 8: 86.0' to 93.0' 86% Recovery 57% RQD
88				
89				
90				
91				

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
91			Coal, very fractured and blocky, hard, black	
92			Core loss	
93			Coal, very fractured and blocky, hard, black	93.0, end of run 8
			Coal / Claystone, interbedded, hard, black	Run 9: 93.0' to 103.0'
	M		Sandstone, carbonaceous, cemented, hard very dark gray to black	100% Recovery
94	M		Claystone, carbonaceous, moist, hard, slightly sandy, very dark gray	83% RQD
	M		Sandstone, hard, poorly to slightly cemented, gray	
	5" M			
95	M			
	M			
	10" M			
96	M			
	M			
97	M			
	M			
98	M			
	M			
99	M			



Soils and
Materials
Consultants, Inc.

5604 KENDALL COURT
ARVADA, COLORADO 80002
Phone (303) 431-2335
Fax (303) 431-2594

Western Environment & Ecology, Inc.
2217 W. Powers Avenue
Littleton, CO 80120

April 13, 2004

Project No. 2-238-01

Attention: Mr. Brian R. Partington

Subject: Unconfined Compressive Strength Test Data, Samples
Designated Test Hole WF-1 and WF-9, Wild Flower.

Dear Mr. Partington:

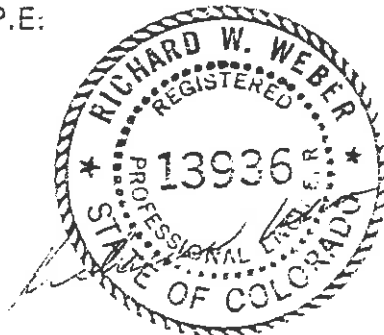
Unconfined compressive strength testing has been performed on 15 core samples supplied to this firm. The supplied data and resulting laboratory test results are supplied on the attached Figures 1 through 15. It should be noted that several of the samples were fractured (some highly fractured) and several of the initial readings are as a result of closing the fracture/layer systems.

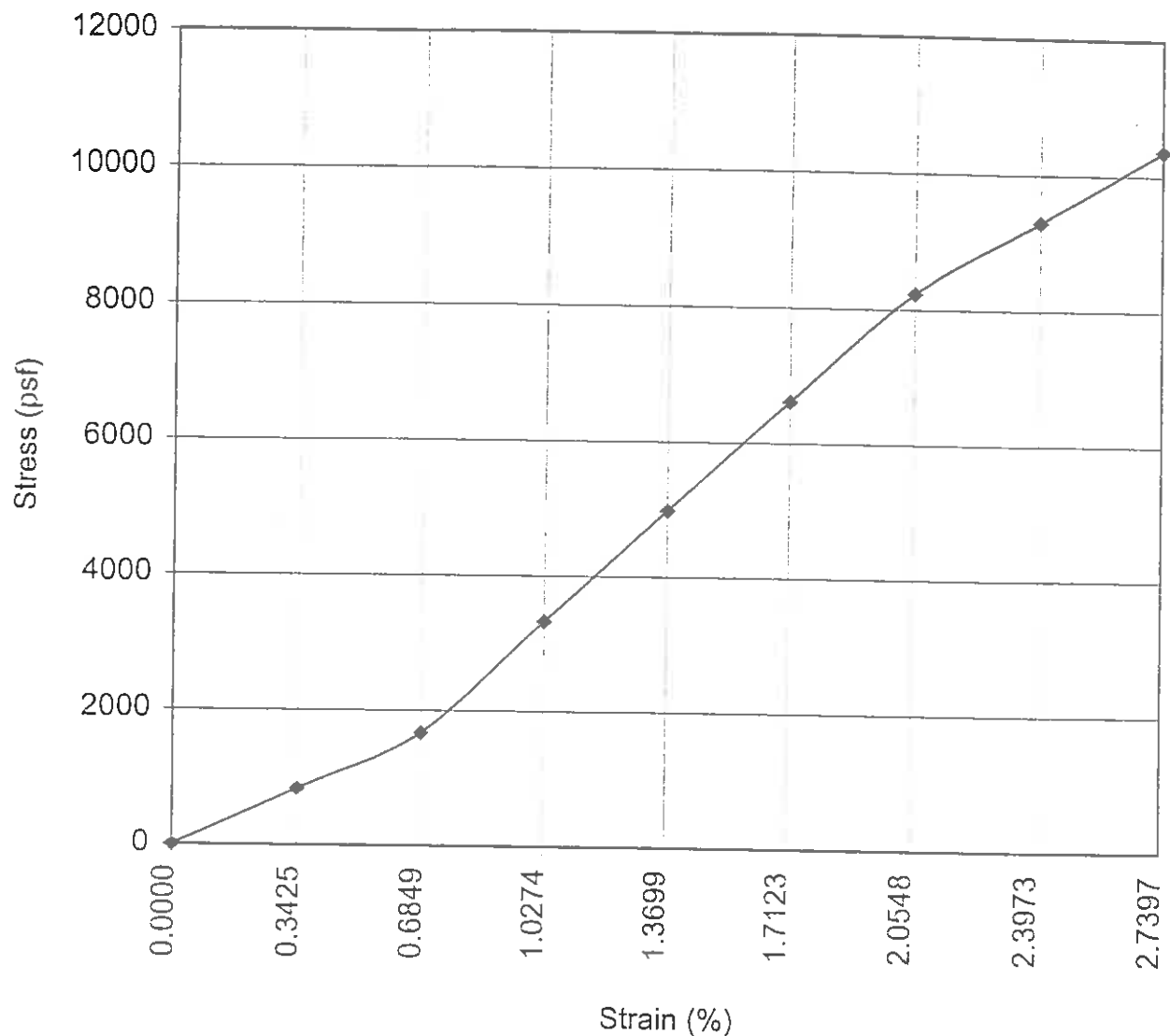
Please call if additional information and/or testing services are desired.

SOILS AND MATERIALS CONSULTANTS, INC.
Richard W. Weber, P.E.
Principal Engineer

RWW/jb

Copies: 3





SAMPLE DESCRIPTION: CLAYSTONE, hard, medium moist, green

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 50.4 FEET

SAMPLE: LENGTH: 4.38 in. DIAMETER: 2.17 in. L/D: 2.02

MOISTURE CONTENT: 12.8% DRY DENSITY: 113 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 10,500 PSF

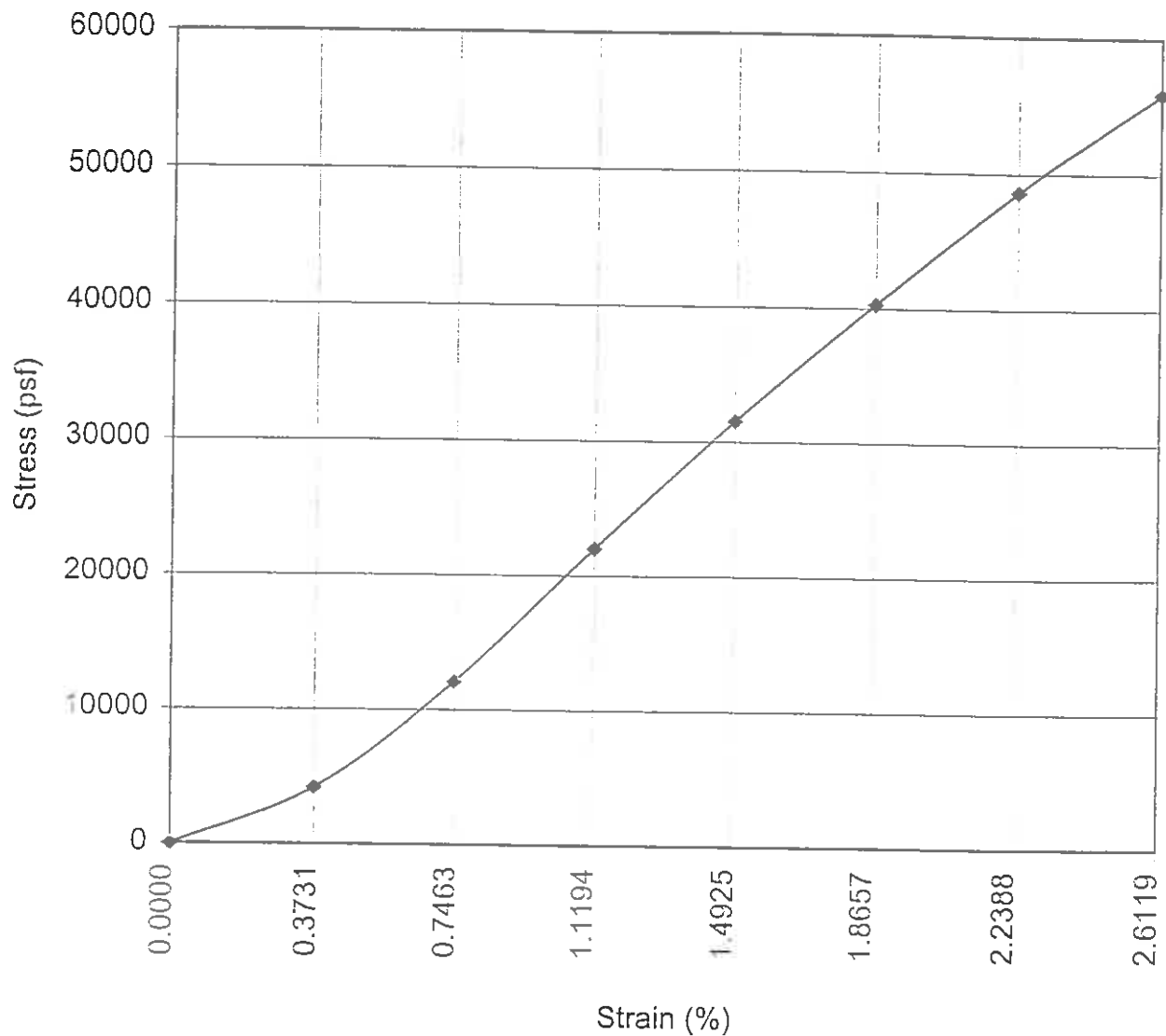
REMARKS: Poor Sample, very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 1



SAMPLE DESCRIPTION: CLAYSTONE, very hard, medium moist, iron stained, brown

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 53.7 FEET

SAMPLE: LENGTH: 4.02 in. DIAMETER: 1.95 in. L/D: 2.06

MOISTURE CONTENT: 11.8% DRY DENSITY: 128 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 56,000 PSF

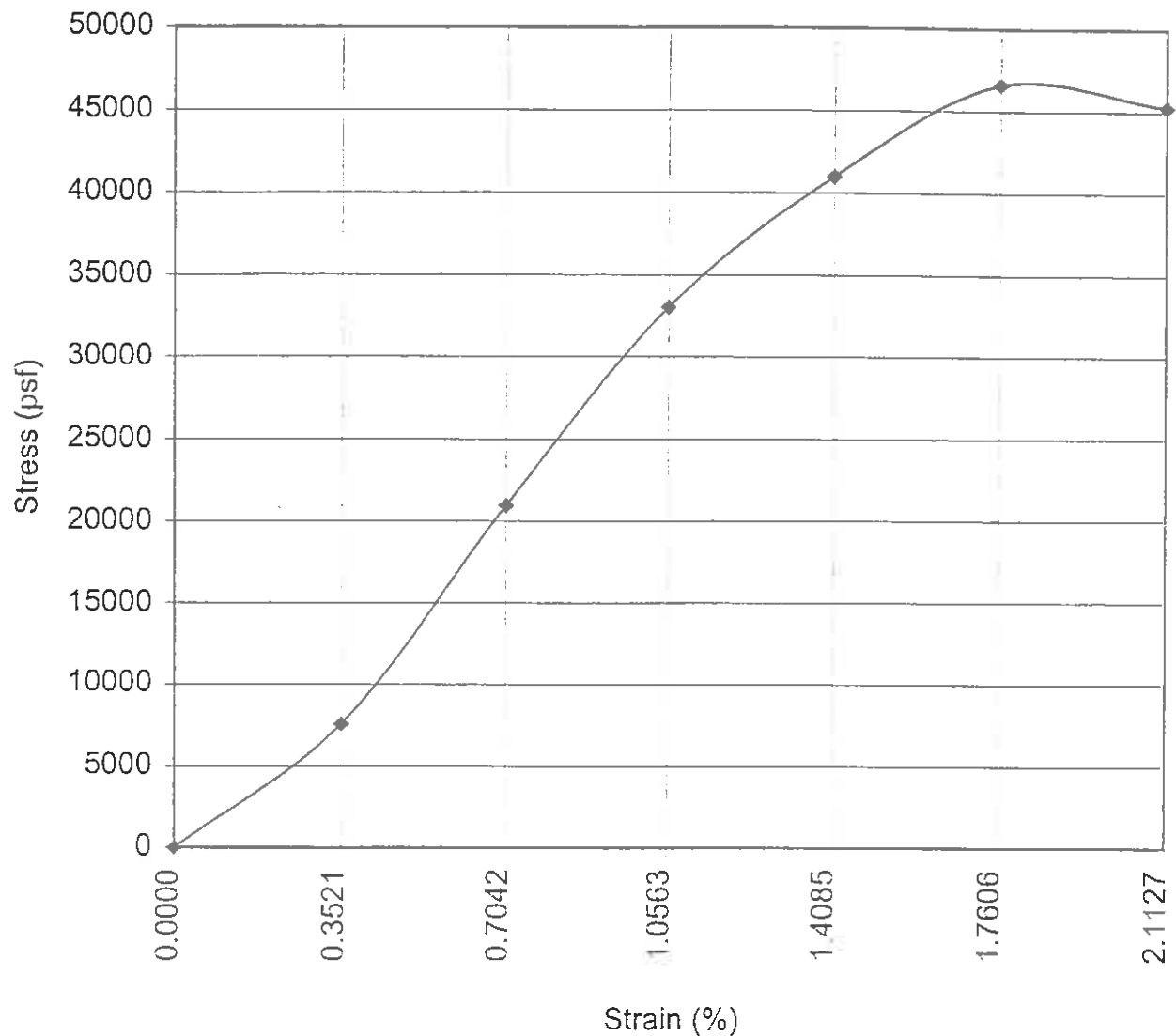
REMARKS: Many horizontal layers, fractured



