pcs group

ASSESSMENT OF IMPACT REPORT

NORTH WESTERLY

Prepared for:

Town of Erie
645 Holbrook, PO Box 750
Erie, Colorado 80516

MARCH 2025

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Introduction

This impact report is provided to the Town of Erie, Colorado, as required in the PD Zoning Development Guide. North Westerly is approximately 390 acres located within the Town of Erie, owned by: Southern Land Company.

The subject property is generally located north of Erie Parkway, east of Weld County Road 5, west of Weld County Road 7, and south of Weld County Road 10. This project is generally described as the portions of Section 16, Township 1 North, Range 68 West of the 6th Principal Meridian.

The property is proposed for zoning as Planned Development (PD), under Title 10 of the Town of Erie Municipal Code. Per the concept plan for the subject property, it is anticipated that approximately one thousand nine hundred fifty-five (1,955) residential dwelling units will be constructed within the area to be zoned Planned Development.

The concept plan is provided within the PD Zoning Map, some items contained within the PD will be conceptual in nature and are subject to change through preliminary plat and final plat stages.

The graphic drawings contained within the PD are intended to depict general locations and illustrate concepts of the textual provisions. During the platting process minor variations should be expected for the purpose of establishing:

Final road alignments
Final configuration of lot and tract sizes and shapes
Final building envelopes
Final access and parking locations
Landscape adjustments

I. PD Map

The subject property is depicted on the PD Map, Exhibit A, attached.

The present boundaries of the municipality in the vicinity of the proposed PD Zoning.

Shown on Exhibits B1 and B2 are the following:

The present streets, major trunk water mains, sewer interceptors and outfalls, other utility lines and ditches, and the proposed extension of such streets and utility lines in the vicinity of the annexations.

Shown on Exhibit C1 and C2, attached hereto, are the following:

The 2015 Comprehensive Plan-Land Use Plan Map showing existing and

proposed land use patterns in the vicinity of the properties to be zoned PD; and the current Zoning Map showing existing zoning in the vicinity of the properties to be zoned PD.

II. Utilities/Municipal Services

1. Water Distribution System

The North Westerly Development will draw its potable water from Pressure Zone 3 of the Town's system. Connections to the existing potable water system will be in several locations including connections to the existing 12-inch water main in CR5, the existing 30-inch water main in Erie Parkway, and the existing 20-inch water main in CR7.

2. Sanitary Sewer System

The North Westerly development will tie into the Town of Erie's existing sanitary sewer system via three proposed sewer outfalls.

Outfall #1 will serve the southwest corner of the site which is within the Town's Weld County Road 3 Sewer Basin. A sewer main will be extended from the site, west along the north side of Erie Parkway to connect to an existing manhole and eighteen-inch main that will convey flows northwest through the Colliers Hill development. Previous utility reports have allowed for approximately 900 single-family equivalents (SFE) of downstream capacity for this outfall.

Outfall #2 serves the northwest corner of the site which is also within the Town's Weld County Road 3 Sewer Basin. An eight-inch sewer main has been stubbed under CR 5 to the North Westerly property as part of the Colliers Hill Filing G4 development. It is anticipated that approximately two hundred units will utilize this outfall. Review of the Colliers Hill G4 utility report shows that this stub may have been overlooked in the sewer capacity calculations. Preliminary capacity calculations with the additional two hundred units show that a few runs of pipe may slightly exceed the Town's capacity criteria. During Final design a variance may be requested.

Outfall #3 serves the remaining portions of the site and corresponds with the Town's Weld County Road 5 sewer basin. There is not an existing outfall for this sewer basin. A proposed fifteen-inch main will be constructed from the sites northwest north along Weld County Road 5 to the intersection of Colorado Highway 52. At this point the sewer will connect to a proposed thirty-inch main to be construction with the Summerfield development.

3. Roadway Network

It is anticipated that street connections will be made to Erie Parkway, WCR 10, WCR 5 and WCR 7. Each perimeter street along the property frontage will be improved according to the preliminary and final plat.

The interior streets will include curb and gutter. The street network will be developed to provide dual access to neighborhood pods to meet life safety requirements. Dead end alleys or stubbed streets for future connections will be designed to meet maximum allowable length criteria. Intersection locations will be designed with consideration of appropriate separation from existing streets.

4. Storm Drainage and Detention

There are no major drainageways that traverse the North Westerly Site. There are multiple outfall points along the perimeter of the site as the site in general drains away from the Community Ditch which traverses the site. The Site is in the Town of Erie Outfall Systems Plan (East of Coal Creek) by Merrick dated January 2020. The site is located within both Boulder Creek and Godding Hollow drainage basins. The proposed improvements are in general compliance with improvements contained within the Erie Outfall Systems Plan (East of Coal Cree). There are six extended detention basins as part of the North Westerly development. The extended detention basins will provide water quality capture volume, excess urban runoff volume, as well as 100-year detention. Each pond outfall will discharge to the historic outfall location of that drainage basin.

5. Other Utilities

AT&T currently provides telephone service within the proposed PD vicinity. No change in this service is proposed.

Black Hills Energy currently provides natural gas services within the proposed PD vicinity. No change in this service is proposed.

United Power currently provides electrical power services within the proposed PD vicinity. No change in this service is proposed.

Extension of these other utility services into the property proposed for PD will be the responsibility of the developer.

6. Police Protection

The Town of Erie provides its own police protection and will provide police protection services to the area proposed be zoned PD within the Town's boundaries.

7. Fire Protection

Mountain View Fire Protection District will provide fire protection services to the area proposed to be zoned PD within the Town's boundaries.

8. Street Maintenance and Improvements

Proposed streets within the PD area will be constructed by the developer. The Town will be providing maintenance of said streets after acceptance by the Public Works Division. Maintenance of sidewalks and tree lawns shall be provided by the adjacent property owner or HOA.

9. Open Space and Recreation

To be determined with the detailed planning of the community.

10. Other Municipal Services

The Town of Erie provides municipal services such as recreation and senior services and will extend these services to the area proposed to be zoned PD within the Town's boundaries. North Westerly will utilize re-use water where available.

III. Municipal Services Financing

No additional infrastructure is required or proposed to provide municipal services within the area proposed to be included within the Town's boundaries as part of this annexation. To the extent any additional service provision occurs, such service can be accommodated within the Town's current budget. The developer of the property will be responsible for on-site and off-site public improvements.

IV. Special Districts

The proposed PD Zoning area is encompassed within the following districts:

- Town of Erie Fire Protection District
- St. Vrain School District
- Mile High Flood District

The proposed PD Zoning area will petition to be within the following districts:

- Northern Water Conservancy District

V. School District Impact

The proposed project's impact on the St. Vrain Valley School District in terms of the number of students to be generated by the project if 1,955 dwelling units

are developed, will be determined with Final Plat. The current cash-in-lieu requirements are listed below by housing type.

Single Family = $1,143
Multi Family = $695
Duplex/Triplex = $997
Condo/Townhouse = $409
Mobile Homes = $925

In addition, any of Southern Land's Westerly housing credits remaining after Westerly is completed, could be applied to North Westerly units.

Per the Intergovernmental Agreement ("IGA") between the St. Vrain Valley School District, and the Town of Erie, the owner is required to pay fees to the School District prior to the issuance of building permits.

Exhibit A
Legal Description of the Property to be Zoned PD

PD ZONING LEGAL DESCRIPTION

A PARCEL OF LAND LOCATED IN SECTION 16, TOWNSHIP 1 NORTH, RANGE 68 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF WELD, STATE OF COLORADO MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: BEARINGS ARE BASED ON THE ASSUMPTION THAT THE NORTH LINE OF THE SOUTHEAST 1/4 OF SECTION 16 BEING N 89°30'52" E AND MONUMENTED AS FOLLOWS:

-CENTER 1/4 CORNER OF SECTION 16, BEING A FOUND 3.25" ALUMINUM CAP, LS 6973, RW BAYER ASSOC., PER MON REC DATED 3-1-14.

-EAST 1/4 CORNER OF SECTION 16, BEING A FOUND 2" ALUMINUM CAP IN RANGE BOX, PARTIALLY ILLEGIBLE, PLS 14083, PER MONUMENT RECORD DATED 4-9-96.

BEGINNING AT THE CENTER 1/4 CORNER OF SECTION 16;

THENCE N 89°30'52" E ALONG THE NORTH LINE OF THE SOUTHEAST 1/4 OF SAID SECTION 16 A DISTANCE OF 2630.74 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF WELD COUNTY ROAD NO. 7 AS DESCRIBED IN BOOK 86 PAGE 273;

THENCE S 00°22'39" E ALONG SAID RIGHT-OF-WAY LINE A DISTANCE OF 2075.17 FEET TO THE NORTHEAST CORNER OF THAT SPECIAL WARRANTY DEED RECORDED AT RECEPTION NO. 4925429;

THENCE ALONG THE NORTHERLY BOUNDARY OF SAID SPECIAL WARRANTY DEED RECORDED AT RECEPTION NO. 4925429 THE FOLLOWING FIVE (5) COURSES;

1) S 89°37'21" W A DISTANCE OF 40.00 FEET;
2) S 00°22'39" E A DISTANCE OF 473.00 FEET;
3) ALONG A CURVE TO THE RIGHT HAVING A CHORD OF S 44°37'59" W 35.36 FEET, A RADIUS OF 25.00 FEET, AN ARC OF 39.28 FEET, AND A DELTA OF 90°01'15";
4) S 89°38'36" W A DISTANCE OF 912.35 FEET;
5) S 00°21'24" E A DISTANCE OF 40.00 FEET TO A POINT ON THE NORTHERLY RIGHT-OF-WAY LINE OF ERIE PARKWAY (AKA WELD COUNTY ROAD NO. 8) RECORDED IN BOOK 86 PAGE 273;

THENCE S 89°38'36" W ALONG SAID RIGHT-OF-WAY LINE A DISTANCE OF 1656.00 FEET;

THENCE S 89°38'17" W CONTINUING ALONG SAID RIGHT-OF-WAY LINE A DISTANCE OF 1343.47 FEET TO THE SOUTHEAST CORNER OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. 3158505;

THENCE N 00°13’30” W ALONG THE EASTERLY BOUNDARY OF SAID PARCEL A DISTANCE OF 1949.87 FEET TO A POINT ON THE SOUTHERLY BOUNDARY OF THAT PARCEL OF LAND RECORDED AT RECEPTION NO. 4206840;

THENCE ALONG THE SOUTHERLY, EASTERLY AND NORTHERLY BOUNDARY OF SAID PARCEL OF LAND THE FOLLOWING SIX (6) COURSES:

1) N 89°38’27” E A DISTANCE OF 2.00 FEET;
2) N 04°46’24” W A DISTANCE OF 110.00 FEET;
3) S 89°38’27” W A DISTANCE OF 48.00 FEET;
4) N 44°31’51” W A DISTANCE OF 339.83 FEET;
5) N 03°21’55” E A DISTANCE OF 545.00 FEET;
6) S 89°31’06” W A DISTANCE OF 1032.00 FEET TO A POINT ON THE EASTERLY RIGHT-OF-WAY LINE OF WELD COUNTY ROAD NO. 5 RECORDED IN SAID BOOK 86 PAGE 273;

THENCE N 00°12’52” W ALONG SAID EASTERLY RIGHT-OF-WAY LINE A DISTANCE OF 2358.50 FEET TO A POINT ON THE SOUTHERLY RIGHT-OF-WAY LINE OF WELD COUNTY ROAD NO. 10 RECORDED IN SAID BOOK 86 PAGE 273;

THENCE N 89°23’44” E ALONG SAID SOUTHERLY RIGHT-OF-WAY LINE A DISTANCE OF 2624.71 FEET TO A POINT ON THE NORTH-SOUTH CENTERLINE OF SAID SECTION 16;

THENCE S 00°18’49” E ALONG SAID NORTH-SOUTH CENTERLINE OF SAID SECTION 16 A DISTANCE OF 2607.31 FEET TO THE **POINT OF BEGINNING**.

THE ABOVE DESCRIBED PARCEL CONTAINS 17,026,720 SQUARE FEET OR 390.8797 ACRES MORE OR LESS.

Economic & Planning Systems, Inc.
The Economics of Land Use

Memo

To: Southern Land Company

From: Andrew Knudtsen and Karen Chen, Economic & Planning Systems, Inc.

Subject: North Westerly Market Study
EPS #243067

Date: October 7, 2024

Economic & Planning Systems, Inc. ("EPS") was retained by Southern Land Company ("SLC") to develop near-term forecasts for residential and retail uses in the Town of Erie, as well as to assess the degree to which the North Westerly development can capture a portion of the overall demand.

North Westerly is a planned development in Erie, Colorado located on a parcel of land SLC recently acquired from the Colorado State Land Board. The North Westerly development is anticipated to include a mix of uses including 1,852 resident units and retail space.

The specific questions this analysis focuses on include the following:

- Can the master planned community support 220,000 square feet of retail floor area over the course of development?
- What are realistic assumptions about capture rates from households within the development as well as those from surrounding areas, in terms of supportable retail square footage?
- What elements are important to take into consideration as the team defines a retail town center that will be viable in perpetuity?

EPS has completed studies for the Town of Erie in the recent past that include a forecast for residential, commercial, and employment land uses to support the Town's comprehensive plan. EPS has drawn from the findings of that effort and focused the analysis on the North Westerly master planned community. The data in the tables reflect the market performance that can be expected from the addition of the proposed 1,852 units and fit within the larger development trends documented in the comprehensive plan.

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Land Use Forecast Assumptions

Assumptions used to forecast retail demand are shown in **Table 1**. The number of annual residential units used in this forecast is based on historic construction trends in the Town of Erie. The bracketing of the performance for the North Westerly development is based on the developer's assumptions, reflecting past experience with master planned communities in the region.

The high and low figures used for the Town has been drawn from the work provided for the Comprehensive Plan and reflects a bracket that encompasses the full planning area (annexed and to be annexed). A more detailed set of data to support these figures is provided below. An average of 563 residential units per year reflects the midpoint and has been used for the forecast in the model provided later in this memo.

Table 1. Land Use Forecast Assumptions

Description	Value
Ann. Residential Units (Town of Erie)	
Low	444
Mid (Average of Low and High)	563
High	682
Residential Absorption (State Land Board Parcel)	
Low	100
High	150

Source: Southern Land Company; Zonda; Economic & Planning Systems

Historic residential construction closings were used to estimate a low and high figure for the number of units constructed annually in the Town of Erie as shown in **Table 2**. For a low figure, the 2010 to 2023 average of 444 annual units, and the 2019 to 2023 average of 682 annual units for a high figure. The resulting figures reflect historic performance for the Erie market, tapering the strong production of the recent past to establish a credible floor for production.

Table 2. Annual Residential Units 2010-2023 Q3

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023 Q3	2010-2023 Total	2010-2023 Avg.	2019-2023 Total	2019-2023 Avg.
Annual Closings																		
Single Family Detached	150	112	186	262	190	404	502	507	581	695	607	552	382	366	5,496	393	2,236	559
Duplex	21	5	0	0	0	0	0	0	0	0	0	105	201	63	395	28	306	77
Townhome	2	0	0	0	16	19	1	15	44	81	13	54	37	9	291	21	185	46
Condo	24	8	0	0	0	0	0	0	0	0	0	0	0	0	32	2	0	0
Total	**197**	**125**	**186**	**262**	**206**	**423**	**503**	**522**	**625**	**776**	**620**	**711**	**620**	**438**	**6,214**	**444**	**2,727**	**682**

Source: Zonda, Economic & Planning Systems

Retail Demand

Retail expenditure potential generated by existing and future households in Erie were estimated by using home sales price data provided by SLC. On average, homes in the North Westerly development will have an anticipated sales price of $690,000.

Based on the anticipated household income correlated to anticipated home prices, new households generated by this development will have an average household income of approximately $128,900 which generates a Total Personal Income (TPI) of $238.7 million, as shown in **Table 3**.

Table 3. Total Personal Income, Town of Erie Existing Households and Projected Growth

Description	Town of Erie (2024)	New Households (Excl. SLB)	SLB Parcel
Town of Erie			
Households	12,136	15,305	1,852
Avg. Household Income	$199,665	$125,302	$128,900
Total Personal Income	**$2,423,134,440**	**$1,917,740,421**	**$238,722,663**
Avg. Sales Price		*$670,738*	*$690,000*

Source: Town of Erie; ESRI; Economic & Planning Systems

Using data from the U.S. Census of Retail Trade, the percent of TPI by store category is estimated at the statewide level to estimate expected resident spending patterns at a level of geography large enough to negate the impacts of sales inflows and outflows. The percentage of TPI spent by store category in Colorado is then applied to the TPI of Erie to estimate expenditure potential (regardless of location of purchases). This shows the total amount that residents in each category are expected to spend on retail goods.

At full buildout, North Westerly households are anticipated to spend a total of $87.3 million on retail goods annually, as shown in **Table 4**.

Table 4. Resident Expenditure Potential, Existing Households and Projected Growth

Store Type	Retail Sales % TPI (2017)	Town of Erie (2024) ($000s)	New Households (Excl. SLB) ($000s)	SLB Parcel ($000s)
Total Personal Income (TPI)	**100%**	**$2,423,134**	**$1,917,740**	**$238,723**
Convenience Goods				
Supermarkets and Other Grocery Stores	7.3%	$176,334	$139,556	$17,372
Convenience Stores (incl. Gas Stations)	2.9%	$71,185	$56,338	$7,013
Specialty Food and Beer, Wine, & Liquor Stores	1.3%	$32,565	$25,773	$3,208
Health and Personal Care	1.7%	$41,996	$33,237	$4,137
Total Convenience Goods	**13.3%**	**$322,080**	**$254,904**	**$31,731**
Shopper's Goods				
General Merchandise				
Department Stores	0.5%	$12,302	$9,737	$1,212
Warehouse Clubs & Supercenters	5.7%	$138,347	$109,492	$13,630
Subtotal	**6.2%**	**$150,650**	**$119,229**	**$14,842**
Other Shopper's Goods				
Clothing & Accessories	2.0%	$47,719	$37,766	$4,701
Furniture & Home Furnishings	1.3%	$30,408	$24,066	$2,996
Electronics & Appliances	1.0%	$23,343	$18,474	$2,300
Sporting Goods, Hobby, Book, & Music Stores	1.1%	$27,537	$21,794	$2,713
Miscellaneous Retail	1.6%	$37,839	$29,947	$3,728
Subtotal	**6.9%**	**$166,846**	**$132,047**	**$16,437**
Total Shopper's Goods	**13.1%**	**$317,495**	**$251,275**	**$31,279**
Eating and Drinking	**6.8%**	**$163,736**	**$129,585**	**$16,131**
Building Material & Garden	**3.4%**	**$82,960**	**$65,657**	**$8,173**
Total Retail Goods	**36.6%**	**$886,271**	**$701,421**	**$87,314**

Source: 2017 Census of Retail Trade; Economic & Planning Systems

Residential expenditure potentials include spending regardless of location. To estimate the amount of retail sales that residents generate within Erie, a capture rate is applied to expenditure potential estimates, shown in **Table 5**.

The capture rates for the store categories likely to be found within North Westerly are shown in the table below. On average, local retail establishments are estimated to capture approximately 44.1 percent of total resident retail spending.

Table 5. Resident Estimated Local Sales

Store Type	Retail Sales % TPI (2017)	Local Capture %	Town of Erie (2024) Exp. Potential ($000s)	Town of Erie (2024) Est. Sales ($000s)	(Excl. SLB) Exp. Potential ($000s)	(Excl. SLB) Est. Sales ($000s)	SLB Parcel Exp. Potential ($000s)	SLB Parcel Est. Sales ($000s)
Total Personal Income (TPI)	**100.0%**		**$2,423,134**		**$1,917,740**		**$238,723**	
Convenience Goods								
Supermarkets and Other Grocery Stores	7.3%	80%	$176,334	$141,067	$139,556	$111,645	$17,372	$13,898
Convenience Stores (incl. Gas Stations)	2.9%	80%	$71,185	$56,948	$56,338	$45,070	$7,013	$5,610
Specialty Food and Beer, Wine, & Liquor Stores	1.3%	60%	$32,565	$19,539	$25,773	$15,464	$3,208	$1,925
Health and Personal Care	1.7%	80%	$41,996	$33,597	$33,237	$26,590	$4,137	$3,310
Total Convenience Goods	**13.3%**		**$322,080**	**$251,151**	**$254,904**	**$198,768**	**$31,731**	**$24,743**
Shopper's Goods								
General Merchandise								
Department Stores	0.5%	0%	$12,302	$0	$9,737	$0	$1,212	$0
Warehouse Clubs & Supercenters	5.7%	0%	$138,347	$0	$109,492	$0	$13,630	$0
Subtotal	**6.2%**		**$150,650**	**$0**	**$119,229**	**$0**	**$14,842**	**$0**
Other Shopper's Goods								
Clothing & Accessories	2.0%	10%	$47,719	$4,772	$37,766	$3,777	$4,701	$470
Furniture & Home Furnishings	1.3%	10%	$30,408	$3,041	$24,066	$2,407	$2,996	$300
Electronics & Appliances	1.0%	10%	$23,343	$2,334	$18,474	$1,847	$2,300	$230
Sporting Goods, Hobby, Book, & Music Stores	1.1%	10%	$27,537	$2,754	$21,794	$2,179	$2,713	$271
Miscellaneous Retail	1.6%	10%	$37,839	$3,784	$29,947	$2,995	$3,728	$373
Subtotal	**6.9%**		**$166,846**	**$16,685**	**$132,047**	**$13,205**	**$16,437**	**$1,644**
Total Shopper's Goods	**13.1%**		**$317,495**	**$16,685**	**$251,275**	**$13,205**	**$31,279**	**$1,644**
Eating and Drinking	**6.8%**	50%	**$163,736**	**$81,868**	**$129,585**	**$64,793**	**$16,131**	**$8,065**
Building Material & Garden	**3.4%**	50%	**$82,960**	**$41,480**	**$65,657**	**$32,828**	**$8,173**	**$4,087**
Total Retail Goods	**36.6%**	**44.1%**	**$886,271**	**$391,183**	**$701,421**	**$309,594**	**$87,314**	**$38,539**

Source: 2017 Census of Retail Trade; ICSC; Economic & Planning Systems

Resident expenditure by store category translates into supportable floor area based on typical annual sales revenues. As shown in **Table 6**, the retail square footage supportable by projected demand is estimated using average sales per square foot estimates for each store category.

Table 6. Supportable Retail Square Feet

Store Type	Avg. Sales Per Sq. Ft.	Total Sales ($000s) Town of Erie (2024)	Total Sales ($000s) New Households (Excl. SLB)	Total Sales ($000s) SLB Parcel	Demand (sq. ft.) Town of Erie (2024)	Demand (sq. ft.) New Households (Excl. SLB)	Demand (sq. ft.) SLB Parcel
Convenience Goods							
Supermarkets and Other Grocery Stores	$500	$141,067	$111,645	$13,898	282,100	223,300	27,800
Convenience Stores (incl. Gas Stations)	$400	$56,948	$45,070	$5,610	142,400	112,700	14,000
Beer, Wine, & Liquor Stores	$300	$19,539	$15,464	$1,925	65,100	51,500	6,400
Health and Personal Care	$500	$33,597	$26,590	$3,310	67,200	53,200	6,600
Total Convenience Goods		**$251,151**	**$198,768**	**$24,743**	**556,800**	**440,700**	**54,800**
Shopper's Goods							
General Merchandise							
Department Stores	$300	$0	$0	$0	0	0	0
Warehouse Clubs & Supercenters	$500	$0	$0	$0	0	0	0
Subtotal		**$0**	**$0**	**$0**	**0**	**0**	**0**
Other Shopper's Goods							
Clothing & Accessories	$500	$4,772	$3,777	$470	9,500	7,600	900
Furniture & Home Furnishings	$300	$3,041	$2,407	$300	10,100	8,000	1,000
Electronics & Appliances	$500	$2,334	$1,847	$230	4,700	3,700	500
Sporting Goods, Hobby, Book, & Music	$250	$2,754	$2,179	$271	11,000	8,700	1,100
Miscellaneous Retail	$300	$3,784	$2,995	$373	12,600	10,000	1,200
Total		**$16,685**	**$13,205**	**$1,644**	**47,900**	**38,000**	**4,700**
Total Shopper's Goods		**$16,685**	**$13,205**	**$1,644**	**47,900**	**38,000**	**4,700**
Eating and Drinking	$350	**$81,868**	**$64,793**	**$8,065**	**233,900**	**185,100**	**23,000**
Building Material & Garden	$300	**$41,480**	**$32,828**	**$4,087**	**138,000**	**109,000**	**14,000**
Total Retail Goods		**$391,183**	**$309,594**	**$38,539**	**976,600**	**772,800**	**96,500**

Source: 2017 Census of Retail Trade; Economic & Planning Systems

Service retail, which is not included in the retail sales data used for other retail categories, adds 20 percent to the square footage figures shown in **Table 6**. A 5 percent square footage reduction is applied to account for the increase in online spending that has occurred nationwide since the 2017 Economic Census was released, thus redirecting a portion of household income that might otherwise be spent in brick and mortar locations.

After these adjustments, existing households in the Town of Erie, and new households generated by planned and proposed development at full buildout (including North Westerly) are estimated to support a total of approximately 2.1 million square feet of floor area, shown in **Table 7**.

Table 7. Total Retail Demand

Description	Factor	Town of Erie (2024)	New Households (Excl. SLB)	SLB Parcel	Total
Retail Type					
Convenience Goods		556,800	440,700	54,800	1,052,300
General Merchandise		0	0	0	0
Other Shopper's Goods		47,900	38,000	4,700	90,600
Eating and Drinking		233,900	185,100	23,000	442,000
Building Material & Garden		138,000	109,000	14,000	261,000
Subtotal		**976,600**	**772,800**	**96,500**	**1,845,900**
Service Retail	20%	**195,320**	**154,560**	**19,300**	**369,180**
Online Spending	-5%	**-48,830**	**-38,640**	**-4,825**	**-92,295**
Total Demand		**1,123,090**	**888,720**	**110,975**	**2,122,785**

Source: Economic & Planning Systems

Retail Absorption Schedule

While **Table 7** shows total retail demand in the Town of Erie after future residential units reach full buildout, **Table 8** includes the supportable retail square footage that can be captured by North Westerly specifically.

A detailed retail absorption model using the middle tier residential growth projection of 563 annual residential units shown in **Table 8**, integrates development timing with projected retail demand. This model highlight the first five years of construction, and each year following in which the demand captured by North Westerly surpasses 75,000 square foot increments of retail space up to 225,000 square feet.

This forecast assumes that the North Westerly development has the potential to capture 10% of total demand generated by existing Town of Erie residents, 15% of demand generated by future households (due to the proximity of new residential development to this site), and 60% of demand generated by North Westerly residents. Based on Erie's current retail inventory, the square footage of unmet demand is calculated for the town overall. Note that the development's capture of demand generated by existing households applies to unmet demand in Erie to account for existing retail space in the town.

Table 8. Retail Absorption Forecast – Midlevel Forecast

Description	Factor	Total	Const. Start	Year 0 2024	Year 1 2025	Year 2 2026	Year 3 2027	Year 4 2028	Year 5 2029	Year 6 2030	Year 15 2039	Year 30 2054
Households (Annual)												
Town of Erie (2024)	--	12,136	--	12,136	0	0	0	0	0	0	0	0
New Households (Excl. SLB)	413 - 463	15,305	2025	0	463	463	463	463	438	438	511	563
SLB Parcel	100 - 150	1,852	2025	0	100	100	100	100	125	125	52	0
Total New Households	**563**	**17,157**	--	**0**	**563**	**563**	**563**	**563**	**563**	**563**	**563**	**563**
SLB Capture					*17.8%*	*17.8%*	*17.8%*	*17.8%*	*22.2%*	*22.2%*	*9.2%*	*0.0%*
Households (Cumulative)												
Town of Erie (2024)	--	12,136	--	12,136	12,136	12,136	12,136	12,136	12,136	12,136	12,136	12,136
New Households (Excl. SLB)	--	15,305	--	0	463	926	1,389	1,852	2,290	2,728	6,593	15,038
SLB Parcel	--	1,852	--	0	100	200	300	400	525	650	1,852	1,852
Total Households	**--**	**--**	**--**	**12,136**	**12,699**	**13,262**	**13,825**	**14,388**	**14,951**	**15,514**	**20,581**	**29,026**
Household Income												
Town of Erie (2024)	$199,665	--	--	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440	$2,423,134,440
New Households (Excl. SLB)	$125,302	--	--	$0	$58,014,624	$116,029,247	$174,043,871	$232,058,495	$286,940,579	$341,822,664	$826,113,205	$1,884,284,904
SLB Parcel	$128,900	--	--	$0	$12,889,993	$25,779,985	$38,669,978	$51,559,970	$67,672,461	$83,784,952	$238,722,663	$238,722,663
Total				**$2,423,134,440**	**$2,494,039,056**	**$2,564,943,672**	**$2,635,848,289**	**$2,706,752,905**	**$2,777,747,480**	**$2,848,742,056**	**$3,487,970,307**	**$4,546,142,006**
Retail Expenditure Potential												
Town of Erie (2024)	36.6%	--	--	$886,270,949	$886,270,949	$886,270,949	$886,270,949	$886,270,949	$886,270,949	$886,270,949	$886,270,949	$886,270,949
New Households (Excl. SLB)	36.6%	--	--	$0	$21,219,077	$42,438,153	$63,657,230	$84,876,307	$104,949,645	$125,022,983	$302,154,153	$689,184,612
SLB Parcel	36.6%	--	--	$0	$4,714,565	$9,429,131	$14,143,696	$18,858,262	$24,751,469	$30,644,676	$87,313,752	$87,313,752
Total		**--**	**--**	**$886,270,949**	**$912,204,591**	**$938,138,233**	**$964,071,875**	**$990,005,517**	**$1,015,972,062**	**$1,041,938,607**	**$1,275,738,854**	**$1,662,769,313**
Local Expenditure Potential												
Town of Erie (2024)	44.1%	--	--	$391,183,344	$391,183,344	$391,183,344	$391,183,344	$391,183,344	$391,183,344	$391,183,344	$391,183,344	$391,183,344
New Households (Excl. SLB)	44.1%	--	--	$0	$9,365,702	$18,731,404	$28,097,105	$37,462,807	$46,322,801	$55,182,796	$133,365,166	$304,193,138
SLB Parcel	44.1%	--	--	$0	$2,080,921	$4,161,841	$6,242,762	$8,323,682	$10,924,833	$13,525,984	$38,538,650	$38,538,650
Total		**--**	**--**	**$391,183,344**	**$402,629,966**	**$414,076,589**	**$425,523,211**	**$436,969,833**	**$448,430,979**	**$459,892,124**	**$563,087,159**	**$733,915,132**
Supportable Retail Sq. Ft.												
Town of Erie (2024)	$401	--	--	976,600	976,600	976,600	976,600	976,600	976,600	976,600	976,600	976,600
New Households (Excl. SLB)	$401	--	--	0	23,378	46,757	70,135	93,514	115,630	137,746	332,902	759,318
SLB Parcel	$399	--	--	0	5,211	10,421	15,632	20,842	27,356	33,869	96,500	96,500
Total		**--**	**--**	**976,600**	**1,005,189**	**1,033,778**	**1,062,367**	**1,090,956**	**1,119,585**	**1,148,215**	**1,406,002**	**1,832,418**
Total Retail Demand (w. Services)												
Town of Erie (2024)	15%	--	--	1,123,090	1,123,090	1,123,090	1,123,090	1,123,090	1,123,090	1,123,090	1,123,090	1,123,090
New Households (Excl. SLB)	15%	--	--	0	26,885	53,770	80,655	107,541	132,974	158,408	382,838	873,216
SLB Parcel	15%	--	--	0	5,992	11,984	17,977	23,969	31,459	38,949	110,975	110,975
Total				**1,123,090**	**1,155,967**	**1,188,845**	**1,221,722**	**1,254,599**	**1,287,523**	**1,320,447**	**1,616,903**	**2,107,281**
Erie Retail Inventory (sq. ft.)	--	810,269	--	810,269	810,269	810,269	810,269	810,269	810,269	810,269	810,269	810,269
Unmet Demand (sq. ft.)	--	--	--	312,821	345,698	378,576	411,453	444,330	477,254	510,178	806,634	1,297,012
SLB Capture of Erie Demand												
Town of Erie (2024)	10%	--	--	31,282	31,282	31,282	31,282	31,282	31,282	31,282	31,282	31,282
New Households (Excl. SLB)	15%	--	--	0	4,033	8,066	12,098	16,131	19,946	23,761	57,426	130,982
SLB Parcel	60%	--	--	0	3,595	7,191	10,786	14,381	18,875	23,369	66,585	66,585
Total (sq. ft.)				**31,282**	**38,910**	**46,538**	**54,166**	**61,794**	**70,104**	**78,413**	**155,293**	**228,850**

Source: Zonda; CoStar; ESRI; Economic & Planning Systems

A summary of forecasted retail absorption timing is shown in **Table 9**. Retail absorption is shown in three phases with a hypothetical 75,000 square feet in each phase. Assuming that between 100 to 150 residential units in the North Westerly development will be absorbed annually, residential construction is expected to be completed in 15 years.