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 2



SAMPLE DESCRIPTION: CLAYSTONE, very hard, medium moist, black w/ white lenses, iron stained

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 58.7 FEET

SAMPLE: LENGTH: 4.26 in. DIAMETER: 2.12 in. L/D: 2.01

MOISTURE CONTENT: 15.2% DRY DENSITY: 113 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 47,500 PSF

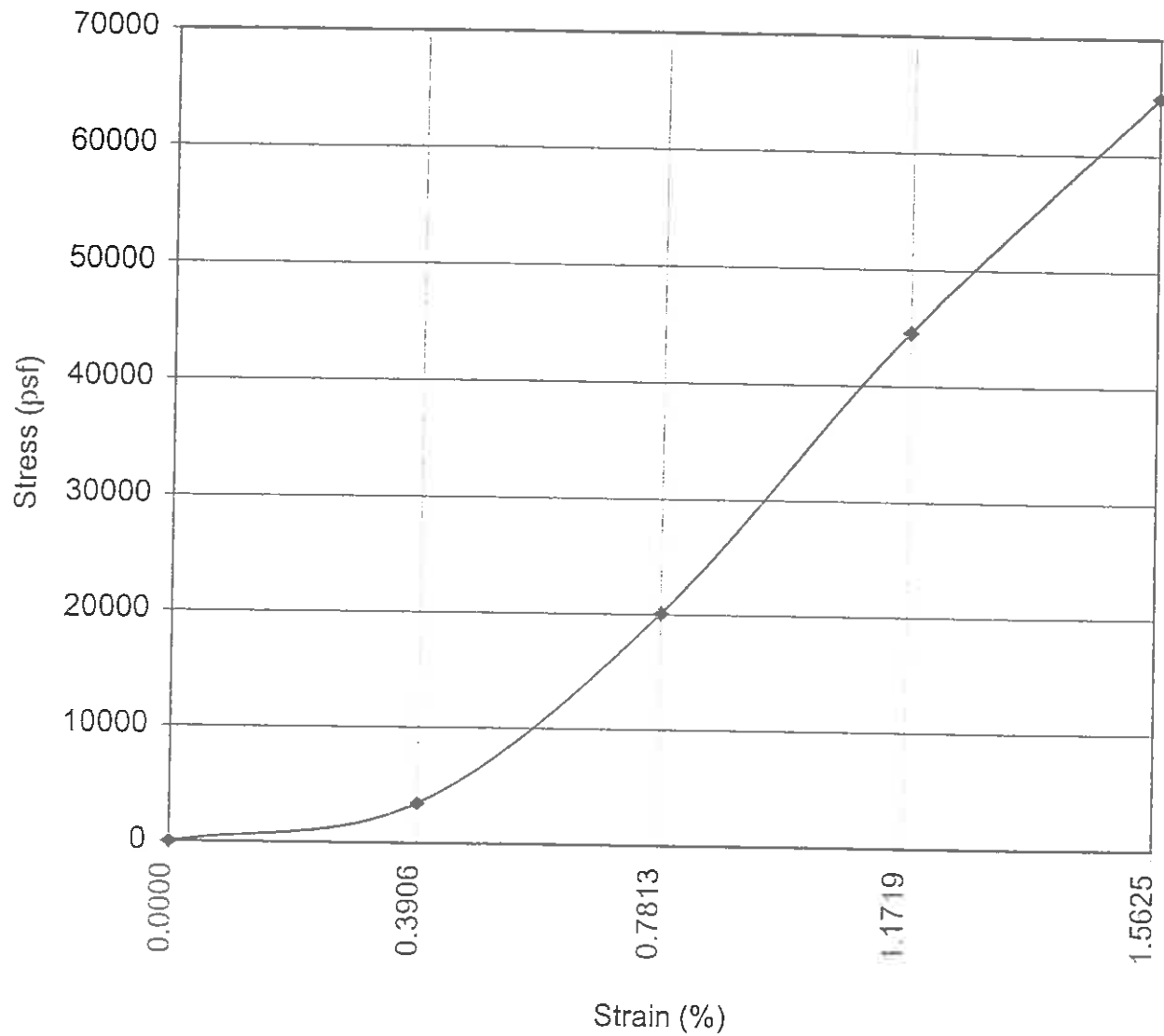
REMARKS: Very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 3



SAMPLE DESCRIPTION: LIGNITE, very hard, black

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 65.1 FEET

SAMPLE: LENGTH: 3.84 in. DIAMETER: 2.14 in. L/D: 1.79

MOISTURE CONTENT: 16.0% DRY DENSITY: 095 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 65,000 PSF

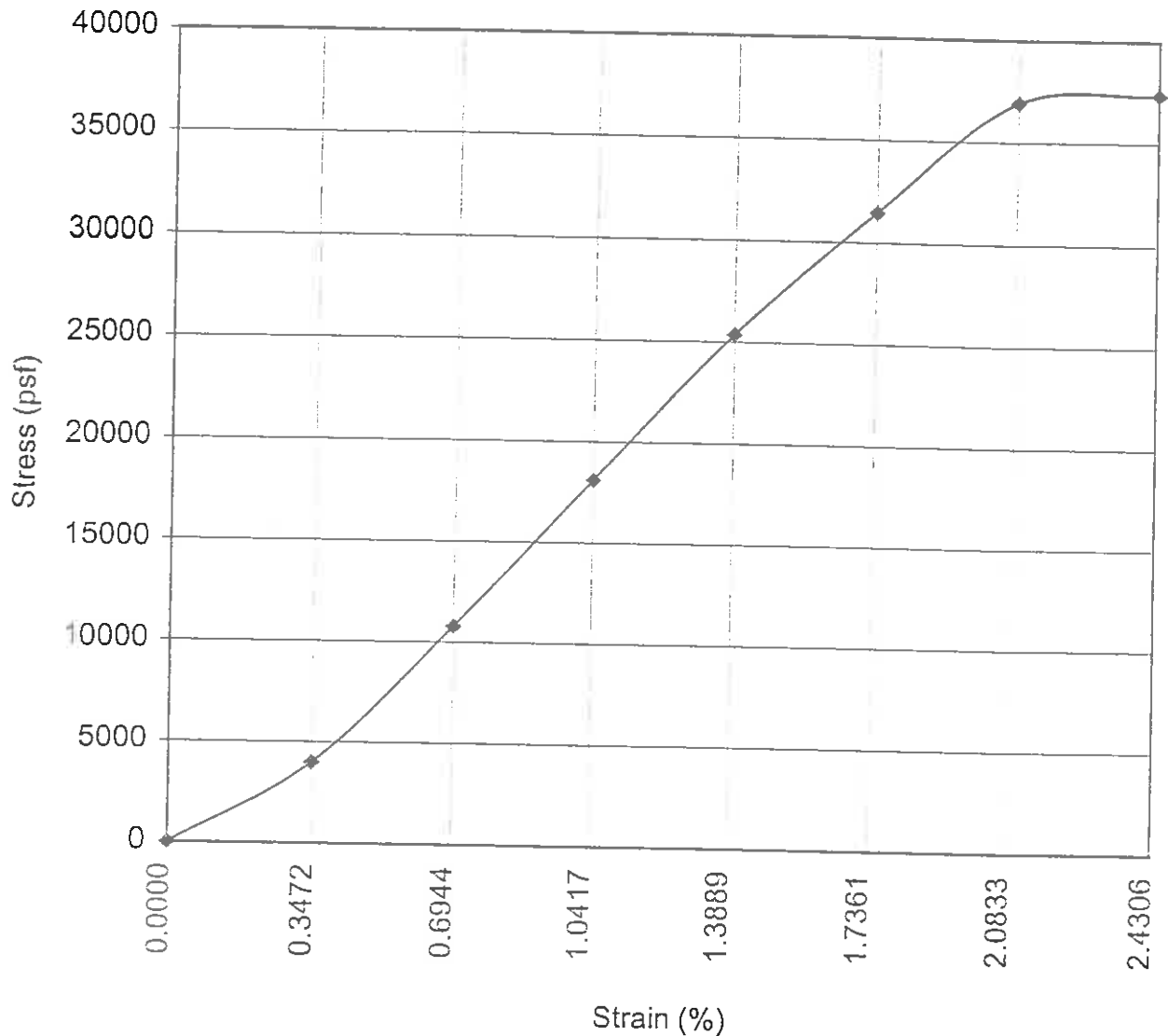
REMARKS: Short sample



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 4



SAMPLE DESCRIPTION: CLAYSTONE, very silty, very hard, slightly moist, black

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 68.0 FEET

SAMPLE: LENGTH: 4.32 in. DIAMETER: 2.15 in. L/D: 2.01

MOISTURE CONTENT: 9.6% DRY DENSITY: 125 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 38,000 PSF

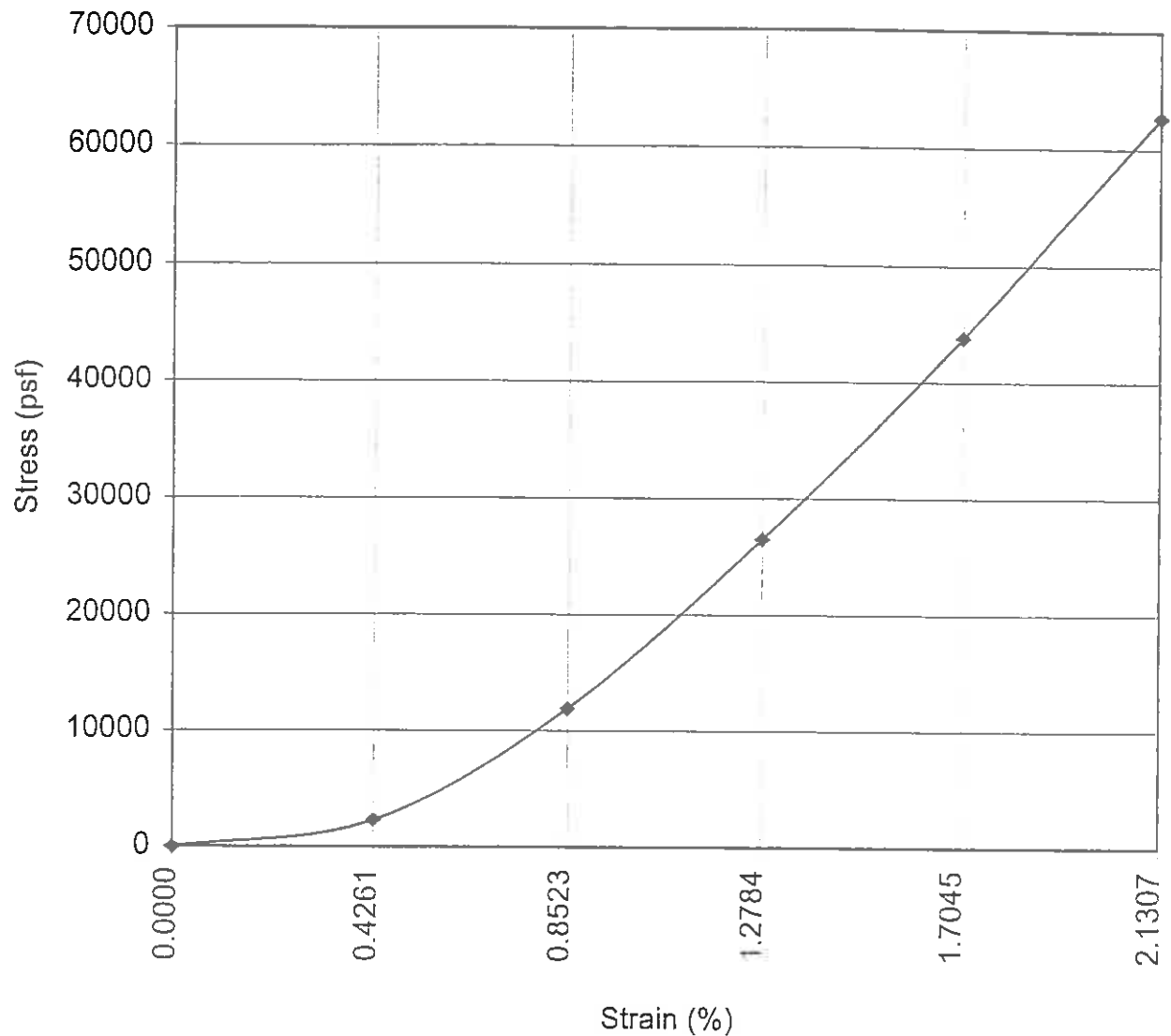
REMARKS: Very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 5