Table 9. Absorption Summary

Description	Threshold (sq. ft.)	North Westerly Demand (sq. ft.)	Year	
Residential				
Construction Start	--	--	2025	Year 1
Construction End	--	--	2039	Year 15
Retail Absorption				
Forecast (Low)				
Phase 1	75,000	79,458	2031	Year 7
Phase 2	150,000	151,325	2042	Year 18
Phase 3	225,000	228,645	2062	Year 36
Forecast (Mid)				
Phase 1	75,000	78,413	2030	Year 6
Phase 2	150,000	155,293	2039	Year 15
Phase 3	225,000	228,850	2054	Year 30
Forecast (High)				
Phase 1	75,000	75,275	2029	Year 5
Phase 2	150,000	153,428	2037	Year 13
Phase 3	225,000	230,210	2049	Year 25

Source: Economic & Planning Systems

Findings

After applying the capture rates to determine the supportable square footage onsite at North Westerly, the middle scenario in **Table 9** shows that it will take six years for 78,413 square feet of retail space to be absorbed, 15 years for 155,293 square feet, and 30 years for 228,850 square feet.

Based on this forecast, the middle scenario indicates that by Year 15 after residential construction at North Westerly kicks off, there is sufficient demand for at least 150,000 square feet of retail space on site, but it could take around 30 years for a total of 225,000 square feet of retail space to be absorbed.

The primary finding of this analysis is that the timing of the project is such that the commercial development that is supportable is the amount that can be built while the residential is being built. Any additional floor area, after the last certificate of occupancy is issued, represents sales transfers (cannibalization) from other locations elsewhere in town to this location.

The residential portion of North Westerly is anticipated to finish construction and reach full buildout in approximately 15 years. To generate support for more on-site retail would require redirecting sales flows from other sites within the Erie trade area. Reserving vacant land past that point in time comes at a high cost, one that does not serve the interests of the Town or the developer.

Aly Burkhalter | Senior Planner
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10/2/2024

MARKET STUDY ADDITIONAL INFORMATION

The proposed amount of leasable commercial space in the North Westerly PD is approximately 145,000 square feet. The justification for a reduction from previously proposed totals is as follows:

1. From the Applicant's experience, the total square footage represents the suitable amount of space to maintain the mix of uses and quality of tenants to further the Goals of the Community and Vision of the Village. The quality of tenants, experiences and products incorporated into the Village is more important to its success than the total amount of commercial space built.

2. The total square footage proposed should be absorbed within the development horizon of the project. The Village will be built incrementally over time and the duration of the commercial development must coincide with the duration of the residential development.

3. The arrangement of the commercial space to create a central gathering place is central to the design of the community. Well-scaled spaces that provide the opportunity for small gatherings around a fire pit as well as a place for a neighborhood-sized concert have been designed into the concept plan. The applicant has a long history of actively programming events and engaging the community to keep this type of area active and interesting. A curated tenant mix that supports this vision is crucial to creating an environment that is successful as a community gathering place. Vacant commercial space pulls the life out of commercial areas. Vacant commercial space is particularly detrimental to a high-quality village that is the vision for this community.

The following is a detailed description of the Goals of the Community and Vision of the Village of North Westerly:

COMMUNITY GOALS

The vision of the proposed community is to create a place with a diversity of housing, many transportation options and an ease of living that encourages more time spent with friends and family and less time commuting and running errands. A major part of realizing that vision is to design, develop and manage a mixed-use, commercial village that is well-connected to the broader community and seamlessly integrated into this neighborhood. This Village is not only a place to buy and sell but the gathering place where true community is built.

VILLAGE VISION

The vision of the Village is to create a vibrant gathering place for the residents of this community and surrounding Erie neighborhoods. It will be a place that entices strolling tree-lined streets, taking an ice cream to the Village Green, and having a cocktail and dinner with friends while enjoying a sunset concert.

The proposed commercial program is intended to be destination-neighborhood services, daily needs, and F&B (or B&F) focused. The intention is not to be a regional draw or power-center type program, but rather a diverse mix of unique local and regional tenants that further the vision of the place with their products and services. Active storefronts, including outdoor dining and a market are planned for street corners and high-profile locations to evoke a sense of vitality and security.

The planned buildings are not to be larger than approximately 20,000 square feet and are to be delivered sequentially over time. This is to allow flexibility to respond to market conditions as well as to lessen the time pressure on the development and leasing teams. Without undue financial pressure to sign leases and fill space, the quality of the tenants can become more important than the quantity of leases needed.

The private community amenities are collocated with and in the Village to bolster the activity in the area and increase the visibility of the commercial tenants. The private amenities are planned to serve both the residents of this planned community as well as the residents of the Westerly community. The development will host many public and private events on the proposed Village Green and in community amenity spaces. The Village layout, Village Green, and planned programming are, from the applicant's experience, essential ideas to the success of the Village.

VILLAGE DESIGN

The Village has been centrally located in the proposed community as well as adjacent to and easily accessible from the major thoroughfares of Erie Parkway and County Road 7. This is to encourage patronage by not only the proposed community, but also the surrounding neighborhoods by providing easy access.

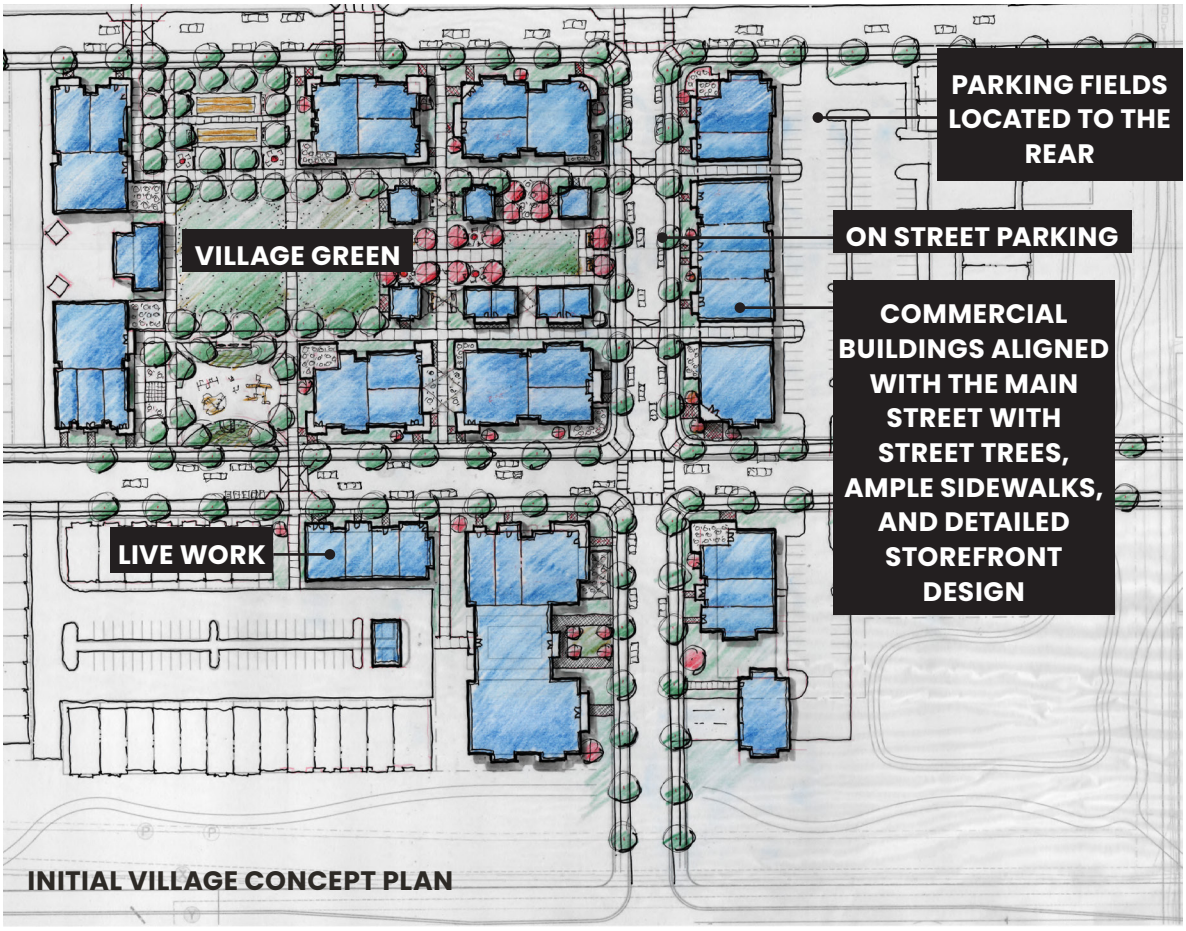
The Village has been designed in a modified, traditional Town Square arrangement with streets surrounding a Village Green. The Village Green has been sized to accommodate daily use as well as large events. The streets create well-sized blocks with comfortably spaced street crossings.

To the extent possible, the Village streets have been designed with active uses and commercial on the ground floor of both sides of the street. This will provide for a well-scaled, interesting and comfortable environment that encourages meandering through an interesting 'shopping loop'.

The planned buildings are aligned and set back the appropriate distance to allow for a comfortable walking experience. Street trees, ample-width sidewalks, and detailed storefront design are the key design components of a comfortable Village commercial environment. The footprints of the building allow for space between that encourage interesting 'surprise' moments as well as convenient access to parking.

On-street parking is provided to allow for convenient access to the shopfronts. Parking fields at the back of the commercial streets have been strategically located to allow for easy ingress and egress as well as convenient pedestrian access to the street. Parking for the community amenities have been located proximate to the Village to allow for parking sharing and to encourage multiple-stop trips to reduce traffic volumes.

Live-Work townhomes radiate from the Village to provide a smooth transition from the activity of the Village area to the quieter residential streets. Live-Work units provide an opportunity to increase entrepreneurship in the community with the long-term goal of having successful start-up businesses move into larger spaces in the Village.



ERIE PARKWAY

EXPERIENCE

The applicant has planned, developed, leased and/or managed (all in-house capabilities) over 1 million square feet of commercial space within the projects it has developed with the majority of it being at a village scale. The development and leasing of quality small-scale commercial space takes a tremendous amount of care and attention. To deliver buildings that fit the aesthetic vision of the community as well as tenants that fit the needs of the residents is

difficult at best. It is the applicant's goal to build a beautiful and successful Village but, more importantly, to provide the right mix of quality experiences and products that make the Village the soul of the community.

CONCEPT PLANS/PRECEDENTS
The following are visual examples of concepts and projects that are representative of the Vision of the Village Area:

Village Concept Plan
The Initial Village Concept Plan (graphic on previous page) depicts how the pedestrian realm, tenant and building form are envisioned to be complimentary. As described above, the commercial spaces are adjacent to the community amenity and surround the Village Green. Tenant lineup, mix and square footage are conceptual only.

Bradburn , Westminster, CO
The design for Bradburn was created by Duany Plater-Zyberk. Bisected by Main Street, the Village Core fronts 120th Avenue, the primary access into the project. Designed around "the look and feel of a small town Main Street", where residents can walk from their homes to shop, eat, and work. the Village Core, offers nearly 140,000 square feet of retail, an event center, bank, restaurants, office space, services, fitness, daycare, a Whole Foods, and a church use.

The Village Core features a plaza along the Main Street, a community center with pool, the church, multistory rowhouse apartments and live/work units, single-family townhomes, and Cherrington Park, named after Linda Cherrington, an original member of the Westminster Historical Society and one of the leading ladies in the city's early education system.

Two areas of offices further define the Village Core. The Main Street Offices occupy the second floor above Main Street's shops and restaurants. And the Rowhouse Live Work are two-story buildings designed for professional uses such as physicians, attorneys, real estate, salon type uses.









Westhaven, Franklin, TN
Project developed by the Applicant, 2002-current
Commercial delivered 2005-2021
200,000 sf Commercial

- 45,000 sf Grocer
- 22 Retail Tenants
- Medical Office
- Services







Pinehurst Village, NC
Original Plan by Frederick Law Olmstead – 1985
National Historic Landmark
Inspiration for Westhaven Village Design




ECTIC
in the Village


© Chris Crumpler

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AQUATIC RESOURCE DELINEATION REPORT

FOR

NORTH WESTERLY PROJECT

WELD COUNTY, COLORADO

DECEMBER 18, 2023

Prepared For:
NORTH WESTERLY OWNER, LLC
1225 17th Street, Suite 2420
Denver, CO 80202
Contact: Heidi Majerik
Phone: 720-531-8924

ERC Project #1155-2301

EXECUTIVE SUMMARY

Project Name	North Westerly Project
Applicant/Owner	NORTH WESTERLY OWNER, LLC
Survey Area Size (Acres)	392.8 acres
County, State	Weld, Colorado
Methodology	*1987 Corps of Engineers Wetlands Delineation Manual*
	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)
	2008 Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States

Summary of Findings

Aquatic Resource ID	Size (acres)	Linear Feet	Connectivity[1] (Yes/No)	Classification[2]	Description
A	**2.36**	**10,839.1**	**No**	**R4SBCx**	**Manmade Intermittent Riverine** (Community Ditch – east and west branches)
B	**0.04**	**--**	**No**	**PSS1C**	**Palustrine Scrub-Shrub Wetland**
Total	**2.40**	**10,839.1**	**--**	**--**	**--**

Note: All areas that have been investigated in the field are mapped on the enclosed Aquatic Resource Delineation Map (**Appendix A**).

[1] *Connectivity Yes=Direct surface connection to other Waters of the US identified.*
No=No direct surface connection to other Waters of the US identified.

[2] *Habitat Type based on Cowardin et al. 1979.*

CONTENTS

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APPENDIX A

Aquatic Resource Delineation Map Overview

APPENDIX B

ERC Wetland Determination Data Forms

1.0 INTRODUCTION

This report summarizes the delineation of aquatic resources completed by Ecological Resource Consultants, LLC (ERC) on behalf of NORTH WESTERLY OWNER, LLC for the North Westerly Project Site (survey area). This report documents aquatic resource boundary determinations for verification and jurisdictional review by the US Army Corps of Engineers (USACE), Omaha District Denver Regulatory Office.

Project Contact information		
	Applicant/Owner	**Representative**
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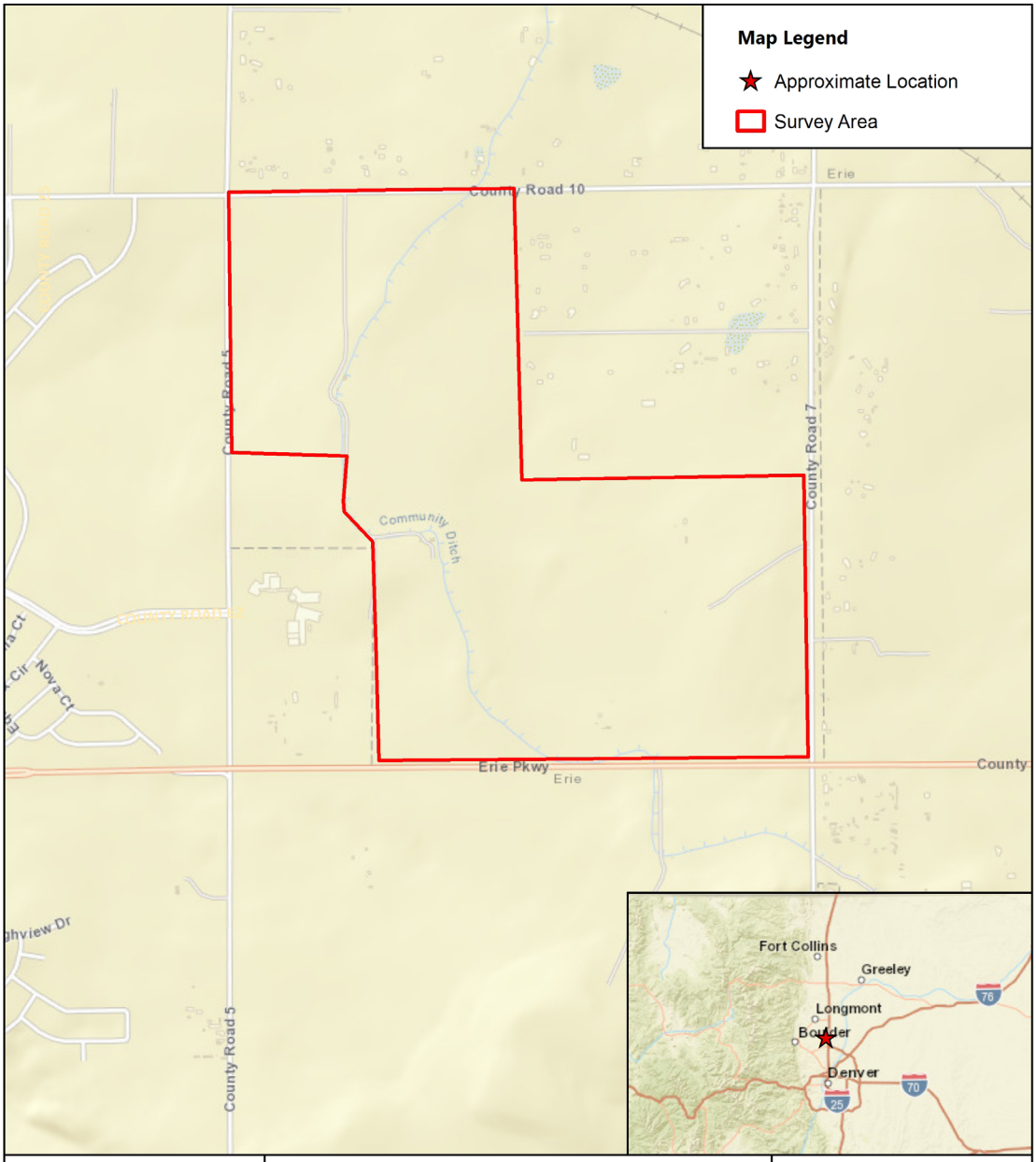
Phone	720-531-8924	303-679-4820 x116
Email	Heidi.Majerik@southernland.com	natalie@erccolorado.net

2.0 SURVEY AREA LOCATION

State	Colorado
County	Weld
County Parcel #	14-671-640-0004, 14-671-62-00076
Nearest Town	Erie
Street Address/ Nearest Intersection	No designated address / Northwest corner of Erie Parkway and County Road 7
Latitude, Longitude (Center of Survey Area)	40.05081°N, -105.0089°W
Section, Township, Range	Section 16, Township 1 North, Range 68 West
Direction from Denver Regulatory Office	Take CO-470 west towards I-70 for 13 miles. Take Exit 1 for I-70 East and continue for approximately 9 miles. Exit I-70 using exit 269B for I-76 East and continue for 5 miles. Take exit 5 for I-25 North and continue for 16 miles. Exit at 232 onto CR-8 heading west, then take the first right onto CR-7. After 1 mile, turn left on CR-10. For optimal access to the site, continue on CR-10 for 0.5 mile and park along the earthen parking on the left.
Refer to **Figures 1, 2 and 3** for a location map, a U.S. Geological Survey (USGS) topographic map and soil survey map of the survey area.	



Prepared By:

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ERC #: 1155-2301

FIGURE 1
LOCATION MAP

NORTH WESTERLY PROJECT
WELD COUNTY, COLORADO

0 800 1,600
Feet

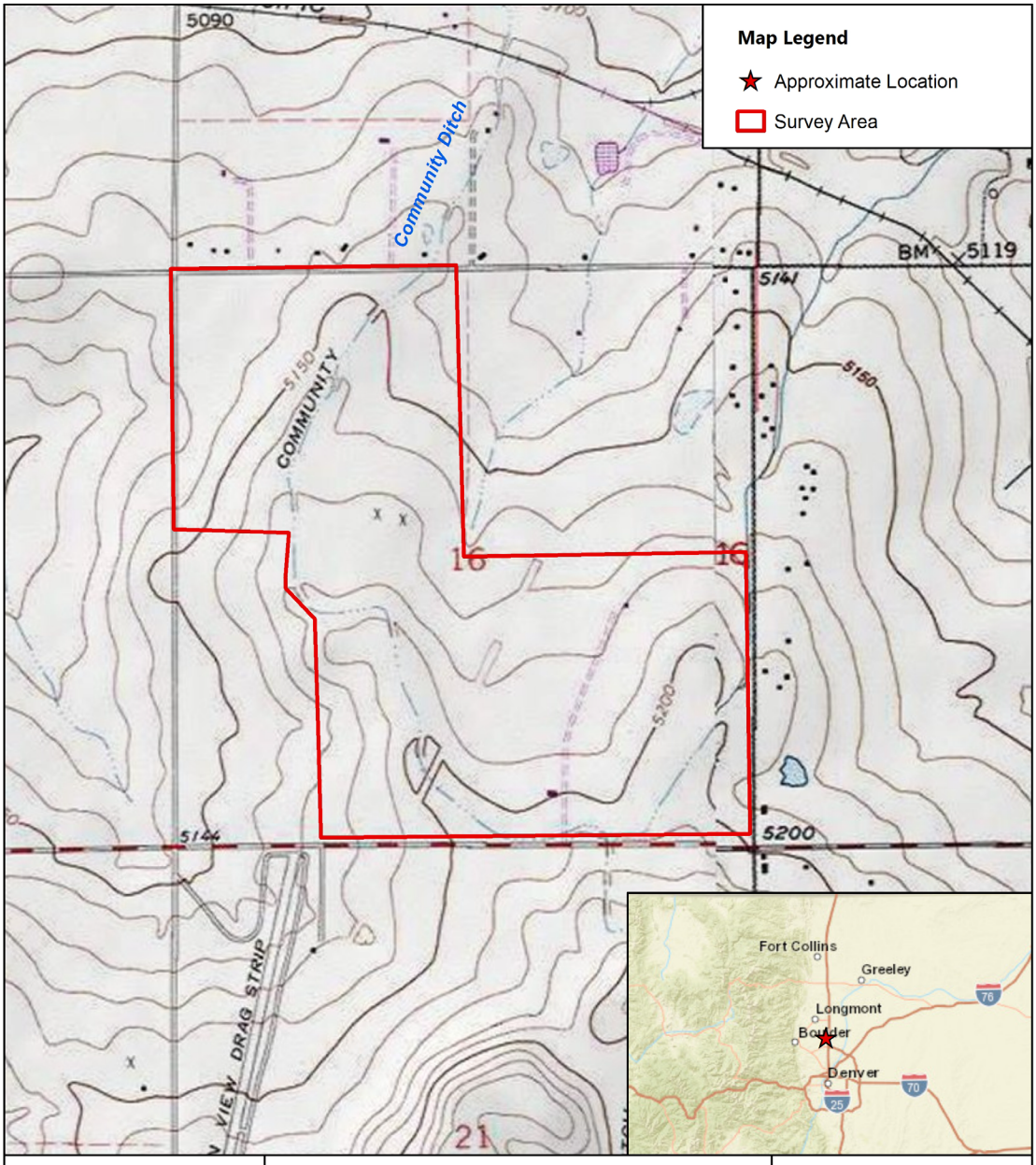

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FIGURE 2
USGS TOPOGRAPHIC MAP

NORTH WESTERLY PROJECT
WELD COUNTY, COLORADO

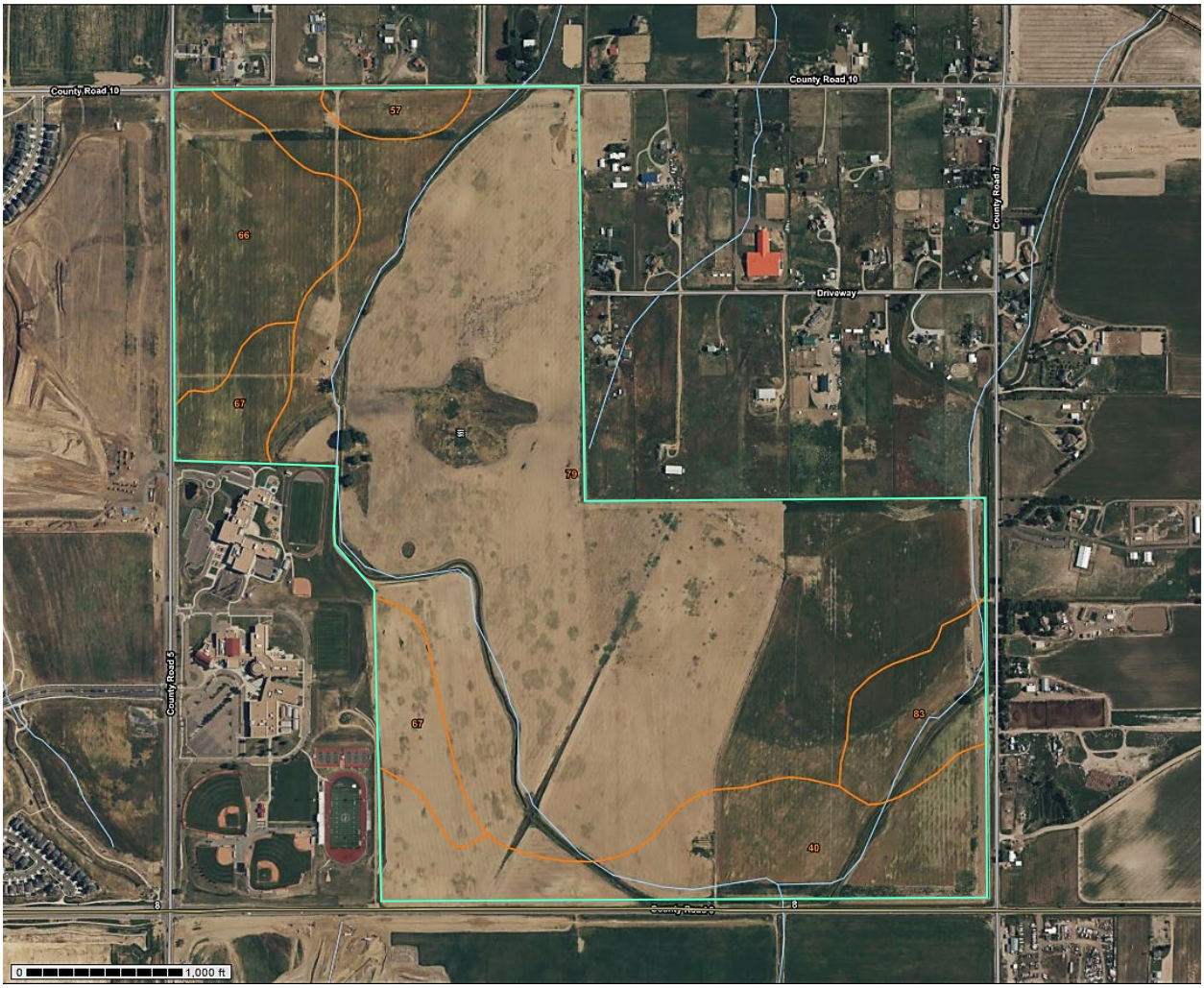

Figure 3. NRCS Web Soil Survey Map

Map Unit Symbol	Map Unit Name	Acres (+/-)	Hydric soil (Yes/No)[3]
40	Nunn loam, 1 to 3 percent slopes	56.4	No
57	Renohill clay loam, 3 to 9 percent slopes	5.7	No
66	Ulm clay loam, 0 to 3 percent slopes	34.2	No
67	Ulm clay loam, 3 to 5 percent slopes	22.8	No
79	Weld loam, 1 to 3 percent slopes	255.9	No
83	Wiley-Colby complex, 3 to 5 percent slopes	17.7	No

[3] Hydric (Yes/No) – obtained from the USDA State Soil Data Access (SDA) Hydric Soils List

3.0 METHODOLOGY

The aquatic resource delineation was conducted following the methodology enumerated in the *1987 Corps of Engineers Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0) (herein referred to as "Supplement") (Environmental Laboratory 1987, USACE 2010).* During the field inspection, dominant vegetation was recorded, representative hydrologic indicators were noted, and soil samples were examined for hydric indicators.

The USACE and the Environmental Protection Agency (USEPA) jointly define wetlands as: "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" [40 CFR 230.3(t)]. Three general environmental parameters define a wetland. These parameters must include the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Except under certain situations, evidence of a minimum of one positive wetland indicator from each of the above parameters must be identified in order to make a positive wetland determination.

In addition, waters of the U.S. (WOTUS) are also defined as areas that *"include essentially all surface waters such as rivers, streams and their tributaries, all wetlands adjacent to these waters, and all ponds, lakes and reservoirs".* The boundaries of some WOTUS (i.e., such as streams or lakes) are further defined by the ordinary high-water mark (OHWM). The OHWM is characterized as "the line on the shores established by the fluctuations of water and indicated by physical characteristics such as: a clear natural line impressed on the bank, shelving, changes in the character of the soil, wetland vegetation, the presence of litter and debris, and other appropriate means that consider the characteristics of the surrounding areas" (USACE 2005). These definitions are the basis of this delineation method.

Areas that do not meet any one of the wetland parameters (hydrophytic vegetation, hydric soils and/or wetland hydrology) or non-vegetated stream channel/open water (OHWM) were classified as a non-wetland (upland) and mapped as such.

Any area determined to be potential WOTUS was delineated in the field using pink flags identified with 'WETLAND BOUNDARY' printed on it and sequentially labeled alpha-numerically (i.e., A1, A2…).

Each wetland determination point was recorded using a hand-held Trimble GeoXH global positioning system (GPS) receiver. The resulting GPS data were post-processed using GPS Pathfinder Office 5.85 software. Post-processing differential correction provided an average horizontal mapping accuracy of +/- 2 feet. Post-processed GPS data were imported into ArcMap Geographic Information Systems (GIS) (Version 10.6) for spatial analysis and mapping. All aquatic resources delineated within the survey area are depicted on the Aquatic Resource Delineation Map (**Appendix A**). Wetland Determination data sheets are provided in **Appendix B**.

4.0 EXISTING CONDITIONS

4.1 LANDSCAPE SETTING

Average Elevation (Feet AMSL)	5,175’
Topography	Primarily flat, becomes gradually higher going from north (lowest) to the southeast corner (highest)
Subregion (LRR)	LRR G
Watershed HUC(s)	*Outlet Boulder Creek – 101900050705* *Firestone Lake- Saint Vrain Creek – 101900050707*
Nearest Waterbody	Boulder Creek
Current Landuse	Agriculture
Historic Landuse	Agriculture
Dominant Vegetation Communities	Cultivated Cropland
Reference	(NatureServe 2023)
General Vegetation Description	The majority of the survey area is dominated by cultivated cropland as the historic and current land use of the property and surrounding area is agriculture. The area is primarily Winter Wheat (*Triticum aestivum*). Around the earthen roads, the edges of the row crop fields, and near Community Ditch, the vegetation has been considerably disturbed due to agricultural practices. If not barren, these areas are dominated by upland grasses and shrubs such as cheatgrass (*Bromus tectorum*) and intermediate wheatgrass (*Thinopyrum intermedium*). A small adjacent wetland is located in the southeast portion of the survey area and dominated by Narrowleaf Willow (*Salix Exigua*).
Other Vegetation Communities	Great Plains Ruderal Grassland and Shrubland, Disturbed, Salix exigua / Mesic Graminoids Western Wet Shrubland
Reference	(NatureServe 2023)
Vegetation Community Description(s)	*Cultivated Cropland* The cultivated cropland community is characterized as a non-natural system which includes lands used for the production of annual crops where crop vegetation accounts for greater than 20 percent of the total vegetation and where the land is actively tilled (SWReGAP 2011). This community also includes all land being actively tilled. The cultivated cropland community within the survey area comprises relatively flat agricultural fields currently planted with row crops consisting primarily of winter wheat (*Triticum aestivum*). The agricultural fields appear to be regularly plowed and/or tilled and subject to flood irrigation practices throughout the growing season. *Great Plains Ruderal Grassland and Shrubland* The great plains ruderal grassland and shrubland is characterized being dominated by exotic, invasive grasses, forbs, or, in the south, deciduous shrubs. These species can become abundant after significant disturbance, often

	associated with agricultural activities, or a disruption of natural disturbance regimes. Common disturbances which favor establishment of this macrogroup include long-term, heavy grazing, planting exotic species for livestock forage, plowing land and then abandoning it, and a disruption of the natural fire regime. Vegetation cover varies from low to very high. Common species in the project area include crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), field brome (*Bromus arvensis*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis)*, and intermediate wheatgrass (*Thinopyrum intermedium*) and are located in small areas throughout the project area. This macrogroup can be found on mesic to dry sites on a variety of soils where disturbance regimes have been altered sufficiently to allow the establishment of the exotic species. *Disturbed* The Disturbed community includes the Community Ditch, an irrigation ditch which appears to be used solely for irrigational purposes. These features consist of barren grounds associated with oil and gas related activities, ditch excavation and urban materials such as pavement. Tree canopy varies from 0 to 50% (e.g., open to shaded lawns and gardens). *Salix exigua / Mesic Graminoids Western Wet Shrubland* This riparian association is found primarily in the Rocky Mountains and Intermountain West. The vegetation is characterized by the dominance of *Salix exigua* in a moderately dense tall-shrub canopy with a dense herbaceous layer dominated by graminoids. It typically occurs as a monoculture of *Salix exigua*, but can have other woody species, including saplings of *Populus deltoides* or *Salix amygdaloides*, and shrubs such as *Salix eriocephala, Salix lutea*, and *Amorpha fruticosa*. Tall perennial grasses can appear to codominate the stand when *Spartina pectinata, Panicum virgatum* or other tall grasses are present. Other mesic graminoids, such as *Carex* spp., *Eleocharis* spp., *Juncus* spp., *Pascopyrum smithii, Schoenoplectus pungens*, and *Sphenopholis obtusata*, may be present. Common forb species include *Bidens* spp., *Lobelia siphilitica, Lycopus americanus, Lythrum alatum, Polygonum* spp., and *Xanthium strumarium*. Diagnostic features of this association include the nearly pure stands of *Salix exigua* shrubs, with a dense herbaceous layer of at least 30% cover of mesic graminoids. It generally occurs along backwater channels and other perennially wet but less scoured sites, such as floodplain swales and irrigation ditches.
Notable Features	Community Ditch
Dates of Field Work	December 7, 2023
Weather	Partly cloudy and high winds, 60°F
Typical Climatic/ Hydrologic Condition	Normal conditions for the time of year.