SAMPLE DESCRIPTION: SILTSTONE, very hard, slightly moist, gray

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 75.2 FEET

SAMPLE: LENGTH: 3.52 in. DIAMETER: 2.15 in. L/D: 1.64

MOISTURE CONTENT: 10.7% DRY DENSITY: 126 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 63,500 PSF

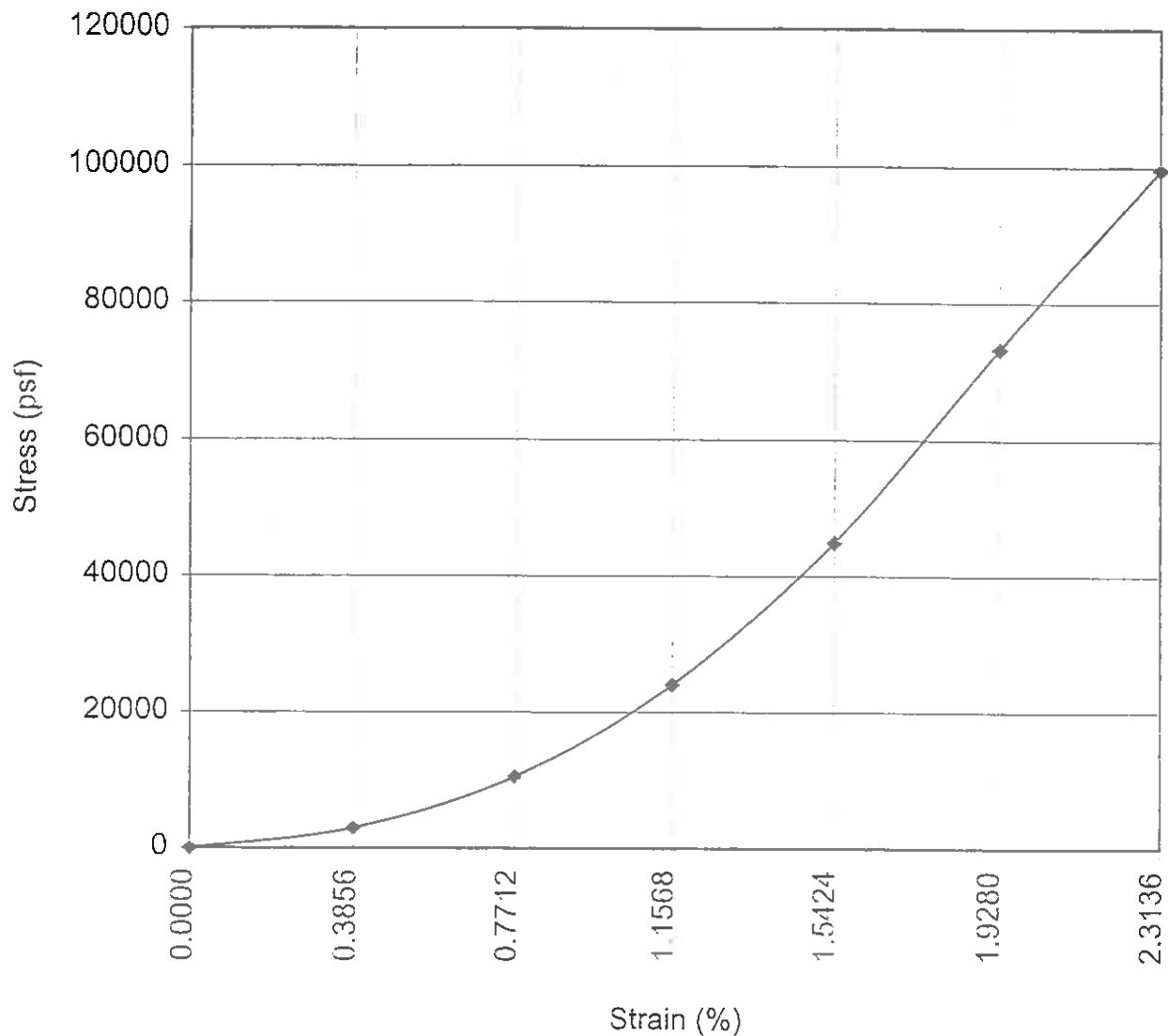
REMARKS: Short sample, highly fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 6



SAMPLE DESCRIPTION: SILTSTONE, very hard, slightly moist, gray & black

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 79.1 FEET

SAMPLE: LENGTH: 3.89 in. DIAMETER: 2.11 in. L/D: 1.84

MOISTURE CONTENT: 8.1% DRY DENSITY: 125 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 100,000 PSF

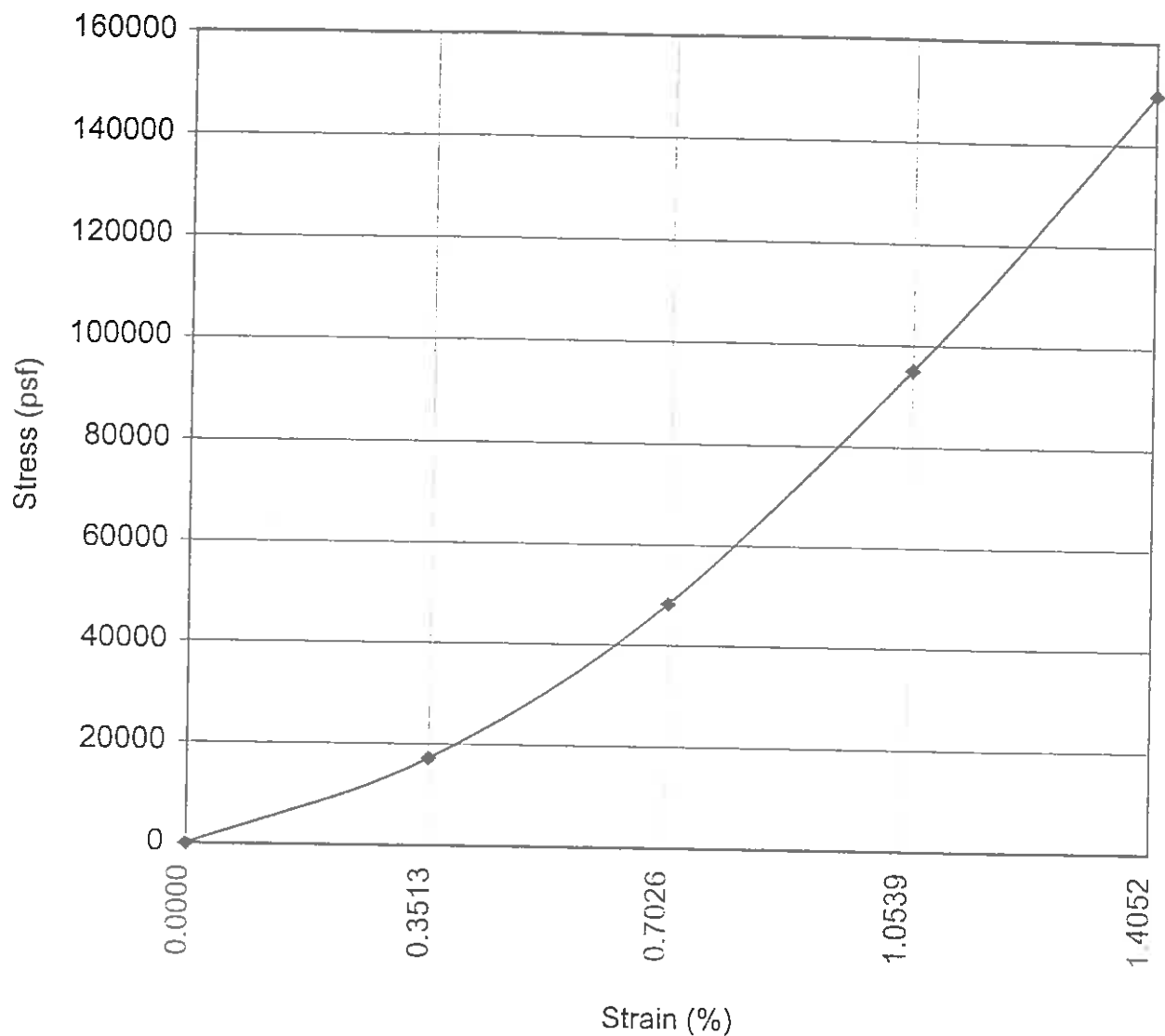
REMARKS: Short sample



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 7



SAMPLE DESCRIPTION: SILTSTONE, hard, slightly moist

SAMPLE LOCATION: TEST HOLE: WF-1 DEPTH 97.5 FEET

SAMPLE: LENGTH: 4.27 in. DIAMETER: 2.11 in. L/D: 2.02

MOISTURE CONTENT: 8.1% DRY DENSITY: 123 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 150,000 PSF

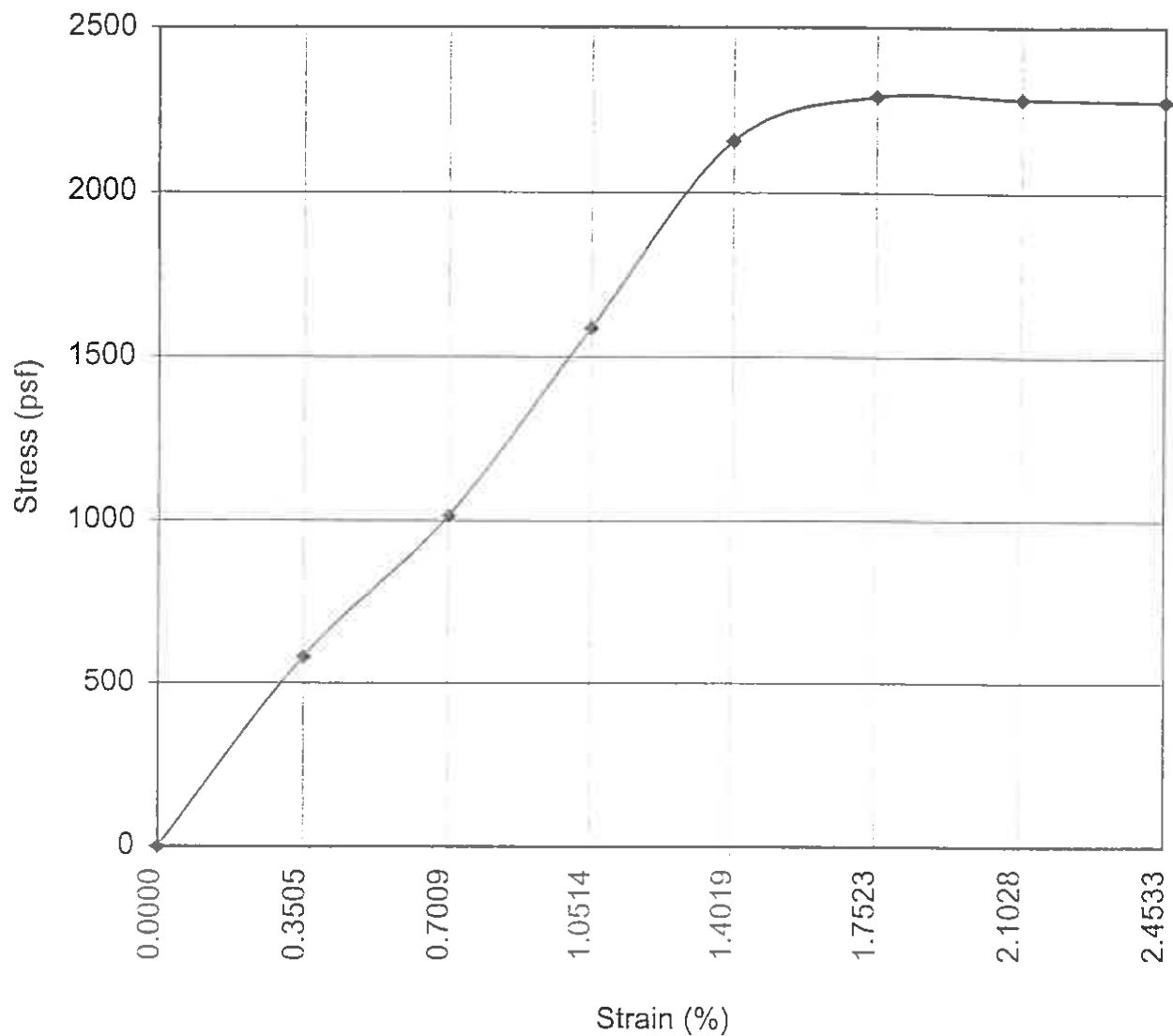
REMARKS: Many horizontal layers, fractured



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 8



SAMPLE DESCRIPTION: CLAYSTONE, hard, moist, brown, iron stained

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 38.2 FEET

SAMPLE: LENGTH: 4.28 in. DIAMETER: 2.13 in. L/D: 2.01

MOISTURE CONTENT: 19.9% DRY DENSITY: 108 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 2,300 PSF