Refer to **Photos 1-6** below for general characteristics of the survey area. Photos were taken on December 7, 2023.



Photo 1. View south of the row crops, primarily winter wheat, in the northern portion of the survey area.



Photo 2. View facing southwest of barren row crop fields from the northern portion of the survey area.



Photo 3. View facing northeast of the ruderal grassland and shrublands from the central region of the survey area.



Photo 4. View facing east of agricultural fields from the central portion of the survey area.



Photo 5. View southwest from the northern portion of the survey area showing agricultural fields (left), disturbed vegetation around earthen road and edges of ditch (center), and Community Ditch (right). Aquatic Resource A marked with blue lines.



Photo 6. View facing northwest from southeast portion of survey area showing barren row crops in the foreground, Community Ditch - east branch in the background, and Aquatic Resource B on the far right (marked by yellow arrow).

4.2 AQUATIC RESOURCES

Delineated aquatic resources were classified according to the physical and biological characteristics using the Classification of Wetlands and Deepwater Habitat of the United States (Cowardin Classification System) (Cowardin et al. 1979). Within the survey area, wetland habitat types were classified based on field evaluation and are summarized in **Table 1**.

Table 1. Summary of Aquatic Resources Delineated Within the Survey Area

Aquatic Resource Name	Classification		Acres	Linear Feet	Feature Type
	[4]Cowardin	Location (lat/long)			
A	R4SBCx	40.04801° N, -105.0087° W	2.36	10,839.1	Community Ditch
B	PSS1C	40.04552° N, -105.0018° W	0.04	--	Palustrine Scrub-Shrub Wetland
Total			**2.40**	**10,839.1**	

A total of 2.4 acres (10,839.1 linear feet) of aquatic resources were delineated by ERC within the survey area. A description of aquatic resource habitat types is provided below. The Aquatic Resource Delineation Map is provided in **Appendix A**. Wetland Determination data sheets are provided in **Appendix B.** Refer to **Table 2** for a list of plant species identified within the survey area (Lichvar et al. 2016).

AQUATIC RESOURCE A (2.36 ACRES) (10,839.1 LINEAR FEET)

Aquatic Resource A (Community Ditch) is a manmade, intermittent ditch (R4SBCx) excavated in uplands. Within the survey area, Community Ditch begins along the southern boundary and flows in 3 directions – northwest, northeast, and east. The first and largest portion, known as the Community Ditch - west branch, flows northwest through the entirety of the survey area, curves northeast and exits the survey area in the northeast corner of the northern parcel. The second portion, known as Community Ditch - east branch, flows northeast and remains in the southeast portion of the survey area. The last portion, an unnamed segment of an irrigation ditch stemming from Community Ditch - east branch, flows east along the southern boundary of the survey area and terminates in the southeast corner within the survey area.

Aquatic Resource A collects hydrology from upstream irrigation in Community Ditch. Surface water flow was not observed at the time of the delineation. Aquatic Resource A does not have connectivity with any designated WOTUS.

Overall, the vegetation community within Aquatic Resource A is dominated by species such as Hairy perennial panic grass (*Dichanthelium acuminatum*), Scratchgrass (*Muhlenbergia asperifolia*), and Green foxtail (*Setaria viridis*). Due to continual disturbance from agricultural practices, the dominant species within the wetland area consist of a range of species, from upland to hydrophytic (UPL-FACW). Some

[4] *Habitat Type based on Cowardin et al. 1979.*

wetland areas within Community Ditch are stripped of vegetation from seasonal flooding of irrigation waters.

Soils within Aquatic Resource A are clay loam in texture, exhibiting hydric soil indicators Loamy Gleyed Matrix (F2) and Depleted Matrix (F3). At the time of the delineation, primary wetland hydrology indicators B7 (Inundation on Aerial Imagery), B9 (Water-Stained Leaves), C3 (Oxidized Rhizospheres on Living Roots, where not tilled), and C4 (Presence of Reduced Iron) were observed. Secondary indicators B8 (Sparsely Vegetated Concave Surface), B10 (Drainage Patterns), C3 (Oxidized Rhizospheres on Tilled Roots), D2 (Geomorphic Position), and D5 (FAC-Neutral Test) were also observed; however, no flow or saturation was present during the site visit. Aquatic Resource A meets the criteria for a wetland based on the presence of hydric soils and wetland hydrology and includes an OHWM. Hydrophytic vegetation was present in some areas within Aquatic Resource A and missing from other areas due to high rates of disturbance from agricultural use, making the vegetation significantly disturbed. Therefore, the vegetation does not impact the jurisdiction of wetlands for these portions of the survey area.

Aquatic Resource A comprises a total of 2.36 acres (10,839.1 linear feet) of manmade, intermittent riverine (R4SBCx) (**Appendix A**). Refer to **Photos 7-10** below for characteristics within Aquatic Resource A which were taken December 7, 2023.



Photo 7. Overview facing south of Aquatic Resource A, Community Ditch - west branch, taken from the center of the survey area. The OHWM is depicted by the blue line.



Photo 8. View facing south from inside Community Ditch – west branch in the central area of the property. The OHWM is depicted by the blue line.



Photo 9. View facing west (upstream) of Aquatic Resource A, showing the entrance of Community Ditch and the first segment of the east branch along the southern edge of the survey area. The OHWM is depicted by the blue line.

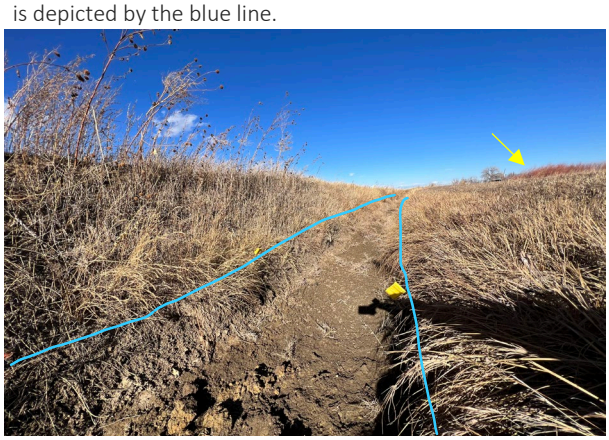

Photo 10. View north of Aquatic Resource A, Community Ditch – east branch, and Aquatic Resource B, adjacent wetland, on the right. The OHWM is depicted by the blue line and Aquatic Resource B location is shown with yellow arrow.

AQUATIC RESOURCE B (0.04 ACRE)

Aquatic Resource B is a seasonally flooded, palustrine scrub-shrub wetland (PSS1C) adjacent to Aquatic Resource A, Community Ditch - east branch. This wetland is located in the southeast portion of the survey area. Aquatic Resource B collects hydrology from seepage from Community Ditch irrigation flows. Aquatic Resource B does not have connectivity with any designated WOTUS.

Overall, the vegetation community within Aquatic Resource B is dominated by species such as Narrowleaf Willow (*Salix exigua*), Annual Beard-grass (*Polypogon monspeliensis*), Common Mullein (*Verbascum thapsus*), and Roundfruit Rush (*Juncus compressus*). The dominant species within the wetland area consist primarily of hydrophytic species (FACW).

Soils within Aquatic Resource B are mucky clay loam in texture, exhibiting hydric soil indicators 1 cm Muck (A9) and Loamy Mucky Mineral (F1). At the time of the delineation, primary wetland hydrology indicators B4 (Algal Mat or Crust) and C2 (Dry-Season Water Table) were observed. Additionally, the water table was present at 17 inches deep and saturation was observed at 15 inches. Secondary indicators C3 (Oxidized Rhizospheres on Tilled Roots) and D5 (FAC-Neutral Test) were also observed. Aquatic Resource B meets the criteria for a wetland based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology and includes an OHWM.

Aquatic Resource B comprises a total of 0.04 acre of palustrine scrub-shrub wetland (PSS1C) (**Appendix A**). Refer to **Photos 11-14** below, taken on December 7, 2023, for characteristics of Aquatic Resource B.

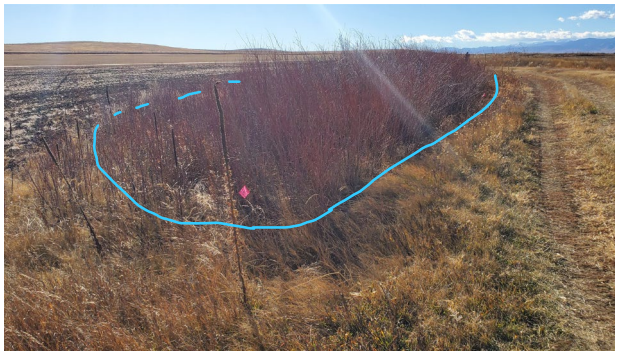

Photo 11. Overview facing south of Aquatic Resource B, PSS wetland, taken from the southeast corner of the survey area. Wetland boundary depicted by the blue line.



Photo 12. View facing northeast of the adjacent wetland, showing dominant species, *Salix exigua*. Wetland boundary depicted by the blue line.

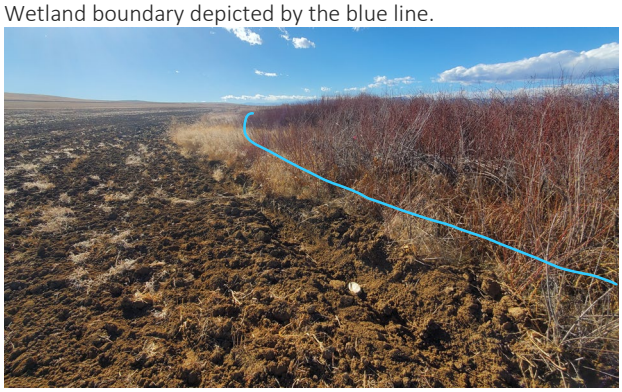

Photo 13. View facing west showing eastern boundary of Aquatic Resource B. Wetland boundary depicted by the blue line.



Photo 14. View northwest of the scrub-shrub wetland. The wetland boundary is depicted by the blue line.

4.3 UPLAND HABITAT

The wetland delineation identified approximately 390.4 acres of upland habitat within the survey area consisting predominantly of cultivated cropland. The topography of the survey area slopes from the southern region (highest point) to the northern region (lowest). The topographic high point of 5,208 feet is in the southern portion of the survey area. The vegetation community characterized within and surrounding the survey area is primarily agricultural fields of winter wheat (*Triticum aestivum*). The peripheral sections, along the roads and ditches have been extensively disturbed by historic and current agricultural land use practices. The vegetation is dominated by invasive species such as smooth brome (*Bromus inermis*) and Canada Thistle (*Cirsium Arvense*). Hydric soils, a dominance of hydrophytic vegetation, and/or wetland hydrology as well as an OHWM were not present in the upland habitats within the survey area.

Refer to **Table 2** for a list of plant species identified within the survey area (Lichvar et al. 2016).

4.4 PLANT SPECIES IDENTIFIED IN THE SURVEY AREA

Table 2. Plant Species Identified in Survey Area

Scientific Name	Common Name	WIS*
Amaranthus blitoides	Prostrate Pigweed	FAC
Bassia scoparia	Kochia	FACU
Bromus inermis	Smooth Brome	UPL
Bromus tectorum	Cheatgrass	UPL
Bouteloua dactyloides	Buffalograss	FACU
Chenopodium album	Lamb's Quarters	FACU
Cirsium arvense	Canada Thistle	FACU
Dichanthelium acuminatum	Hairy Perennial Panic Grass	FAC
Helianthus annuus	Common Sunflower	FACU
Juncus compressus	Roundfruit Rush	FACW
Lactuca serriola	Prickly Lettuce	FAC
Lepidium latifolium	Perennial Pepperweed	FACW
Muhlenbergia asperifolia	Scratchgrass	FACW
Onopordum acanthium	Scotch Thistle	UPL
Plantago patagonica	Woolly Plantain	UPL
Polypogon monspeliensis	Annual Beard-grass	FACW
Salix exigua	Narrowleaf Willow	FACW
Salsola kali	Tumbleweed	FACU
Setaria viridis	Green Foxtail	UPL
Thinopyrum intermedium	Intermediate Wheatgrass	UPL
Tribulus terrestris	Tackweed	UPL
Verbascum thapsus	Common Mullein	UPL

* Wetland Indicator Status (WIS) – Great Plains Regions:

OBL = occurs in aquatic resources > 99% of time
FACW = occurs in aquatic resources 67-99% of time
FAC = occurs in aquatic resources 34-66% of time
FACU = occurs in aquatic resources 1-33% of time
UPL = occurs in uplands > 99% of time

WIS Source: Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X http://www.phytoneuron.net/

4.5 AQUATIC RESOURCE CONNECTIVITY ASSESSMENT

Based on aerial imagery and USGS National Hydrography Dataset map, Aquatic Resource A (Community Ditch - east and west branches) conveys seasonal irrigational flow from Community Ditch upstream waters during growing periods. Aquatic Resource B, the adjacent scrub-shrub wetland, receives water from a seep in Community Ditch East Branch. According to aerial imagery, both branches of Community Ditch end in upland agricultural fields. Neither of the aquatic resources have connectivity to a Traditional Navigable Water (TNW).

Table 3. Aquatic Resource Connectivity Assessment

Connectivity to the Waters of the U.S.			
Aquatic Resource Name	**Connectivity Path and Direction**	**Endpoint**	**Feature Type**
A	Aquatic Resource A, Community Ditch - east and west branches, is a manmade, intermittent ditch that flows offsite into upland agricultural fields.	Upland	Intermittent Riverine Channel/Ditch (R4SBC)
B	Aquatic Resource B is an adjacent scrub-shrub wetland and only has connectivity to Community Ditch - east branch.	Upland	Palustrine Scrub-Shrub Wetland (PSS1C)

This report has been prepared by:

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5.0 REFERENCES

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APPENDIX A

Table 1. Summary of Aquatic Resources Delineated Within the Survey Area

Aquatic Resource Name	Classification		Acres	Linear Feet	Feature Type
	[1]Cowardin	Location (lat/long)			
A	R4SBCx	40.04801° N, -105.0087° W	2.36	10,839.1	Community Ditch
B	PSS1C	40.04552° N, -105.0018° W	0.04	--	Palustrine Scrub-Shrub Wetland
Total			2.40	10,839.1	

NOTES:
1. THE SURVEY AREA IS LOCATED IN WELD COUNTY, COLORADO SECTION 16, TOWNSHIP 1 NORTH, RANGE 68 WEST.

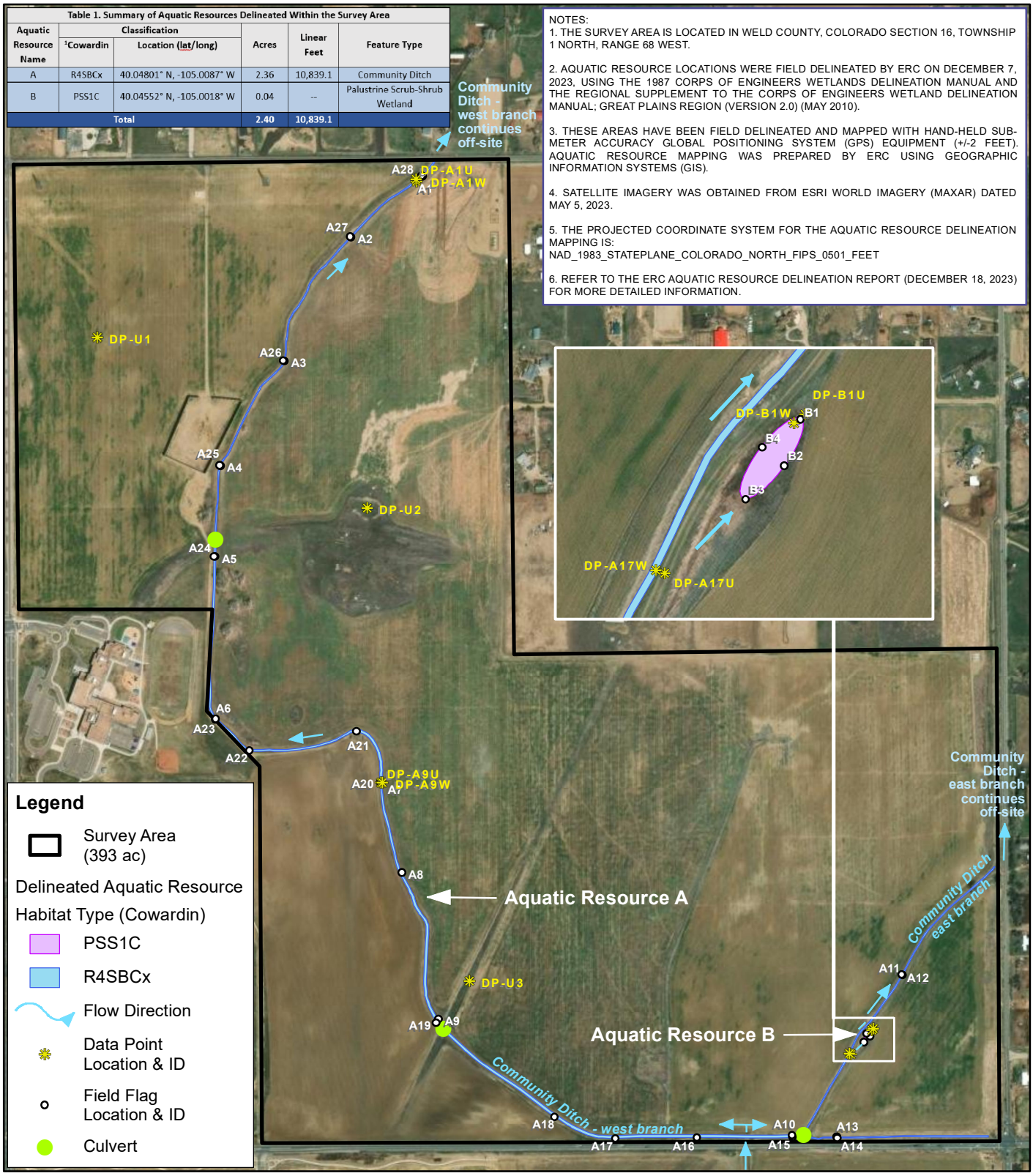
2. AQUATIC RESOURCE LOCATIONS WERE FIELD DELINEATED BY ERC ON DECEMBER 7, 2023, USING THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL; GREAT PLAINS REGION (VERSION 2.0) (MAY 2010).

3. THESE AREAS HAVE BEEN FIELD DELINEATED AND MAPPED WITH HAND-HELD SUB-METER ACCURACY GLOBAL POSITIONING SYSTEM (GPS) EQUIPMENT (+/-2 FEET). AQUATIC RESOURCE MAPPING WAS PREPARED BY ERC USING GEOGRAPHIC INFORMATION SYSTEMS (GIS).

4. SATELLITE IMAGERY WAS OBTAINED FROM ESRI WORLD IMAGERY (MAXAR) DATED MAY 5, 2023.

5. THE PROJECTED COORDINATE SYSTEM FOR THE AQUATIC RESOURCE DELINEATION MAPPING IS:
NAD_1983_STATEPLANE_COLORADO_NORTH_FIPS_0501_FEET

6. REFER TO THE ERC AQUATIC RESOURCE DELINEATION REPORT (DECEMBER 18, 2023) FOR MORE DETAILED INFORMATION.



Prepared By:

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ERC #: 1155-2301

APPENDIX A
AQUATIC RESOURCE DELINEATION MAP

NORTH WESTERLY SITE
WELD COUNTY, COLORADO

0 700 1,400 Feet

December 18, 2023

APPENDIX B

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A1U
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): field | Local relief (concave, convex, none): convex | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.05811 °N | Long: -105.0104 °W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland data point in the northern portion of the survey area. Paired with wetland data point DP-A1W.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: ____)			
1. *Bromus inermis*	80	Yes	UPL
2. *Onopordum acanthium*	10	No	UPL
3. *Cirsium arvense*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
Plants were typical for upland vegetation community in agricultural area. Did not meet criteria for hydrophytic vegetation.

SOIL

Sampling Point: DP-A1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/4	100					Sandy	Sandy loam
10-18	10YR 3/4	97	10YR 5/8	3	C	PL	Sandy	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators were observed; soils were uniform and dry. Does not meet criteria for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- X Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary hydrology indicators were observed, only oxidation on tilled roots. Does not meet criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A1W
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): ditch | Local relief (concave, convex, none): concave | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.05808 °N | Long: -105.0104 °W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: R4SBCx
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland data point in an irrigation ditch, known as Community Ditch, in the northern portion of the survey area. Paired with upland data point DP-A1U.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1. *Dichanthelium acuminatum*	35	Yes	FAC
2. *Muhlenbergia asperifolia*	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	50 (A)		135 (B)

Prevalence Index = B/A = 2.70

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Plants were representative of wetland vegetation. Meets criteria for hydrophytic vegetation.

SOIL

Sampling Point: DP-A1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/2	95	5YR 5/8	5	C	PL	Loamy/Clayey	
6-18	10YR 4/2	80	5YR 5/8	20	C	PL	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Indicator F3, a depleted matrix and prominent redox concentrations as pore linings, was observed. Meets criteria for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators were observed, including water stained leaves and oxidized rhizospheres. Indicator B7 was observed from Google Earth Imagery dated 9/2020. No inundation was observed during site visit on 12/7/2023. Additional secondary indicators were also met, including drainage patterns, geomorphic position, and FAC-neutral test. Meets criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A9U
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): field | Local relief (concave, convex, none): none | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.04927 °N | Long: -105.0111 °W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland data point in the central portion of the survey area. Paired with data point DP-A9W.
Due to heavy use of machinery for agricultural purposes, soil and vegetation have been significantly disturbed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A =	____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Tilled and compacted by agricultural machinery. No vegetation present.

SOIL

Sampling Point: DP-A9U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/6	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted soil

Depth (inches): 5

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators were observed; soils were uniform and dry. Does not meet criteria for hydric soils. Restrictive layer at 5 inches from severely compacted soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators were observed. Does not meet criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A9W
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): ditch | Local relief (concave, convex, none): concave | Slope (%): 0-3
Subregion (LRR): LRR G | Lat: 40.04927 °N | Long: -105.0111 °W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: R4SBCx
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Data point within Community Ditch, below the Ordinary High Water Mark, in the central portion of the survey area. Paired with upland data point DP-A1U.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1. *Setaria viridis*	30	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 70

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	30	x 5 =	150
Column Totals:	30 (A)		150 (B)
Prevalence Index = B/A =			5.00

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Plot located in an agricultural ditch that floods and removes all vegetation. Sparsely vegeted with only upland vegetation crossing over wetland boundary currently during off-season (not flooded).

SOIL

Sampling Point: DP-A9W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	60	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 2/1	20	C	M		Faint redox concentrations
10-18	10YR 4/2	70	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
			10YR 2/1	10	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Indicator F3, a depleted matrix and prominent redox concentrations as pore linings, was observed. Meets criteria for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicator B9, water stained leaves, was observed. Indicator B7 was observed from Google Earth Imagery dated 9/2020. No inundation was observed during site visit on 12/7/2023 Additional secondary indicators were also met, including drainage patterns, geomorphic position, and FAC-neutral test. Meets criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A17U
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): field/roadside | Local relief (concave, convex, none): none | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.04526 °N | Long: -105.0022 °W | Datum: WGS 1984
Soil Map Unit Name: Nunn loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland data point in the southeastern portion of the survey area. Paired with data point DP-A17W. Due to heavy use of machinery for agricultural purposes, soil has been significantly disturbed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1. *Bromus tectorum*	40	Yes	UPL
2. *Setaria viridis*	40	Yes	UPL
3. *Verbascum thapsus*	5	No	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	85	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
Plants were typical for upland vegetation community in agricultural area. Did not meet criteria for hydrophytic vegetation.

SOIL

Sampling Point: DP-A17U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted soil/root layer

Depth (inches): 8

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators were observed; soils were uniform and dry. Does not meet criteria for hydric soils.Restrictive layer at 8 inches from severely compacted soil and root layer□

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators were observed. Does not meet criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-A17W
Investigator(s): Natalie Rothman | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): field/roadside | Local relief (concave, convex, none): concave | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.04527 °N | Long: -105.0022 °W | Datum: WGS 1984
Soil Map Unit Name: Nunn loam, 1 to 3 percent slopes | NWI classification: R4SBCx
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Data point within Community Ditch, below the Ordinary High Water Mark, in the southeastern portion of the survey area. Paired with data point DP-A17U. The aquatic resource is an agricultural ditch with little to no vegetation. Vegetation has been significantly disturbed. Hydric soils and hydrology are present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Plot located in an agricultural ditch that floods and removes all vegetation. No vegetation present (significantly disturbed).

SOIL

Sampling Point: DP-A17W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	80	10YR 3/1	10	C	PL	Loamy/Clayey	
			7.5YR 6/8	10	C	M		Anaerobic organic material
2-16	5GY 7/1	70	7.5YR 6/8	28	C	M	Loamy/Clayey	Prominent redox concentrations
			5Y 7/1	2	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- X Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Both soil indicators F2 (Loamy Gleyed Matrix) and F3 (Depleted Matrix) were both present. Meets criteria for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- X Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- X Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicator C4, presence of reduced iron, was observed. Indicator B7 was observed from Google Earth Imagery dated 9/2020. No inundation was observed during site visit on 12/7/2023. Additional secondary indicators were observed. Meets criteria for wetland hydrology.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-B1U
Investigator(s): Tyler Worley | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): Seep | Local relief (concave, convex, none): Concave | Slope (%): 1
Subregion (LRR): LRR G | Lat: 40.04562°N | Long: -105.0017°W | Datum: WGS 1984
Soil Map Unit Name: Nunn loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Upland data point in southeastern portion of the survey area, adjacent to a seep and within the agricultural field. Paired with wetland point DP-B1W.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. *Salix exigua*	15	Yes	FACW
2.			
3.			
4.			
5.			
	15 =Total Cover		
Herb Stratum (Plot size: ____)			
1. *Amaranthus blitoides*	25	Yes	FAC
2. *Verbascum thapsus*	20	Yes	UPL
3. *Lepidium latifolium*	20	Yes	FACW
4. *Plantago patagonica*	10	No	UPL
5. *Bromus tectorum*	10	No	UPL
6.			
7.			
8.			
9.			
10.			
	85 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A =	____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Upland data point paired with wetland point and is adjacent to the seep within the disturbed agricultural field. As a result, the vegetation is dominantly hydrophytic species. However, the other indicators are not present so this is not within a wetland nor below Ordinary High Water Mark.

SOIL

Sampling Point: DP-B1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/3	100					Sandy	Sandy loam
5-9	10YR 3/2	100					Sandy	Sandy loam
9-21	10YR 3/1	100					Sandy	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators present. Data point is paired with wetland point and is adjacent to seep in agricultural field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No primary wetland indicators present. One 1 secondary indicator is present (D5).

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
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OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-B1W
Investigator(s): Tyler Worley | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): Seep | Local relief (concave, convex, none): Concave | Slope (%): 1
Subregion (LRR): LRR G | Lat: 40.045437°N | Long: -105.001906°W | Datum: WGS 1984
Soil Map Unit Name: Nunn loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Wetland point is situated within a seep in the southeastern portion of the project area. The seep is likely supported by the Community Ditch - east branch. Paired with upland point DP-B1U.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. *Salix exigua*	45	Yes	FACW
2.			
3.			
4.			
5.			
	45 =Total Cover		
Herb Stratum (Plot size: ____)			
1. *Polypogon monspeliensis*	25	Yes	FACW
2. *Verbascum thapsus*	15	Yes	UPL
3. *Juncus compressus*	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	55 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 45

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Wetland data point situated in an agricultural seep adjacent to the Community Ditch - east branch.

SOIL

Sampling Point: DP-B1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Muck	
3-7	10YR 2/1	80	7.5YR 5/8	20	D	M	Mucky Loam/Clay	
7-18	10YR 2/1	75	7.5YR 5/8	25	D	M	Loamy/Clayey	
18-21	N 2.5/	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- X 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil indicators A9 (1 cm Muck) and F1 (Loamy Mucky Mineral) were present. Data point within a seep adjacent to the Community Ditch - east branch. Meets criteria for hydric soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- X Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 17		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 15	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Primary wetland hydrology indicators B4 (Algal Mat or Crust) and C2 (Dry-Season Water Table) present. Additionally, secondary indicators were present including C3 (Oxidized Rhizospheres on Tilled Roots) and D5 (FAC-Neutral Test).

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-U1
Investigator(s): Tyler Worley | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): Agricultural field | Local relief (concave, convex, none): None | Slope (%): 0
Subregion (LRR): LRR G | Lat: 40.055797°N | Long: -105.016508°W | Datum: WGS 1984
Soil Map Unit Name: Ulm clay loam, 0 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland data point in the northwest portion of the project area in an agricultural field. No vegetation was present at time of delineation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 100

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Upland data point situated in an agricultural field in the northwest portion of the project area. No vegetation at the time of the delineation was observed.

SOIL

Sampling Point: DP-U1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/4	100					Sandy	Sandy loam texture
5-18	10YR 3/4	100					Sandy	Sandy loam texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators present. Upland data point is situated in an agricultural field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators present. Upland data point is situated in an agricultural field.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-U2
Investigator(s): Tyler Worley | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): Agricultural field | Local relief (concave, convex, none): Concave | Slope (%): 1
Subregion (LRR): LRR G | Lat: 40.05329°N | Long: -105.0113°W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland data point in the central portion of the project area in a general refuse area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1. *Bassia scoparia*	15	Yes	FACU
2. *Bromus tectorum*	15	Yes	UPL
3. *Tribulus terrestris*	10	Yes	UPL
4. *Lactuca serriola*	5	No	FAC
5. *Salsola kali*	5	No	FACU
6. *Thinopyrum intermedium*	5	No	UPL
7. *Bromus inermis*	5	No	UPL
8. *Chenopodium album*	5	No	FACU
9.			
10.			
	65	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 35

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	25	x 4 =	100
UPL species	35	x 5 =	175
Column Totals:	65 (A)		290 (B)
Prevalence Index = B/A =			4.46

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:
Upland data point situated in an area with general refuse (bricks, concrete, foundations, etc.).

SOIL

Sampling Point: DP-U2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	5YR 5/8	100					Sandy	Gravelly sand with general debris
4-8	7.5YR 3/4	100					Sandy	Sandy loam with bits of gravel
8-13	10YR 3/3	100					Sandy	Sandy loam
13-20	10YR 3/4	100					Sandy	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators present. Data point located in the central portion of the project area in an area that has general refuse (bricks, concrete, foundations, etc.). □

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators present. Upland data point is situated in the central portion of the project area in an area that has general refuse (bricks, concrete, foundations, etc.) and an abundance of ruderal weedy species.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Great Plains Region
See ERDC/EL TR-10-1; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: North Westerly Project Site | City/County: Erie/Weld | Sampling Date: 12/7/2023
Applicant/Owner: NORTH WESTERLY OWNER, LLC | State: CO | Sampling Point: DP-U3
Investigator(s): Tyler Worley | Section, Township, Range: Section 16, Township 1 North, Range 68 West
Landform (hillside, terrace, etc.): Upland swale | Local relief (concave, convex, none): Concave | Slope (%): 1
Subregion (LRR): LRR G | Lat: 40.046346°N | Long: -105.009429°W | Datum: WGS 1984
Soil Map Unit Name: Weld loam, 1 to 3 percent slopes | NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland data point in the southern portion of the project area within an upland swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____	=Total Cover	
Herb Stratum (Plot size: ____)			
1. *Bassia scoparia*	25	Yes	FACU
2. *Bouteloua dactyloides*	20	Yes	FACU
3. *Salsola kali*	20	Yes	FACU
4. *Lactuca serriola*	15	No	FAC
5. *Verbascum thapsus*	10	No	UPL
6. *Thinopyrum intermedium*	5	No	UPL
7. *Helianthus annuus*	5	No	FACU
8.			
9.			
10.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	70	x 4 =	280
UPL species	15	x 5 =	75
Column Totals:	100 (A)		400 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:
____ 1 - Rapid Test for Hydrophytic Vegetation
____ 2 - Dominance Test is >50%
____ 3 - Prevalence Index is ≤3.0[1]
____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Upland data point situated in the southern portion of the project area in an upland swale.

SOIL

Sampling Point: DP-U3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/4	100					Sandy	
6-15	10YR 4/3	100					Sandy	
15-22	10YR 3/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR F)**
- ___ 1 cm Muck (A9) **(LRR F, G, H)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR F)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 73)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No hydric soil indicators present. Upland data point is within an upland swale in the southern portion of the project area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators present.