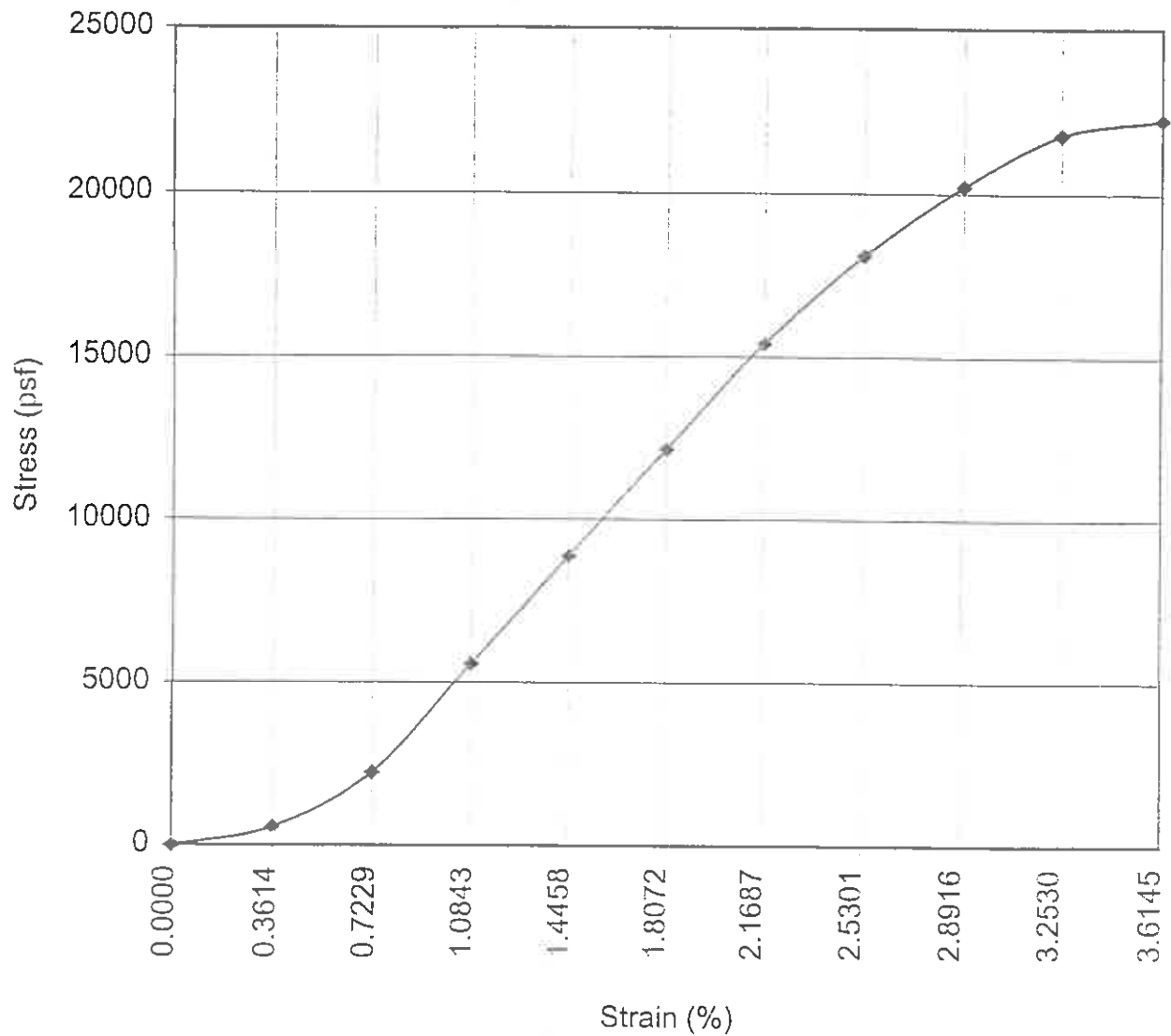
REMARKS: Very Fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 9



SAMPLE DESCRIPTION: CLAYSTONE, very hard, slightly moist, black

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 55.4 FEET

SAMPLE: LENGTH: 4.15 in. DIAMETER: 2.16 in. L/D: 1.92

MOISTURE CONTENT: 8.8% DRY DENSITY: 122 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 22,500 PSF

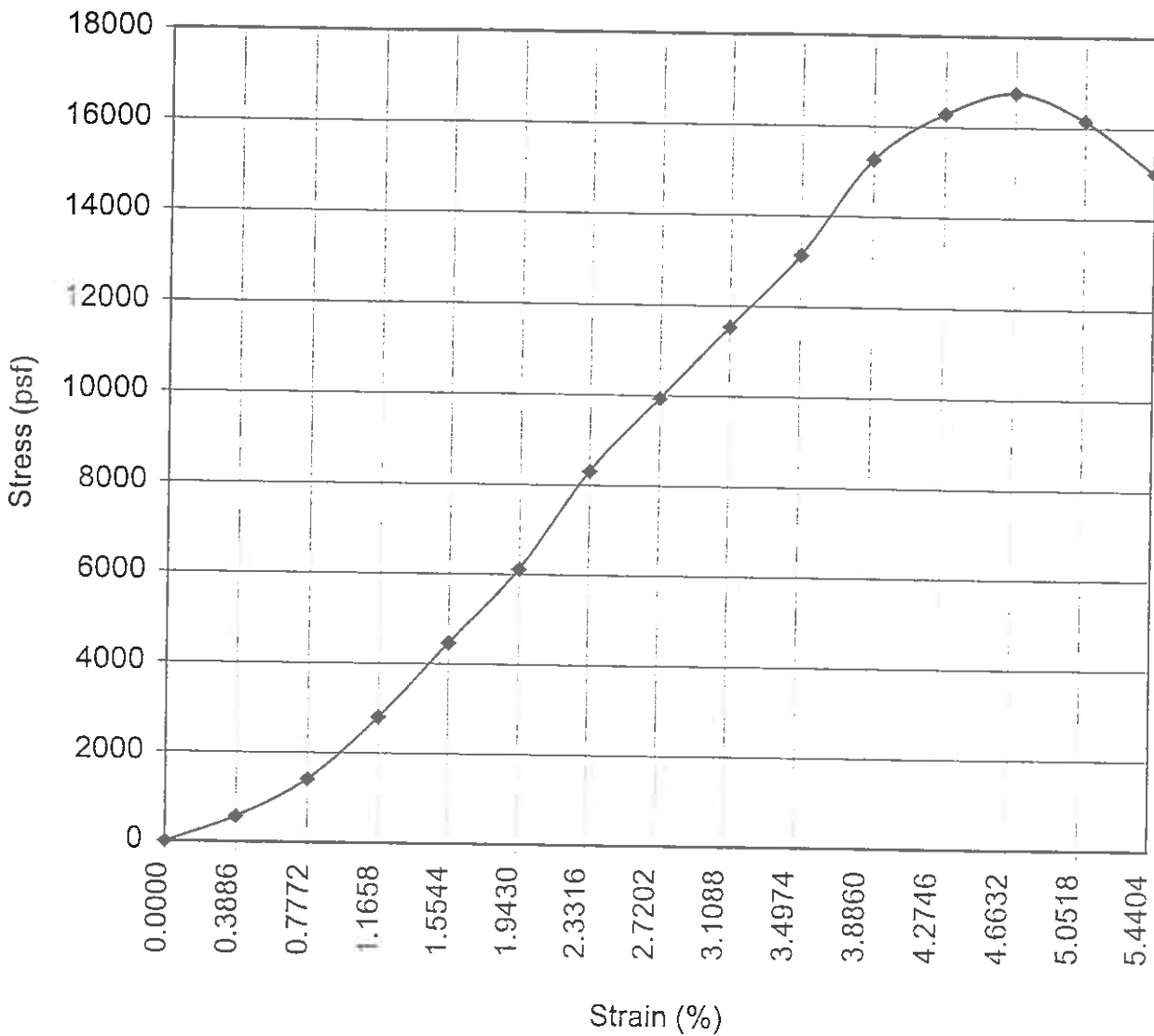
REMARKS: Very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 10



SAMPLE DESCRIPTION: CLAYSTONE, very silty, very hard, medium moist, black

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 69.7 FEET

SAMPLE: LENGTH: 3.86 in. DIAMETER: 2.16 in. L/D: 1.79

MOISTURE CONTENT: 12.9% DRY DENSITY: 117 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 16,900 PSF

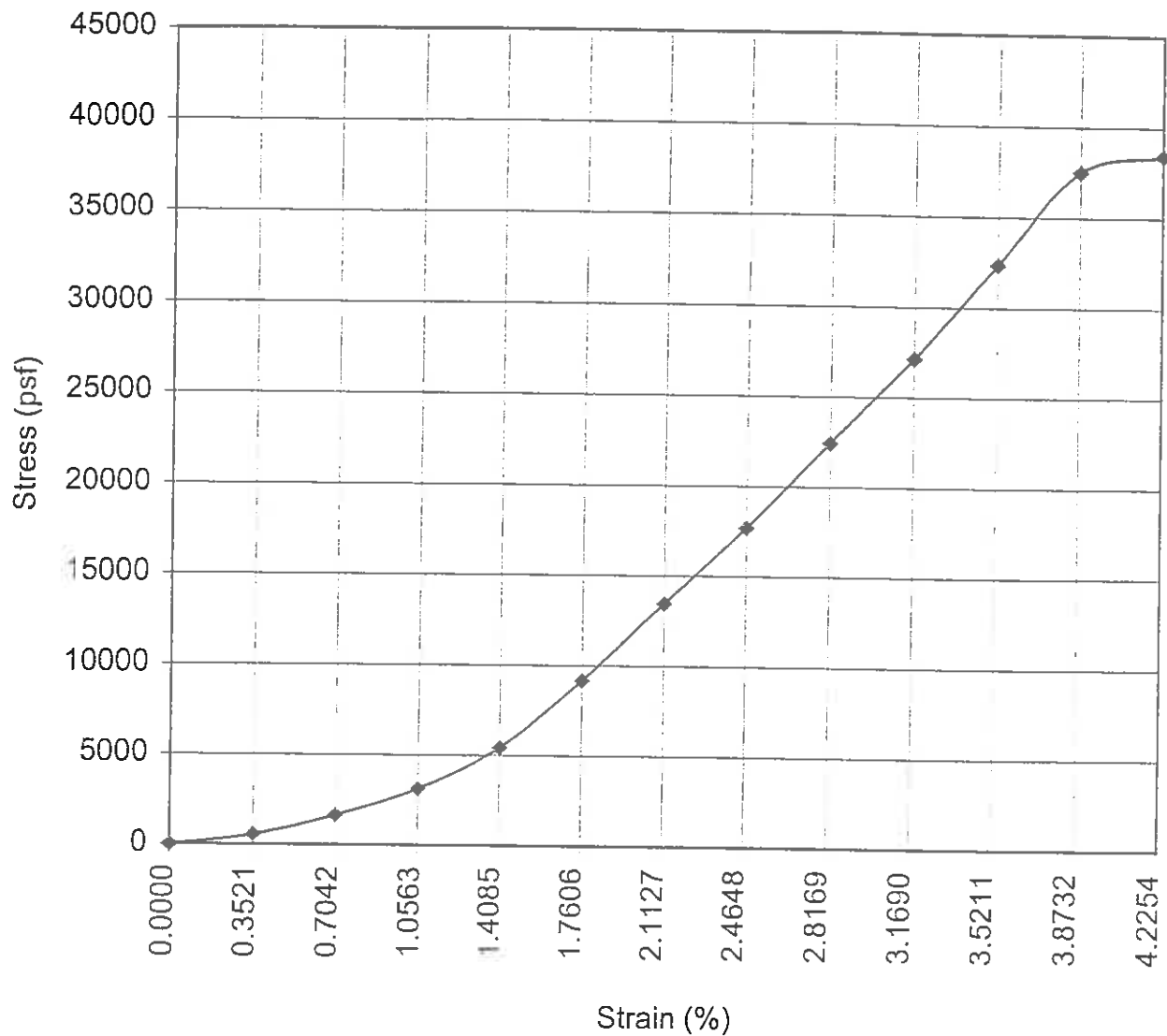
REMARKS: Very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 11



SAMPLE DESCRIPTION: CLAYSTONE, very silty, very hard, slightly moist, black

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 71.3 FEET

SAMPLE: LENGTH: 4.26 in. DIAMETER: 2.19 in. L/D: 1.95

MOISTURE CONTENT: 11.2% DRY DENSITY: 124 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 38,000 PSF

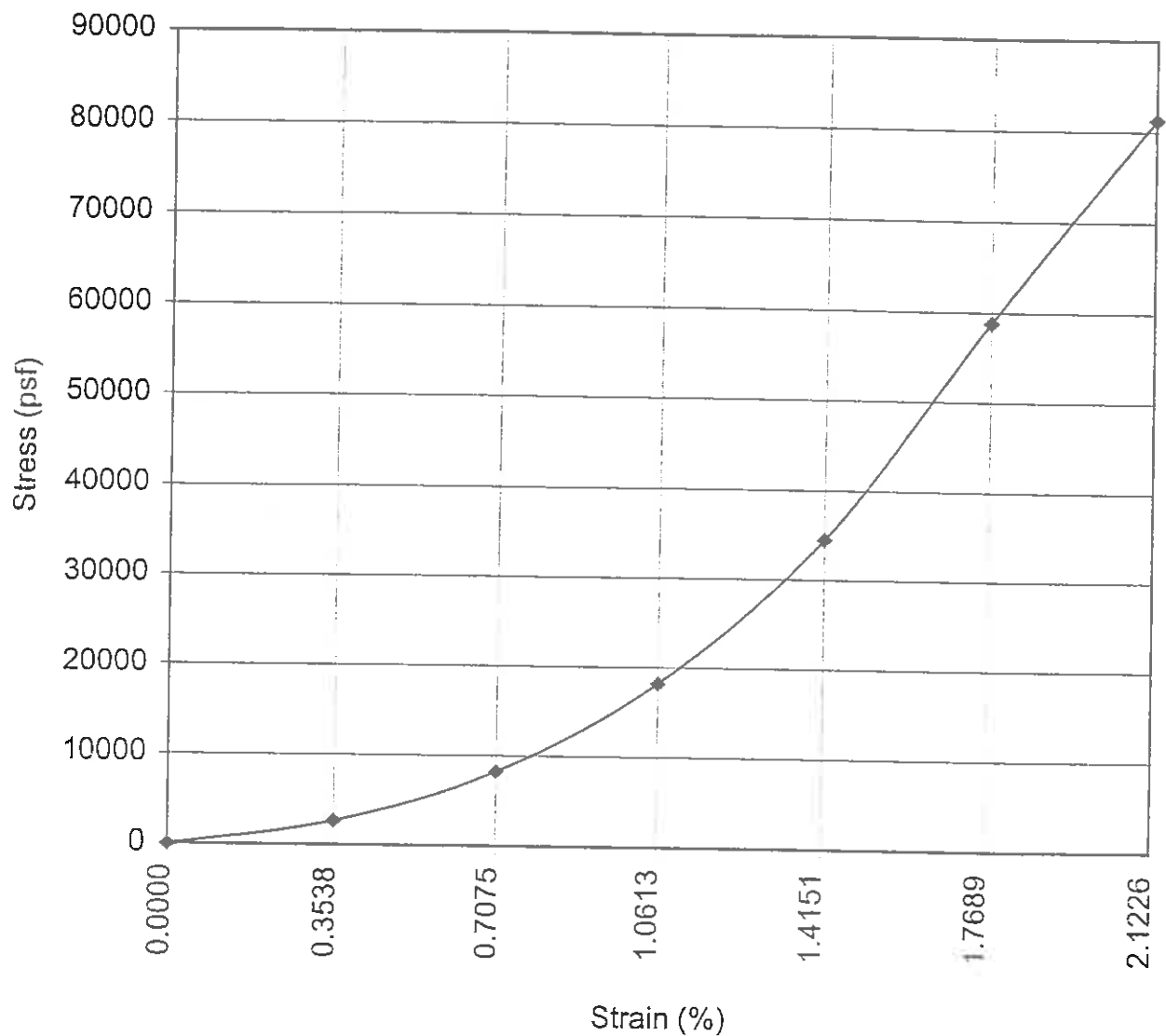
REMARKS: Very fractured.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 12



SAMPLE DESCRIPTION: SILTSTONE, very hard, slightly moist, dark gray

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 94.3 FEET

SAMPLE: LENGTH: 4.24 in. DIAMETER: 2.11 in. L/D: 2.01

MOISTURE CONTENT: 10.7% DRY DENSITY: 120 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 81,000 PSF

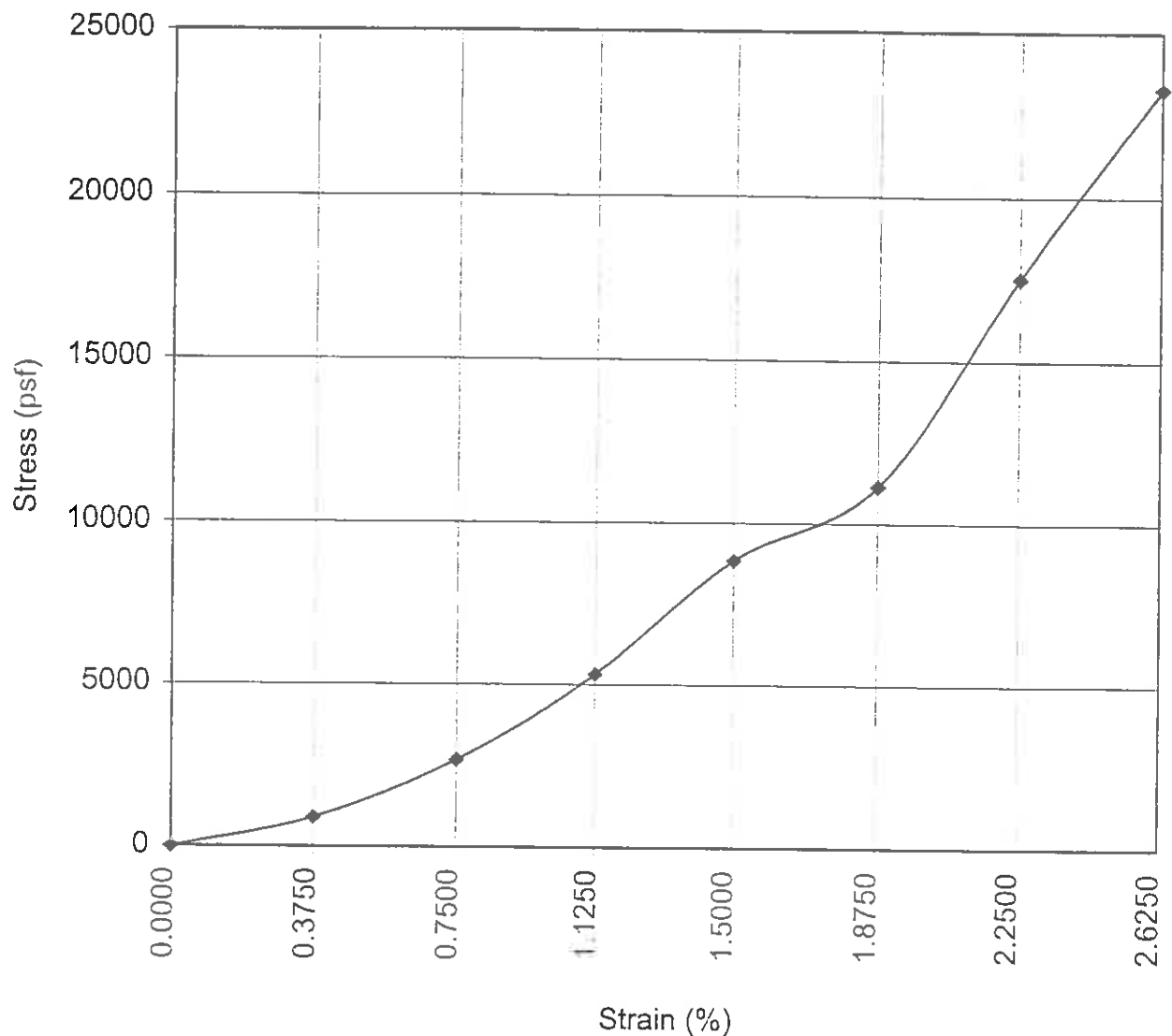
REMARKS:



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 13



SAMPLE DESCRIPTION: SILTSTONE, hard, medium moist, gray

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 96.0 FEET

SAMPLE: LENGTH: 4.00 in. DIAMETER: 2.10 in. L/D: 1.90

MOISTURE CONTENT: 13.3% DRY DENSITY: 115 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 23,000 PSF

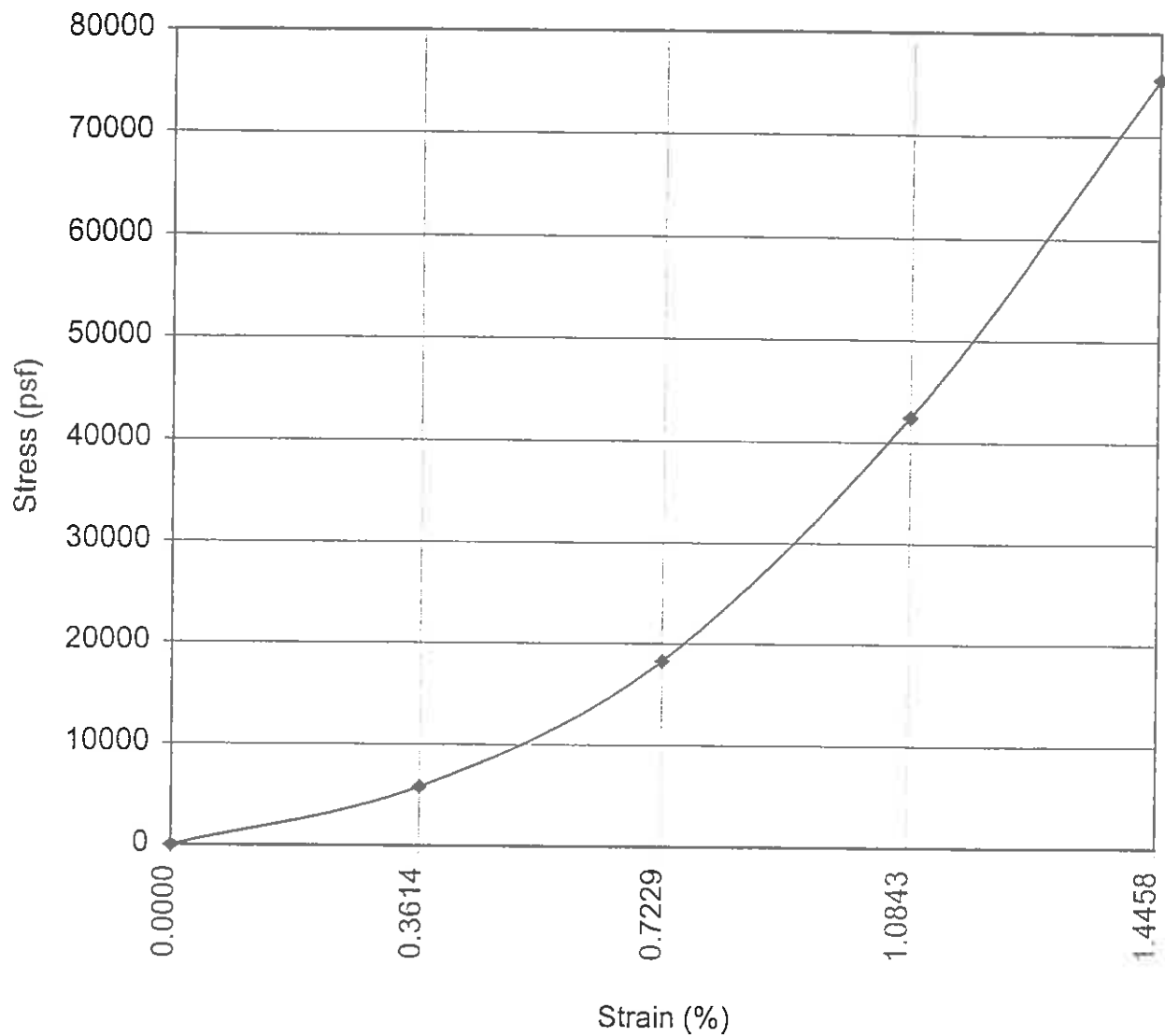
REMARKS: Fractured sample.



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 14



SAMPLE DESCRIPTION: SILTSTONE, very hard, slightly moist, gray

SAMPLE LOCATION: TEST HOLE: WF-9 DEPTH 97.2 FEET

SAMPLE: LENGTH: 4.15 in. DIAMETER: 2.08 in. L/D: 2.0

MOISTURE CONTENT: 8.2% DRY DENSITY: 125 PCF

APPLIED DEFORMATION RATE: 0.0150 in./min.