Ecological Resource Consultants, LLC
2820 Wilderness Place, Suite A~ Boulder, CO 80301~ (303) 679-4820

SCREENING REPORT

FOR

FEDERAL-STATE LISTED THREATENED AND ENDANGERED SPECIES AND GENERAL WILDLIFE

FOR

NORTH WESTERLY PROPERTY

WELD COUNTY, COLORADO

December 18, 2023

Prepared For:

North Westerly Owner, LLC
1225 17th Street, Suite 2420
Denver, CO 80202
Contact: Heidi Majerik
Phone: (720) 531-8924

ERC Project #1155-2302

Screening Report

for

Federal-State Listed Threatened and Endangered Species and General Wildlife

North Westerly Property

Weld County, Colorado

December 18, 2023

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FIGURE 2 – SURVEY AREA VICINITY MAP

FIGURE 3 – VEGETATION COMMUNITY MAP

1.0 INTRODUCTION

Ecological Resource Consultants, LLC (ERC) has prepared this report on behalf of North Westerly Owner, LLC. The 393-acre property referred to herein as the North Westerly Property (survey area) is located west of Erie, Weld County, Colorado. The survey area is under consideration for potential residential development which includes single-family detached homes and attached unit townhomes which will likely alter a majority of the current survey area landscape; therefore, this report has been prepared to specifically identify potential federal and state listed threatened and endangered species and/or habitat that could exist on or immediately surrounding the survey area. In addition, this report provides a cursory screening of general wildlife use characteristics and existing vegetation community types.

This report has been prepared in accordance with the Migratory Bird Treaty Act (MBTA), Endangered Species Act (ESA), Colorado Parks and Wildlife (CPW) Colorado Statute Title 33 and the Bald and Golden Eagle Protection Act (BGEPA).

2.0 GENERAL SURVEY AREA DESCRIPTION

The survey area is located approximately 2.26 miles west of the intersection of Briggs Street and Erie Parkway and west of Erie in the *Outlet Boulder Creek* and *Firestone Lake-Stain Vrain* watersheds (HUC 101900050705 and 101900050707, respectively). More specifically, the survey area is located in Section 16, Township 1 North, Range 68 West, in Weld County. Approximate center point of survey area is **latitude 40.050651° north, longitude -105.010531° west**. From the intersection of Briggs Street and Erie Parkway in Erie, the survey area can be accessed by heading west on Erie Parkway for approximately 2.26 miles until reaching a dirt access road north of Erie Parkway. The survey area is comprised of agricultural fields with the Community Ditch West branch transecting the survey area from south to north and the Community Ditch East Branch transecting the southeastern portion of the survey area from southwest to northeast. Refer to **Figure 1** for a location map and **Figure 2** for a US Geological Survey (USGS) topographic map of the survey area.

The survey area is situated within the Great Plains ecoregion (Bailey 1976) at an approximate elevation of 5,175 feet above mean sea level (AMSL). The vicinity of the survey area is comprised of agricultural lands with private, single-family homes to the north, northeast and east. Additionally, the north is bound by Weld County Road 10, and the east is bound by Weld County Road 7. The south is bound by Weld County Road 8, open agricultural land, as well as the McStain neighborhood. The west is bound by Weld County Road 5, the Erie High School and Colliers Hill neighborhood. The landscape within the survey area is predominantly characterized as Cultivated Cropland with a small percentage being characterized as Great Plains Ruderal Grassland and Shrubland, Mesic Graminoids Western Wet Shrubland and Disturbed (NatureServe 2023). Refer to **Figure 3** for the vegetation community map of the survey area.

Cultivated Cropland

The cultivated cropland community is characterized as a non-natural system which includes lands used for the production of annual crops where crop vegetation accounts for greater than 20 percent of the total vegetation and where the land is actively tilled (SWReGAP 2011). This community also includes all land being actively tilled. The cultivated cropland community within the survey comprises relatively flat agricultural fields currently planted with row crops consisting primarily of winter wheat (*Triticum*

aestivum). The agricultural fields appear to be regularly plowed and/or tilled and subject to flood irrigation practices throughout the growing season.

Great Plains Ruderal Grassland and Shrubland

The great plains ruderal grassland and shrubland is characterized being dominated by exotic, invasive grasses, forbs, or, in the south, deciduous shrubs. These species can become abundant after significant disturbance, often associated with agricultural activities, or a disruption of natural disturbance regimes. Common disturbances which favor establishment of this macrogroup include long-term, heavy grazing, planting exotic species for livestock forage, plowing land and then abandoning it, and a disruption of the natural fire regime. Vegetation cover varies from low to very high. Abundant species vary greatly in this macrogroup, depending on the geographic location, seed sources, and nature of land use (NatureServe 2023). Common species in the survey area include crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), field brome (*Bromus arvensis*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass *Poa pratensis*, and intermediate wheatgrass (*Thinopyrum intermedium*) and are located in small areas throughout the survey area. This macrogroup can be found on mesic to dry sites on a variety of soils where disturbance regimes have been altered sufficiently to allow the establishment of the exotic species.

Salix exigua / Mesic Graminoids Western Wet Shrubland

This riparian association is found primarily in the Rocky Mountains and Intermountain West semi-desert regions. The vegetation is characterized by the dominance of coyote willow (*Salix exigua*) in a moderately dense tall-shrub canopy with a dense herbaceous layer dominated by graminoids. It typically occurs as a monoculture of coyote willow, but can have other woody species, including saplings of eastern cottonwood (*Populus deltoides*) and shrubs such as yellow willow (*Salix lutea*). Tall perennial grasses can appear to codominate the stand when prairie cordgrass (*Spartina pectinata*), switchgrass (*Panicum virgatum*) or other tall grasses are present. Other mesic graminoids, such as sedges (*Carex* spp.), common Spikerush (*Eleocharis* spp.), rushes (*Juncus* spp.), western wheatgrass (*Pascopyrum smithii*), and three-square bulrush (*Schoenoplectus pungens*), may be present. Common forb species include winged loosestrife (*Lythrum alatum*), knotweed (*Polygonum* spp.), and cocklebur (*Xanthium strumarium*). It generally occurs along backwater channels and other perennially wet but less scoured sites, such as floodplain swales and irrigation ditches. Within the survey area, this community can be found in the small wetland adjacent to Community Ditch East Branch which appears to be supported by seepage from the Community Ditch East Branch.

Disturbed

The Disturbed community includes the Community Ditch West and East Branch, these are irrigation ditches which appear to be used solely for irrigational purposes. Additionally, existing and relatively recent oil and gas operations in the northwest, northeast, central and eastern portions of the survey area are also classified as disturbed. These features consist of barren grounds associated with oil and gas related activities, ditch excavation and urban materials such as pavement. Tree canopy varies from 0 to 50% (e.g., open to shaded lawns and gardens) (NatureServe 2023).

Refer to **Photos 1-8** below for typical characteristics within the survey area. Photos were taken on December 7, 2023.



Photo 1. View southwest from the northeast corner of the survey area. The survey area is dominated by agricultural fields and subject to frequent plowing/tilling.



Photo 2. View south from the central portion of the survey area. The survey area is dominated by agricultural fields and subject to frequent plowing/tilling.



Photo 3. View west from the center portion of the survey area in an existing ruderal grassland and shrubland vegetation community. This area contained general agricultural refuse (bricks, concrete, etc.) and remnants of a concrete foundation.



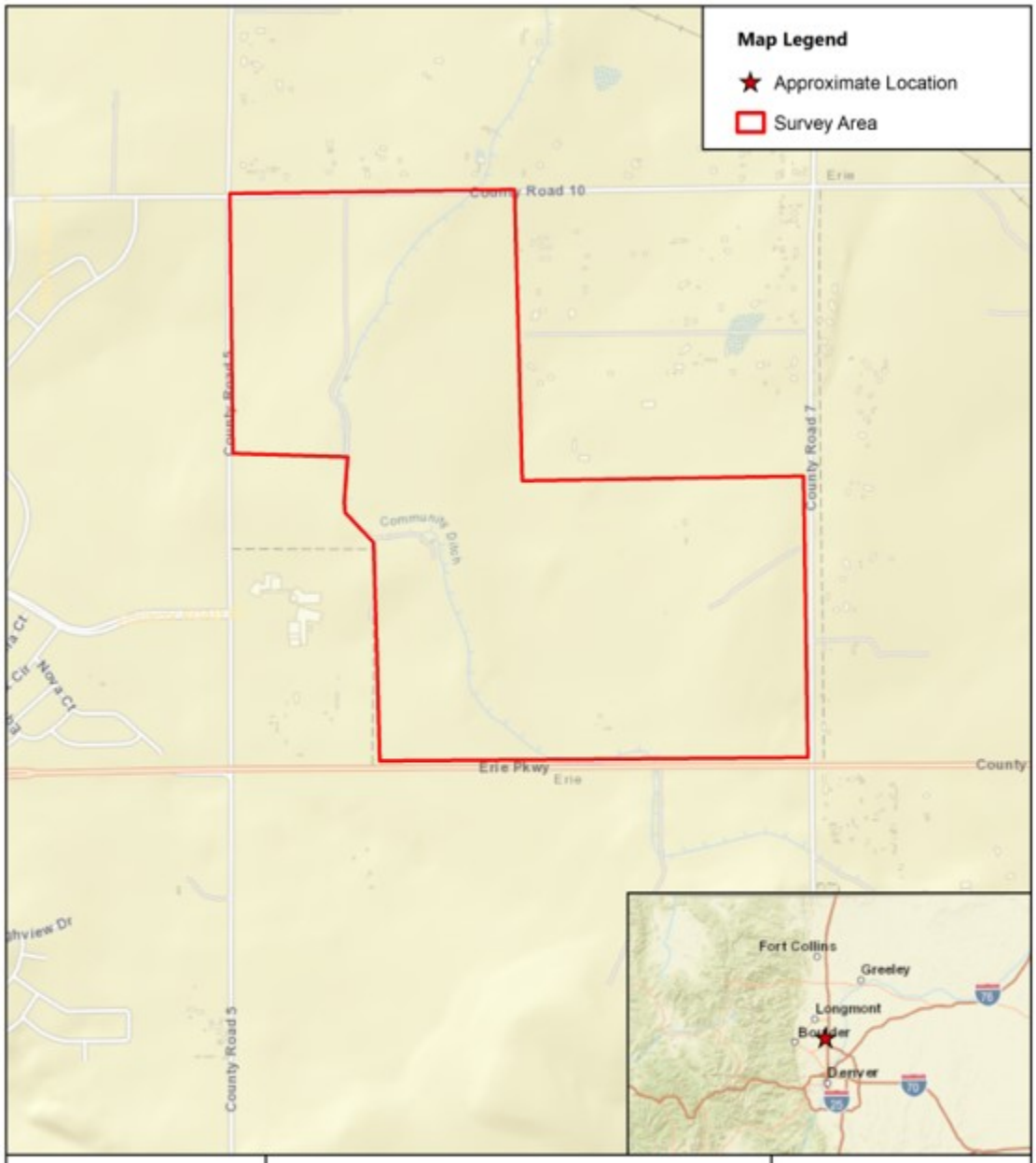
Photo 4. View west from the center portion of the survey area in the existing ruderal grassland and shrubland. Part of the concrete foundation noted in the previous photo can be seen. The large mature cottonwood trees in the background are located on the property but do not contain any MBTA nests.

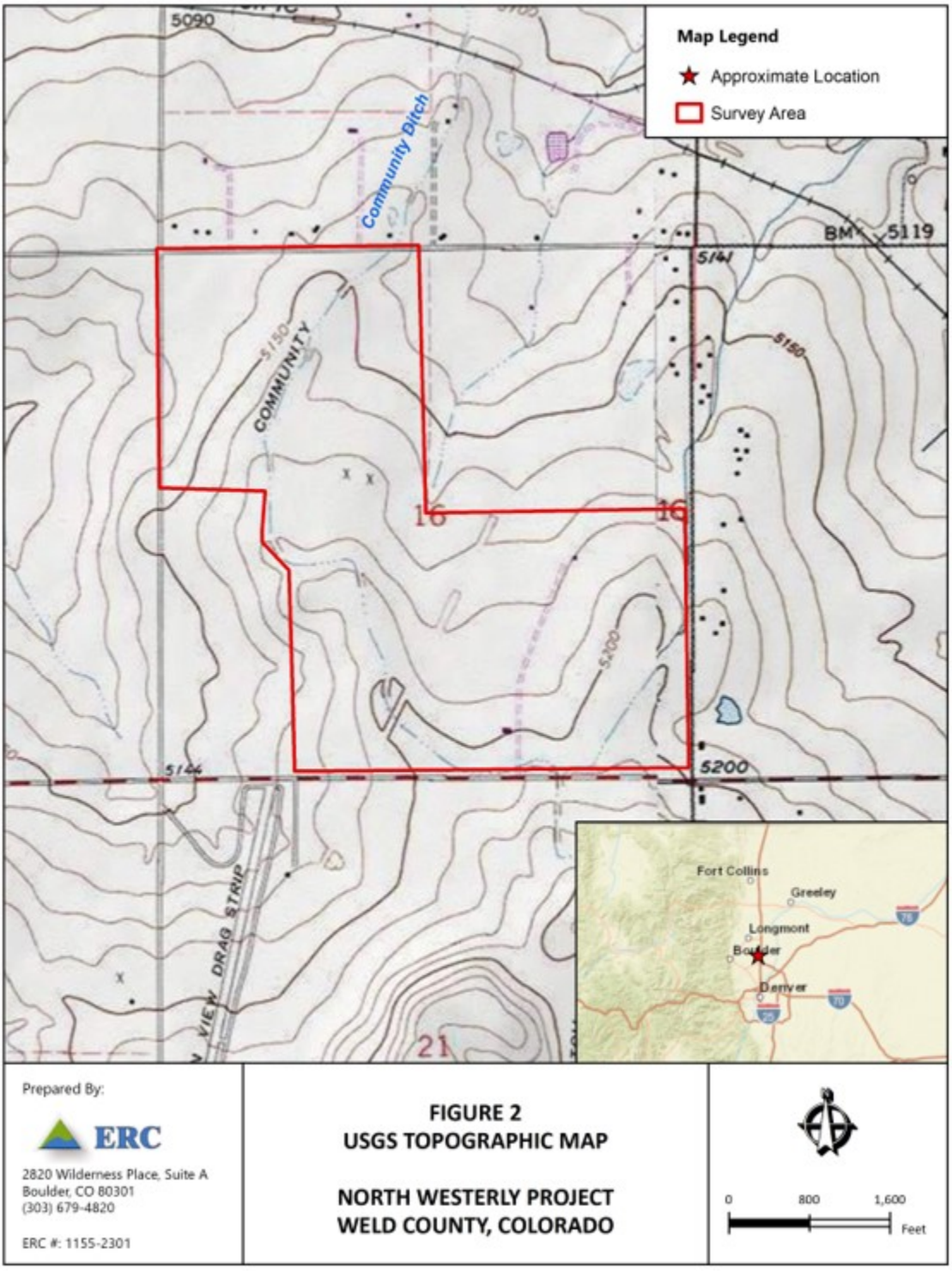


Photo 5. View north from the southern portion of the survey area. The survey area is dominated by agricultural fields and subject to frequent plowing/tilling.



Photo 6. View southwest from the southern corner of the survey area. Weld County Road 7 is located in the left-hand side of the photo and Erie Parkway (Weld County Road 8 (not seen)) is located along the horizon.