UNCONFINED COMPRESSIVE STRENGTH: 75,500 PSF

REMARKS:



UNCONFINED COMPRESSIVE
STRENGTH TEST RESULT

Project No. 2-238-01

Figure No. 15



833 Parfet Street • Lakewood, Colorado 80215 • (303) 232-8308 • Fax: (303) 232-1579

Unconfined Compressive Strength
ASTM D 2216

UNCONFINED COMPRESSIVE STRENGTH TEST DATA
ASTM D 2166

CLIENT Western Environmental & Ecology

JOB NO. 2596-02

BORING NO. WF-9
DEPTH 80.5'

SAMPLED 02-20-04
DATE TESTED 03-15-04 CAL

SAMPLE NO.
SOIL DESCR. Project #91-001-02
LOCATION Wildflower

SATURATED TEST No
AT FIELD MOIST. Yes
CONF. PRES. PSF 0
TEST TYPE UCS

MOISTURE/DENSITY
DATA

BEFORE
TEST

Wt. Soil + Moisture (g)	530.7
Wt. Wet Soil & Pan (g)	539.1
Wt. Dry Soil & Pan (g)	486.6
Wt. Lost Moisture (g)	52.6
Wt. of Pan Only (g)	8.4
Wt. of Dry Soil (g)	478.2
Moisture Content %	11.0
Wet Density PCF	135.6
Dry Density PCF	122.2

Init. Diameter (in)	2.171
Init. Area (sq in)	3.702
Init. Height (in)	4.028
Height to Diameter Ratio	1.855
Volume cu Ft.	0.00863

Notes & Comments:

Short Sample

Data entered by: SR
Data checked by: rae
FileName: WEX0805

Date: 03/18/2004
Date: 3/19/04

ADVANCED TERRA TESTING, INC.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA

CLIENT	Western Environmental & Ecology	JOB NO.	2596-02
BORING NO.	WF-9	SAMPLED	02-20-04
DEPTH	80.5'	DATE TESTED	03-15-04 CAL
SAMPLE NO.		SATURATED TEST	No
SOIL DESCR.	Project #91-001-02	AT FIELD MOIST.	Yes
LOCATION	Wildflower	CONF. PRES. PSF	0
		TEST TYPE	UCS

Init. Ht. (in)	4.028	Init. Area (sq in)	3.702
		Strain Rate (in/min)	0.040

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Prin. Stress Ratio
0.0	0	0.000	0.00	3.702	0	0.00	0.0	0	0	0.00
10.0	389	0.008	0.20	3.709	388	0.00	0.0	0	388	0.00
22.0	856	0.016	0.40	3.717	852	0.00	0.0	0	852	0.00
31.0	1206	0.020	0.50	3.720	1200	0.00	0.0	0	1200	0.00
88.0	3423	0.040	0.99	3.739	3389	0.00	0.0	0	3389	0.00
175.0	6808	0.060	1.49	3.758	6706	0.00	0.0	0	6706	0.00
277.0	10775	0.080	1.99	3.777	10561	0.00	0.0	0	10561	0.00
368.0	14315	0.100	2.48	3.796	13960	0.00	0.0	0	13960	0.00
396.0	15405	0.108	2.68	3.804	14991	0.00	0.0	0	14991	0.00
407.0	15832	0.112	2.78	3.808	15392	0.00	0.0	0	15392	0.00
415.0	16144	0.116	2.88	3.812	15679	0.00	0.0	0	15679	0.00
376.0	14627	0.120	2.98	3.815	14191	0.00	0.0	0	14191	0.00
332.0	12915	0.124	3.08	3.819	12517	0.00	0.0	0	12517	0.00
320.0	12448	0.128	3.18	3.823	12053	0.00	0.0	0	12053	0.00
300.0	11670	0.132	3.28	3.827	11288	0.00	0.0	0	11288	0.00
192.0	7469	0.140	3.48	3.835	7209	0.00	0.0	0	7209	0.00

Data entered by: SR Date: 03/18/2004
 Data checked by: cul Date: 3/19/04
 FileName: WEX0805

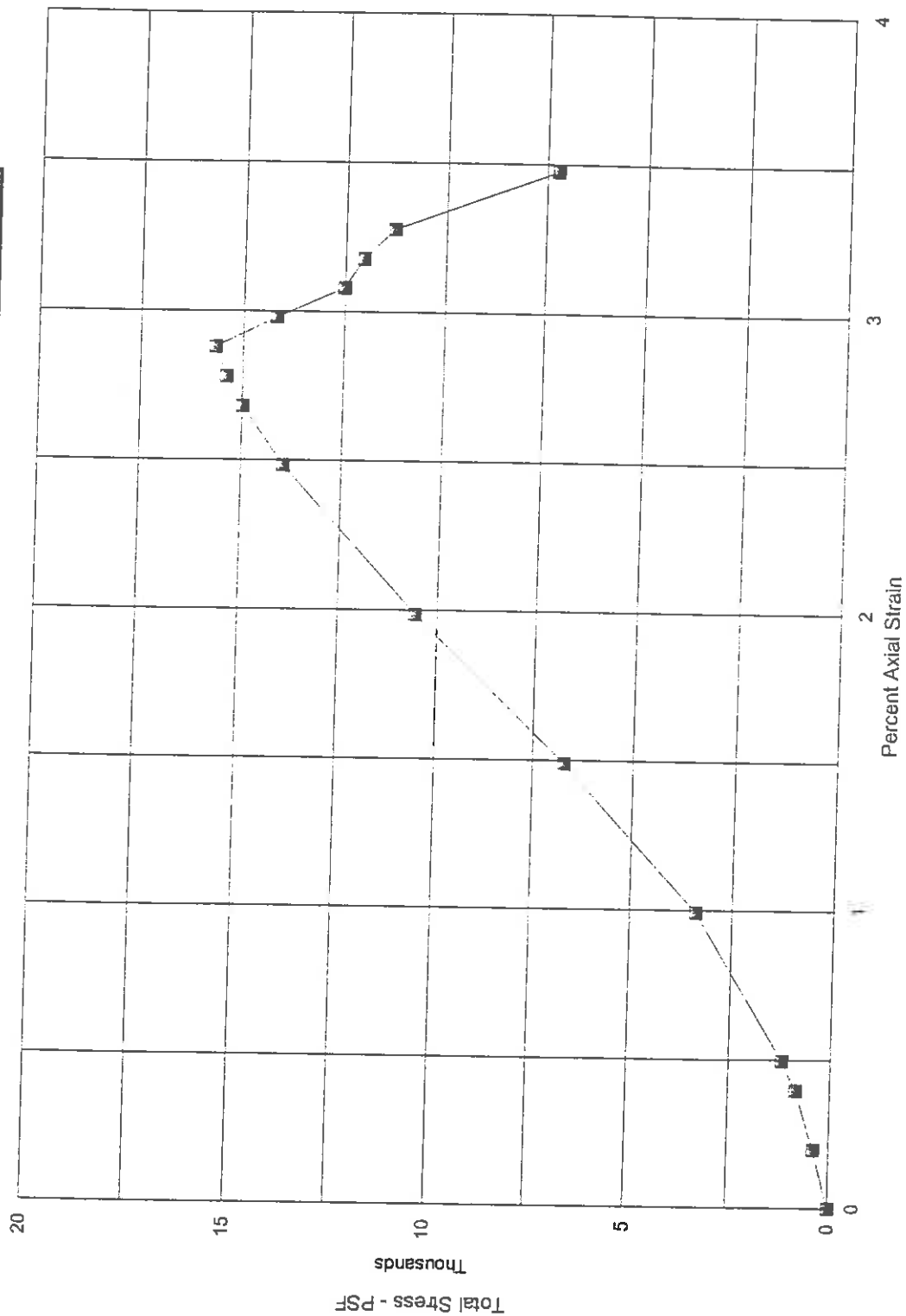
ADVANCED TERRA TESTING, INC.

Client Western Env. & Ecology
Job No. 2576-02
Boring No. WF-9
Depth 20.5'
Sample No. -
Project Wildflower
Sampled 2/20/04 by -
Prepped 3/1/04 by CL
Project No. 97-001-02

UCS

UNCONFINED COMPRESSIVE STRENGTH TEST

WF-9,80.5'



UNCONFINED COMPRESSIVE STRENGTH TEST DATA

CLIENT	Western Environment & Ecology	JOB NO.	2596-02
BORING NO.	WF-9	SAMPLED	02-20-04
DEPTH	73.6	DATE TESTED	03-15-04 CAL
SAMPLE NO.		SATURATED TEST	No
SOIL DESCR.	Project #91-001-02	AT FIELD MOIST.	Yes
LOCATION	Wildflower	CONF. PRES. PSF	0
		TEST TYPE	UCS

Init. Ht. (in)	4.483	Init. Area (sq in)	3.705
		Strain Rate (in/min)	0.040

Axial Load Lbs.	Axial Load PSF	Delta Ht. In.	Axial % Strain	Area Final Sq In.	Dev. Stress PSF	Pore Pres. PSI	Delta Pres. PSF	Sigma 3 PSF	Sigma 1 PSF	Prin. Stress Ratio
0.0	0	0.000	0.00	3.705	0	0.00	0.0	0	0	0.00
22.0	855	0.020	0.45	3.722	851	0.00	0.0	0	851	0.00
53.0	2060	0.040	0.89	3.739	2041	0.00	0.0	0	2041	0.00
109.0	4236	0.060	1.34	3.755	4180	0.00	0.0	0	4180	0.00
191.0	7423	0.080	1.78	3.773	7291	0.00	0.0	0	7291	0.00
317.0	12320	0.100	2.23	3.790	12045	0.00	0.0	0	12045	0.00
500.0	19432	0.120	2.68	3.807	18912	0.00	0.0	0	18912	0.00
531.0	20637	0.124	2.77	3.811	20066	0.00	0.0	0	20066	0.00
537.0	20870	0.128	2.86	3.814	20274	0.00	0.0	0	20274	0.00
545.0	21181	0.132	2.94	3.818	20557	0.00	0.0	0	20557	0.00
574.0	22308	0.136	3.03	3.821	21631	0.00	0.0	0	21631	0.00
584.0	22697	0.140	3.12	3.825	21988	0.00	0.0	0	21988	0.00
593.0	23047	0.143	3.19	3.827	22311	0.00	0.0	0	22311	0.00
548.0	21298	0.148	3.30	3.832	20595	0.00	0.0	0	20595	0.00
524.0	20365	0.152	3.39	3.835	19674	0.00	0.0	0	19674	0.00
487.0	18927	0.156	3.48	3.839	18268	0.00	0.0	0	18268	0.00
380.0	14769	0.160	3.57	3.842	14241	0.00	0.0	0	14241	0.00

Data entered by: SR Date: 03/17/2004
 Data checked by: Cal Date: 3/19/04
 FileName: WEX0WF9

ADVANCED TERRA TESTING, INC.

UNCONFINED COMPRESSIVE STRENGTH TEST DATA
ASTM D 2166

CLIENT Western Environment & Ecology

JOB NO. 2596-02

BORING NO. WF-9
DEPTH 73.6

SAMPLED 02-20-04
DATE TESTED 03-15-04 CAL

SAMPLE NO.
SOIL DESCR. Project #91-001-02
LOCATION Wildflower

SATURATED TEST No
AT FIELD MOIST. Yes
CONF. PRES. PSF 0
TEST TYPE UCS

MOISTURE/DENSITY DATA	BEFORE TEST
Wt. Soil + Moisture (g)	598.4
Wt. Wet Soil & Pan (g)	606.6
Wt. Dry Soil & Pan (g)	545.6
Wt. Lost Moisture (g)	61.0
Wt. of Pan Only (g)	8.2
Wt. of Dry Soil (g)	537.4
Moisture Content %	11.3
Wet Density PCF	137.2
Dry Density PCF	123.3
Init. Diameter (in)	2.172
Init. Area (sq in)	3.705
Init. Height (in)	4.483
Height to Diameter Ratio	2.064
Volume cu Ft.	0.00961

Notes & Comments:

Data entered by: SR

Date: 03/17/2004

Data checked by: cal

Date: 3/19/04

FileName: WEX0WF9

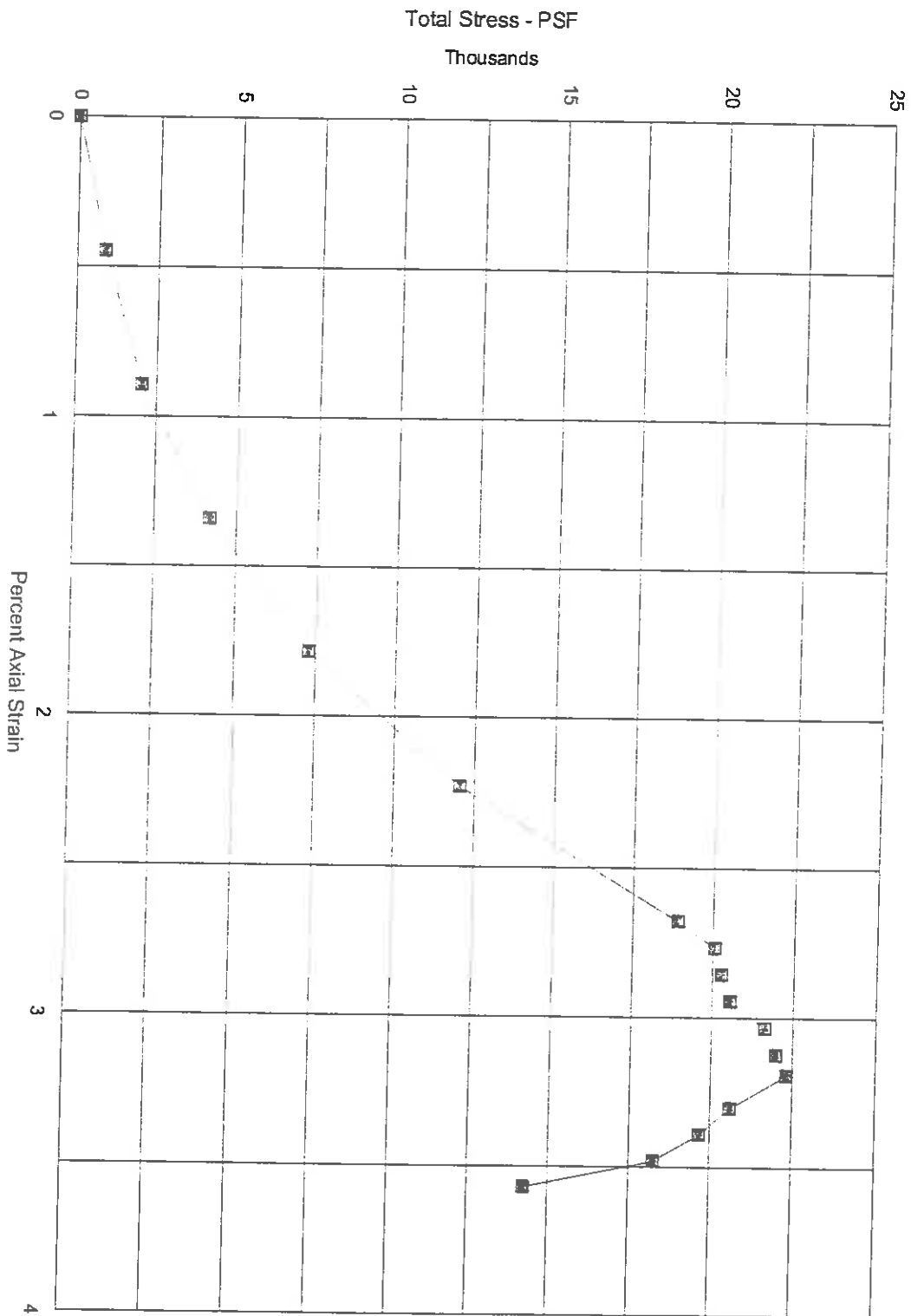
ADVANCED TERRA TESTING, INC.

Client Western Env. & Ecology
Job No. 6596-02
Boring No. WE-7
Depth 78.4
Sample No. —
Project Wildflower
Sampled 2, 20, 04 by —
Drilled 3, 15, 04 by —
Project No. 91-001-02

UCS

UNCONFINED COMPRESSIVE STRENGTH TEST

WF-9,73.6.



MOISTURE CONTENT & DENSITY
ASTM D 2216 & 2937

Moisture & Density Determinations
ASTM D 2216 & D 2937

CLIENT: Western Enviroment & Ecology
LOCATION: Wildflower

JOB NO.: 2596-02

BORING

SAMPLE DEPTH	89.5	82.4	68.9	76.0
SAMPLE NO.	WF-9	WF-9	WF-1	WF-1
DATE SAMPLED	02-20-04	02-20-04	02-20-04	02-20-04
DATE TESTED	03-10-04 CRM	03-10-04 CRM	03-10-04 CRM	03-10-04 CRM
SOIL DESCRIPTION				

DENSITY DETERMINATIONS

Sample Height (IN)	1.121	2.773	1.123	3.460
Sample Diameter (IN)	2.071	2.086	2.147	2.126
Wt of Wet Soil (Gms)	90.12	180.48	147.36	457.77
Sample Volume (CU Ft)	0.00219	0.00548	0.00235	0.00711
WET DENSITY (PCF)	90.9	72.5	138.1	142.0
DRY DENSITY (PCF)	73.7	55.4	125.1	129.9

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	93.72	188.31	151.08	465.75
Wt. of Dry Soil & Dish (gms)	76.64	145.75	137.21	426.66
Net Loss of Moisture (gms)	17.08	42.56	13.87	39.09
Wt. of Dish (gms)	3.62	7.87	3.73	8.06
Wt. of Dry Soil (gms)	73.02	137.88	133.48	418.60
Moisture Content (%)	23.4	30.9	10.4	9.3

BORING

SAMPLE DEPTH	32.1	64.1	81.7
SAMPLE NO.	WF-9	WF-1	WF-1
DATE SAMPLED	02-20-04	02-20-04	02-20-04
DATE TESTED	03-10-04 CRM	03-10-04 CRM	03-10-04 CRM
SOIL DESCRIPTION			

DENSITY DETERMINATIONS

Sample Height (IN)	1.140		
Sample Diameter (IN)	2.141		
Wt of Wet Soil (Gms)	149.35		
Sample Volume (CU Ft)	0.00238		
WET DENSITY (PCF)	138.6		
DRY DENSITY (PCF)	122.7		

DENSITY NOT REQUESTED
DENSITY NOT REQUESTED

MOISTURE DETERMINATIONS

Wt. of Wet Soil & Dish (gms)	152.90	1126.70	687.59
Wt. of Dry Soil & Dish (gms)	135.71	981.05	598.13
Net Loss of Moisture (gms)	17.19	145.65	89.46
Wt. of Dish (gms)	3.57	15.08	15.52
Wt. of Dry Soil (gms)	132.14	965.97	582.61
Moisture Content (%)	13.0	15.1	15.4

Data entered by:

Data checked by: JS

FileName:

SR

Date: 03/19/04

WEMDWILD

Date:

03/19/2004

ADVANCED TERRA TESTING, INC.

ARMPS module build: 5.0.25
Project File: Untitled
Input Units: (ft) (psi)

[PROJECT TITLE]
Wildflower Eureka

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]

Entry Height.....7 (ft)
Depth of Cover.....88.6 (ft)
Crosscut Angle.....90 (deg)
Entry Width.....21.7 (ft)
Number of Entries.....3
Crosscut Spacing.....27 (ft)
Center to Center Distance #1.....40 (ft)
Center to Center Distance #2.....40 (ft)

[DEFAULT PARAMETERS]

In Situ Coal Strength.....900 (psi)
Unit Weight of Overburden.....135 (pcf)
Breadth of AMZ.....47 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]

Loading Condition.....ACTIVE GOB
Extend of Active Gob.....0 (ft)
Abutment Angle of Active Gob.....21 (deg)

ARMPS module build: 5.0.25

Project File: C:\Program Files\NIOSH\Analysis of Retreat Mining Pillar Stability\Wildflower Shamrock

Input Units: (ft) (psi)

[PROJECT TITLE]

Wildflower

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]

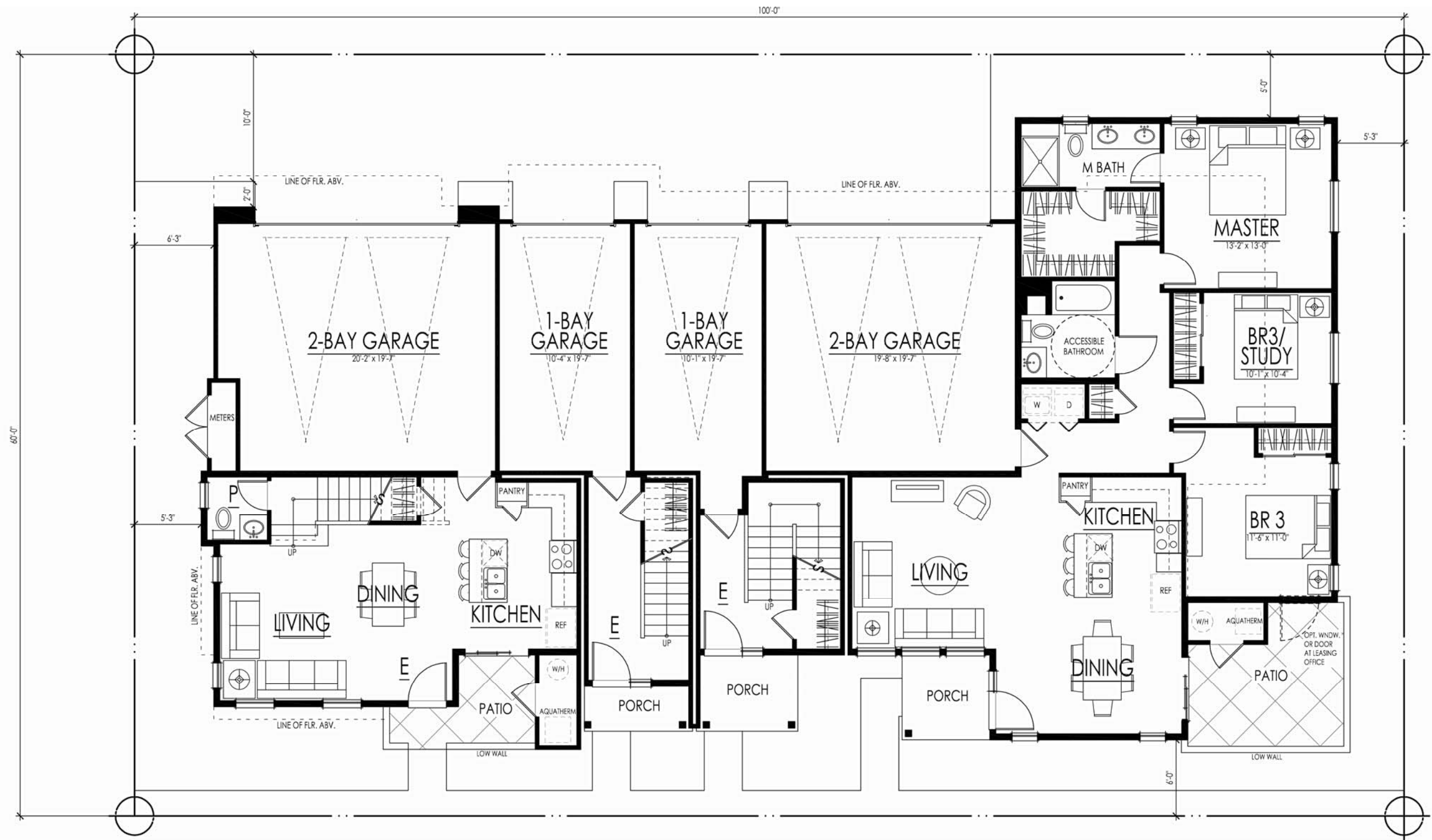
Entry Height.....7 (ft)
Depth of Cover.....88.4 (ft)
Crosscut Angle.....90 (deg)
Entry Width.....18.4 (ft)
Number of Entries.....3
Crosscut Spacing.....23 (ft)
Center to Center Distance #1.....40 (ft)
Center to Center Distance #2.....40 (ft)

[DEFAULT PARAMETERS]

In Situ Coal Strength.....900 (psi)
Unit Weight of Overburden.....135 (pcf)
Breadth of AMZ.....47 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]

Loading Condition.....ACTIVE GOB
Extend of Active Gob.....0 (ft)
Abutment Angle of Active Gob.....21 (deg)



PLAN FOUR
1429 SF
500 SQ. FT.
+ 928 SQ. FT.
1428 SQ. FT.

PLAN TWO
1111 SF
142 SQ. FT.
+ 969 SQ. FT.
1111 SQ. FT.

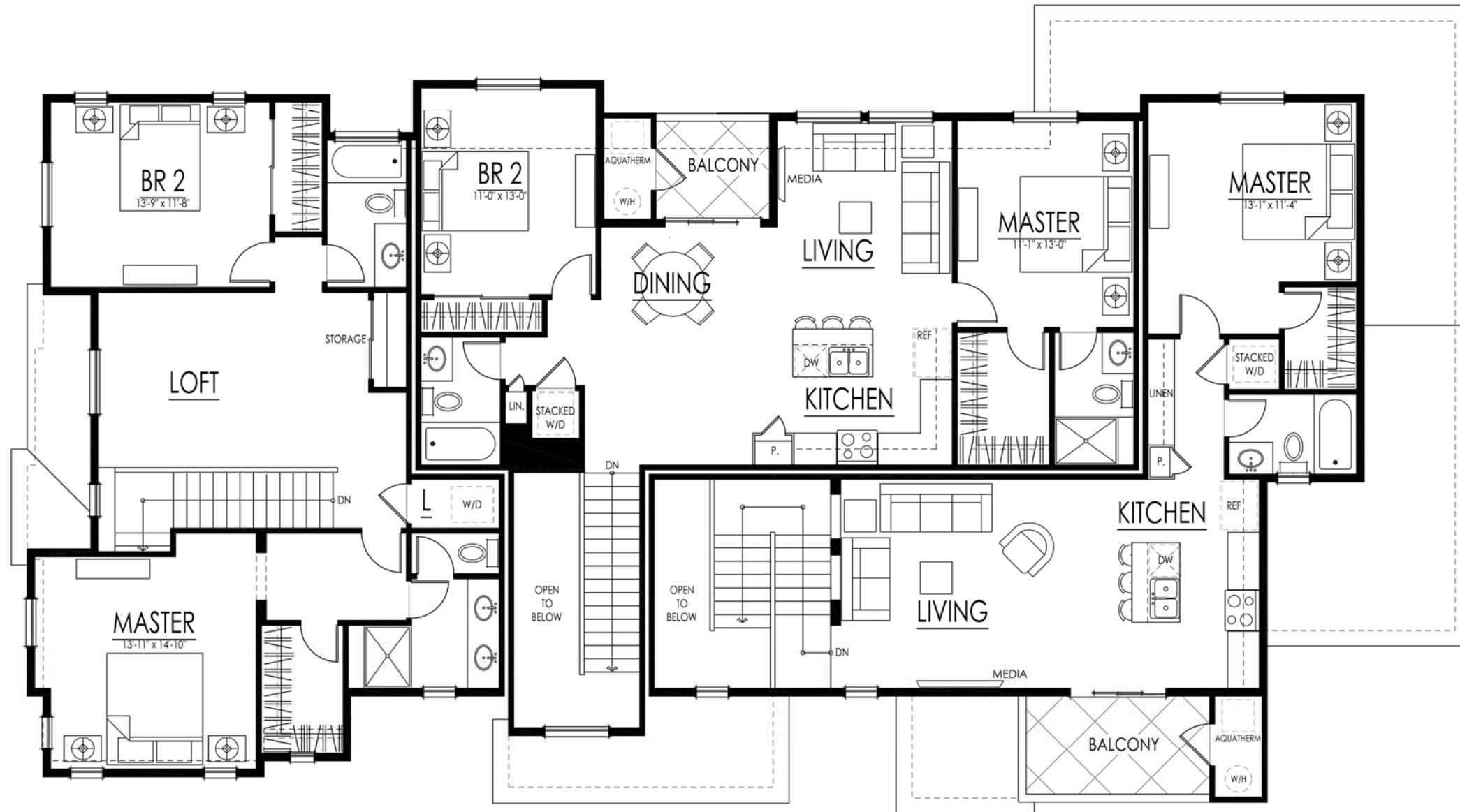
PLAN ONE
867 SF
154 SQ. FT.
+ 713 SQ. FT.
867 SQ. FT.

PLAN THREE
1320 SF

4-UNIT BUILDING

1ST FLOOR PLAN A

MANOR HOMES
chartered development corporation



PLAN FOUR
928 SF

PLAN TWO
969 SF

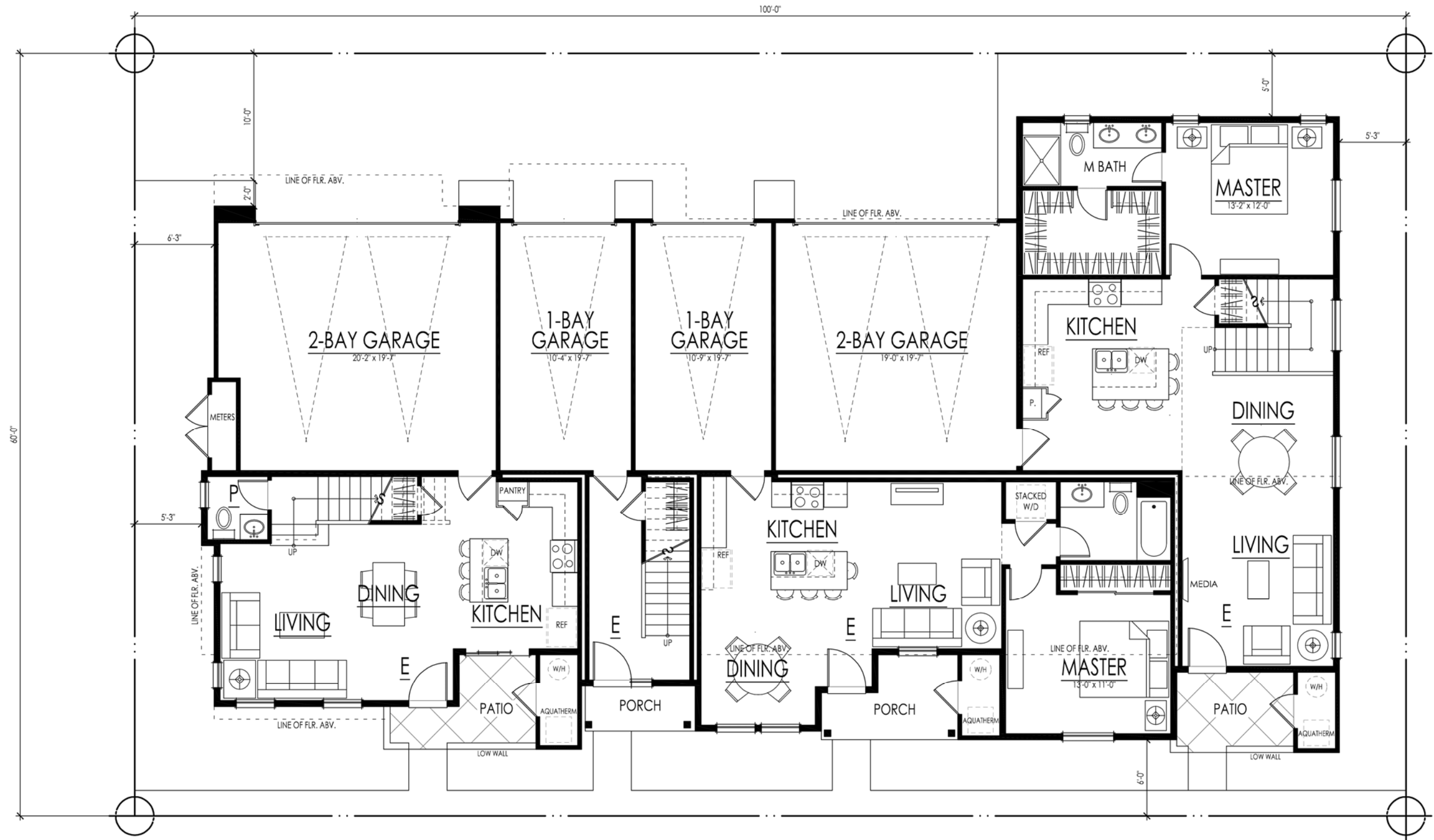
PLAN ONE
713 SF

4-UNIT BUILDING

2ND FLOOR PLAN A

MANOR HOMES

chartered development corporation



PLAN FOUR
1428 SF
500 SQ. FT.
+ 928 SQ. FT.
1428 SQ. FT.

PLAN TWO
1466 SF
142 SQ. FT.
+ 1324 SQ. FT.
1466 SQ. FT.

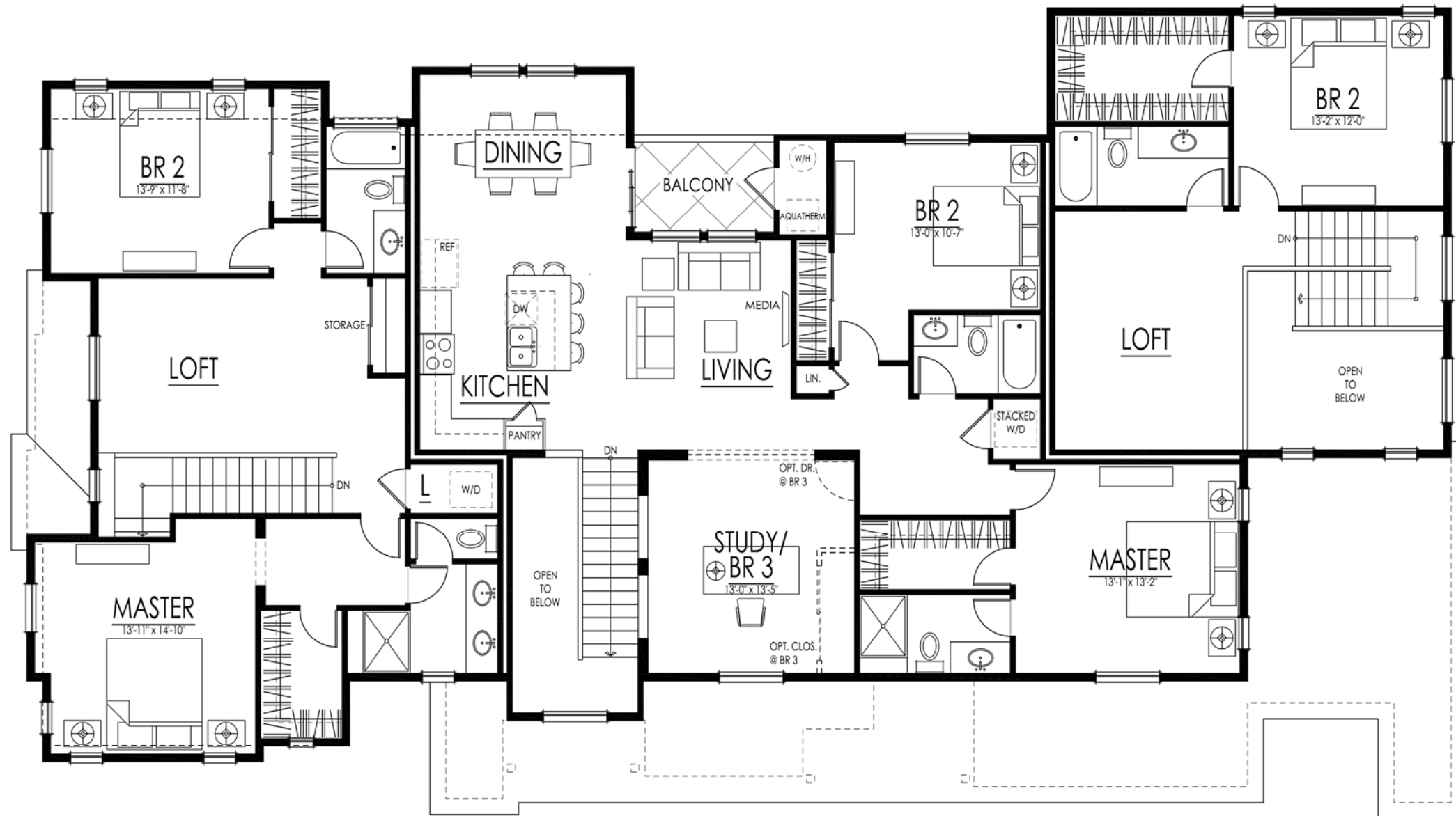
PLAN ONE
692 SF

PLAN THREE
1436 SF
911 SQ. FT.
+ 525 SQ. FT.
1436 SQ. FT.

4-UNIT BUILDING

1ST FLOOR PLAN B

MANOR HOMES
chartered development corporation



PLAN FOUR
928 SF

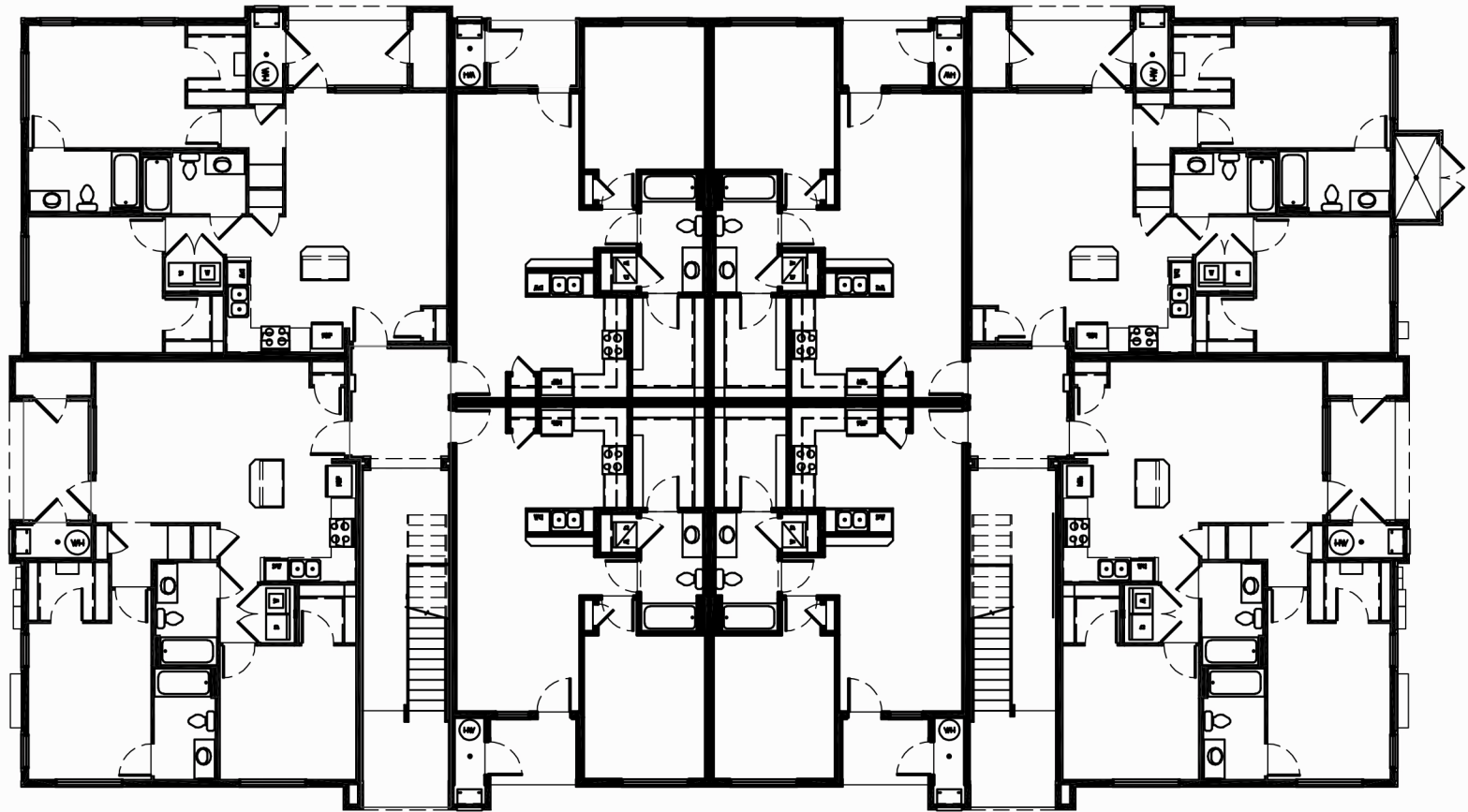
PLAN TWO
1324 SF

PLAN THREE
525 SF

4-UNIT BUILDING
2ND FLOOR
PLAN B

MANOR HOMES

chartered development corporation



1 FIRST FLOOR PLAN
1/16" = 1'-0"

Chartered Ranchwood
— 24-plex Typical Floorplan
8407 sf