Map Legend
Approximate Location
Survey Area
County Road 10
Erie
County Road 5
County Road 7
Community Ditch
Erie Pkwy
Erie
County
Fort Collins
Greeley
Longmont
Boulder
Denver
Prepared By:
ERC
2820 Wilderness Place, Suite A
Boulder, CO 80301
(303) 679-4820
ERC #: 1155-2301
FIGURE 1
LOCATION MAP
NORTH WESTERLY PROJECT
WELD COUNTY, COLORADO
0
800
1,600
Feet


Map Legend
Approximate Location
Survey Area
5090
Community Ditch
BM 5119
5141
5150
COMMUNITY
16
16
5100
5144
5200
DRAG STRIP
21
Fort Collins
Greeley
Longmont
Boulder
Denver
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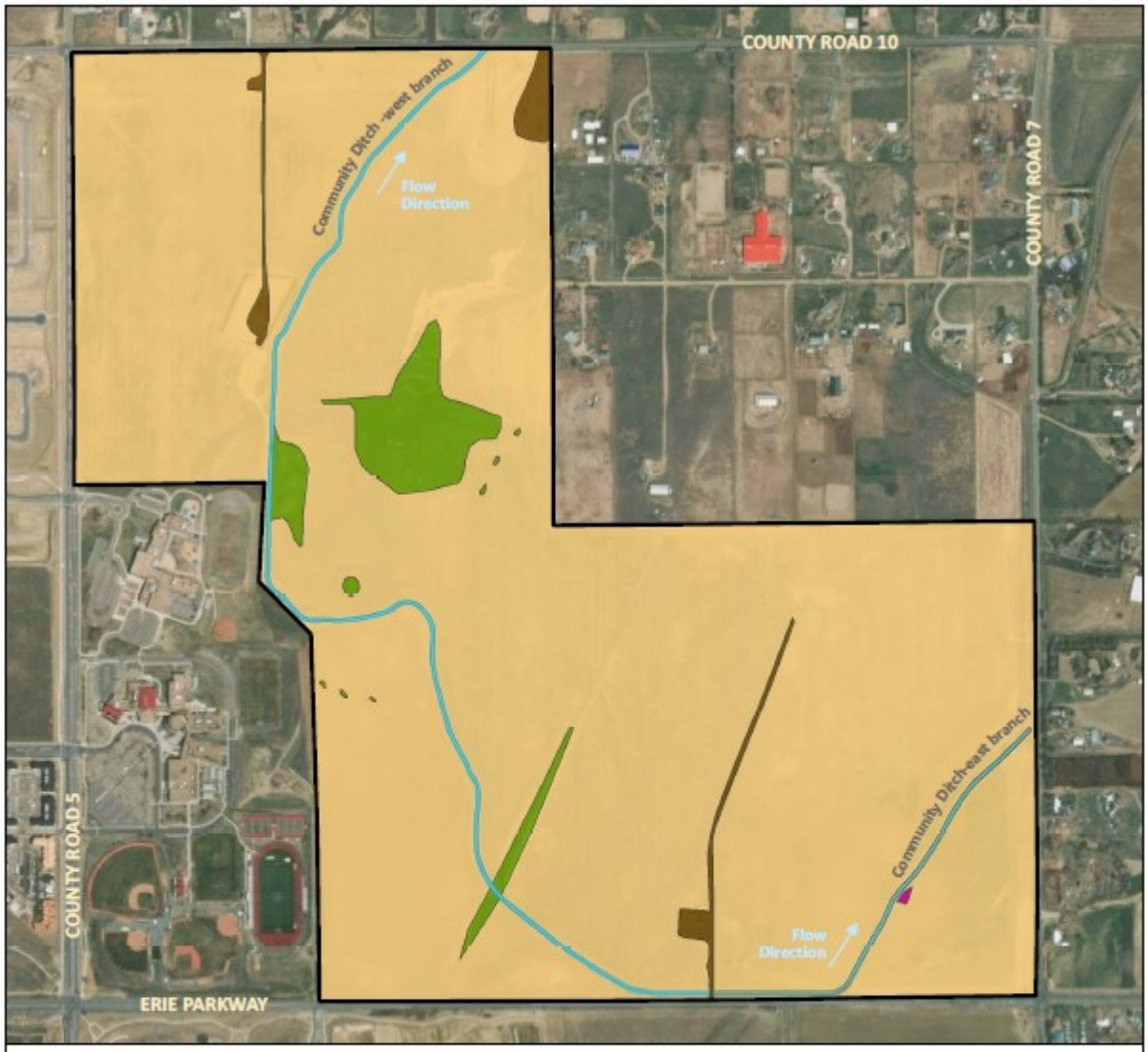
ERC #: 1155-2301
FIGURE 2
USGS TOPOGRAPHIC MAP
NORTH WESTERLY PROJECT
WELD COUNTY, COLORADO
0
800
1,600
Feet



Map Legend

Project Area (≈ 393 ac)

Vegetation Community
- Cultivated Cropland (384.5 ac)
- Disturbed (4.6 ac)
- Ditch (2.4 ac)
- Great Plains Ruderal Grassland & Shrubland (1.2 ac)
- Mesic Graminoids Western Wet Shrubland (0.1 ac)

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FIGURE 3
VEGETATION COMMUNITY MAP

NORTH WESTERLY
WELD COUNTY, COLORADO

0 500 1,000
Feet

3.0 SCREENING METHODOLOGY

ERC conducted a literature review as part of initial data collection for preparation of this report. ERC reviewed available literature sources including: CPW information and the US Fish and Wildlife Service (USFWS) Federal Register.

A field inspection was subsequently conducted on December 7, 2023, to identify and document the presence of natural vegetation communities, general wildlife use and potential for threatened and endangered species/habitat. Upon review of all available resources, including literature and field inspections, ERC provides the following determination for the survey area.

4.0 GENERAL WILDLIFE HABITAT (NON-REGULATED)

Wildlife utilizes the general landscape in a multitude of ways and uses a variety of habitats as areas of permanent inhabitance, seasonal inhabitance, breeding grounds, migratory routes, for foraging purposes, or as temporary shelter. Potential wildlife habitat includes the entire survey area.

Historic and current land use associated with agricultural practices have restricted and/or degraded the development of any significant natural vegetation communities within a majority the survey area, which limits the overall quality of potential wildlife habitat. As discussed in **Section 2.0**, four habitat types were observed within the survey area and are characterized as Cultivated Cropland, Great Plains Ruderal Grassland and Shrubland, Mesic Graminoids Western Wet Shrubland and Disturbed. The Cultivated Cropland (98%), Great Plains Ruderal Grassland and Shrubland (<1%), Mesic Graminoids Western Wet Shrubland (<1%) and Disturbed (1%) vegetative community are dominated by non-native or weedy species and are not typically considered of high ecological value to wildlife; however, agricultural lands can have beneficial values to certain wildlife species. These areas at a minimum are considered “open space” providing limited foraging and hunting grounds, refuge and limited areas for nesting (Kingery 1998). Such lands often serve as a buffer between natural areas, providing food, cover, nesting and open-space habitat which allow movement and exchange of plant and animal populations. The vacant, agricultural land which is present across the survey area has largely replaced the native shortgrass prairie habitat which would have been present in this region. Herbaceous non-native species and ruderal native species which dominate the vegetation community generally do not provide quality habitat for most wildlife. In general, although agriculture practices have altered the structure, function, community composition, and habitat value of land within a majority of the survey area, some areas do provide a variety of wildlife habitat values in an otherwise agricultural landscape. Within the survey area, significant limitations for wildlife use exist due to land use activities such as regular plowing, tilling and mowing, habitat fragmentation from fences, travel corridors and general agricultural practices within the survey area.

Some other local wildlife species that may use this habitat within the survey area include coyote (*Canis latrans*), red fox (*Vulpes vulpes*), rabbit (*Lepus sp.*), cottontail (*Sylvilagus sp.*), black tailed prairie dog (*Cynomys ludovicianus*), white-tailed deer (*Odocoileus virginianus*), deer mouse (*Peromyscus maniculatus*), meadow vole (*Microtus pennsylvanicus*), mourning dove (*Zenaida macroura*), western meadowlark (*Sturnella neglecta*), barn owl (*Tyto alba*), hawks (*Buteo sp.*), and garter snake (*Thamnophis*

sp.). These types of species may utilize the survey area; however, have not specifically been identified within the survey area.

- Generally, there are features within the survey area and the surrounding area that provide general habitat for local songbirds, raptors, and small to mid-size mammals; however, the habitat within the survey area is characterized primarily as Cultivated Cropland, which is degraded from a wildlife perspective by historic and current land use practices.

HIGH PRIORITY HABITAT AREAS

CPW has recently developed Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado in July (CPW 2023). CPW is a recommending agency in regard to energy development and land use and has no regulatory authority over these processes (CPW 2023a). The recommendations identify High Priority Habitat (HPH) by species and provide general recommendations related to disturbances. These recommendations were originally developed specifically for the Colorado Oil and Gas Commission as part of fluid mineral development; however, CPW has provided these recommendations for other land use proposals.

- Within the survey area, no mapped HPH's are present. The survey area is dominated by cultivated cropland and highly fragmented from any natural vegetation communities that provide suitable habitat to general wildlife. Therefore, any future land use changes within the survey area would not be considered a significant impact to CPW listed HPH.

5.0 MIGRATORY BIRD TREATY ACT

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 730-712). The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase barter, or offer for sale, purchase, or barter any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. In Colorado, all birds except for the European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*) and rock pigeon (*Columba livia*) are protected under the MBTA. A total of 523 migratory bird species are known to occur in the Mountain-Prairie Region (USFWS Region 6, Montana, Wyoming, Utah, North Dakota, South Dakota, Nebraska, Kansas and Colorado); 320 of the 523 migratory bird species are known to breed in USFWS Region 6.

Migratory birds likely exist within the survey area. The vegetation communities in the survey area provide at the very least, potential nesting and foraging habitat for migratory birds. These migratory birds are protected under the MBTA and killing or possession of these birds (or their parts and nests) is prohibited under the MBTA. The following migratory birds were directly observed and likely utilize the survey area primarily for foraging and limited seasonal nesting.

Scientific Name	Common Name
Buteo jamaicensis	Red-tailed hawk
Columba livia	Common pigeon
Corvus corax	Common raven
Melospiza melodia	Song sparrow
Sturnella neglecta	Western meadowlark

Non-Raptor Migratory Birds

Non-raptor migratory birds likely utilize the survey area for nesting on a seasonal basis. These birds, their eggs, and active nests are protected under the MBTA and take or possession of these resources is prohibited. For these non-raptor migratory birds, only the active nest is protected and no buffers or restricted surrounding areas are required. Once the nest becomes inactive, disturbances can occur to the nest and no further agency authorization or coordination is required. Generally, the active nesting season for most non-raptor migratory birds in this region of Colorado occurs between April 1 and August 31.

- No non-raptor nests were observed within the survey area. However, seasonal MBTA non-raptor bird nesting activity status can vary seasonally and from year to year. Prior to vegetation removal, a nest survey should be conducted no more than 7-10 days prior any future land use changes to ensure that active nests are not disturbed during the nesting season.

Non-eagle Raptors

Non-eagle raptor nest sites are regulated by the USFWS under the MBTA with local review from the CPW. The CPW has established recommended protective buffer zones and seasonal activity restrictions for a variety of Colorado raptors (CPW 2020). The CPW species-recommended buffer zones are such that if implemented, should assure that the majority of the individual species will continue to occupy the area. CPW considers a nest to be active when it is frequented or occupied by a raptor during the breeding season, or which has been occupied in any of the five previous breeding seasons. Many raptors use alternate nests in various years. Thus, a nest site may be active even if a particular nest is not occupied in a given year. The CPW also maintains Species Activity Mapping (CPW SAM) data which is an online database that lists the known occurrences, status and recorded nest sites of select raptors and other species within the state of Colorado.

- No non-eagle raptor nests were observed and no CPW mapped non-eagle raptor nest protection buffer zones are located within the survey area (CPW 2023b). Inactive raptor nest sites have no regulatory restriction and do not require further agency coordination; however, nest activity status can vary seasonally and from year-to-year. Future land use changes may require additional nest surveys (generally between February 1 and September 15 (CPW 2020)) to determine activity status within ½ to ¼ mile of the survey area to ensure compliance with CPW recommendations.

Eagles

No eagle nest sites are identified on the CPW SAM data within the survey area. No eagles or eagle nests were observed during the site visit.

- If an eagle nest site were to become established within a ½-mile of the survey area or within the survey area, CPW recommends a "No Surface Occupancy" beyond that which has historically occurred. CPW also recommends "No Human Encroachment" within ¼-mile radius and that no human encroachment activities, including construction activities within ½-mile radius of active nest sites from December 1 though July 31. Future land use changes may require an additional nest survey, generally between December 1 and July 31 (CPW 2020) to determine activity status within ½-mile of the survey area to ensure compliance with CPW recommendations.

6.0 SPECIES PROTECTED UNDER THE ENDANGERED SPECIES ACT OF 1973

The ESA of 1973 was enacted by the United States to conserve endangered and threatened species and the ecosystems that they depend on. Under the ESA, species may be listed as either "endangered" or "threatened"; both designations are protected by law. The ESA is administered by the USFWS. The USFWS has developed project specific species lists, available online by request, identifying threatened, endangered, and proposed species, designated critical habitat (USFWS 2008), and candidate species protected under the ESA that may occur within the boundary of a proposed project and/or may be affected by a proposed project (USFWS 2023) (Project Code: 2024-0026445). The species list for the survey area has identified potential for a total of 10 threatened or endangered species within the survey area.

Species Not Present

The following federally listed threatened and endangered species are identified to occur within Weld County. However, these species are not known to exist within the specific vicinity of the survey area and/or have specific habitat requirements (i.e., elevation range) that are not common in the vicinity of the survey area.

Common Name	Scientific Name	Status*	Determination
Gray wolf	*Canis lupus*	FE	NO TAKE
Preble's Meadow Jumping Mouse	*Zapus hundsonius preblei*	FT	NO TAKE
Eastern black rail	*Laterallus jamaicensis*	FT	NO TAKE

*Status key:
FT – Federally listed as threatened
FE—Federally listed as endangered

Water Depletions Species

The USFWS under the ESA has determined that water depletions in the South Platte River Basin are considered an adverse effect to the listed species identified below. The survey area is considered to be located within the South Platte River Basin.

Common Name	Scientific Name	Status*	Determination
Pallid sturgeon	*Scaphirhycchus albus*	FE	NOT PRESENT, NO TAKE^
Piping plover	*Charadrius melodus*	FT	NOT PRESENT, NO TAKE ^
Western prairie fringed orchid	*Platanthera praeclara*	FT	NOT PRESENT, NO TAKE^
Whooping crane	*Grus Americana*	FE	NOT PRESENT, NO TAKE^
Ute ladies'-tressese	*Sprianthes diluvialis*	FT	NOT PRESENT, NO TAKE^

*Status key:
FT – Federally listed as threatened
FE – Federally listed as endangered
^The project is associated with a proposed residential subdivision and a proposed water supply is not known at this time.

Any water related project conducted in the Platte River Basin that has a federal nexus; such as federal funding or a federal permit (i.e., Clean Water Act (CWA) Section 404 Permit), is subject to ESA Section 7 Consultation with the USFWS. The consultation is a mandate for water depletion projects that may affect threatened and endangered species that rely on the South Platte River.

- The survey area does not contain the specific habitat characteristics necessary to support the species listed above. These species and/or critical habitat is not present within the survey area (USFWS 2008). It is assumed herein that future land use changes would not be considered a new water depletion. Therefore, the project would result in No Take to these species.

Species Potentially within Range

The following federally listed threatened and endangered species are identified to occur or historically occur within Weld County (USFWS 2023). The survey area is located within the potential known range for these species to occur. Further analysis was conducted to determine if the species or habitat has the potential to exist within the survey area considering site-specific conditions and characteristics. A brief explanation is provided as to the species life cycle, habitat requirements and potential occurrence within the survey area. The survey area is not within designated critical habitat of any federally listed species (USFWS 2008).

Common Name	Scientific Name	Status*	Determination
Monarch Butterfly	*Danaus plexippus*	C	NO TAKE
Tricolored Bat	*Perimyotis subflavus*	PE	NO TAKE

*Status key:
C – Candidate listed species
PE – Proposed Endangered

MONARCH BUTTERFLY (DANAUS PLEXIPPUS)

The monarch butterfly is listed as candidate species under the ESA. Adult monarch butterflies are large and conspicuous, with bright orange wings surrounded by a black border and covered with black veins. The black border has a double row of white spots, present on the upper side of the wings. Adult monarchs are sexually dimorphic, with males having narrower wing venation and scent patches. The bright coloring of a monarch serves as a warning to predators that eating them can be toxic.

As a candidate species, the monarch butterfly has no statutory protection under the ESA, however the USFWS encourages cooperative conservation efforts because they are species that may warrant future protection under the ESA (USFWS 2017).

- No monarch butterflies were observed within or surrounding the survey area. However, showy milkweed (*Asclepias speciosa*) was observed infrequently along the Community Ditch East and West branches. The survey area historically has been highly modified with agricultural practices. However, future land use changes should consider and describe any planned conservation measures for the monarch butterfly. Conservation measures can include habitat management such as the inclusion of native milkweed plant species in restoration efforts, reducing herbicide and pesticide use within the survey area, and/or creating a conservation easement for habitat protection. Such best management practices will aid in maintaining and/or enhancing the future survival of the monarch butterfly survival. However, these are not regulatory requirements.

TRICOLORED BAT (PERIMYOTIS SUBFLAVUS)

The tricolored bat is a small insectivorous bat that is distinguished by its unique tricolored fur and often appears yellowish to nearly orange. The once common species is wide ranging across the eastern and central United States and portions of southern Canada, Mexico and Central America. During the winter, tricolored bats are often found in caves and abandoned mines, although in the southern United States, where caves are sparse, tricolored bats are often found roosting in road-associated culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures. Tricolored bats face extinction due primarily to the range-wide impacts of white-nose syndrome, a deadly disease affecting cave-dwelling bats across the continent. White-nose syndrome has caused estimated declines of more than 90 percent in affected tricolored bat colonies across the majority of the species range (R. Adams, 2018).

- No tri-colored bat individuals or caves were observed within or surrounding the survey area. While the survey area does contain deciduous trees and a small, relatively undisturbed habitat in the west-central portion of the survey area that can be considered typical habitat for the tri-colored bat, no observations within the survey area were made.
- Conservation measures for the tricolored bat include ongoing research to monitor possible populations, protection and preservation of roosting habitats including deciduous trees, public education regarding the importance of bats, disease management and collaborative conservation with government agencies, non-profit organizations and the public to create conservation initiatives.
- Due to the information provided above, the tri-colored bat is not likely to be present within the survey area. Therefore, disturbance to habitat within the survey area should not adversely affect the tri-colored bat.

7.0 STATE THREATENED AND ENDANGERED SPECIES

Species identified as state threatened or endangered are protected by the CPW under Colorado Statute Title 33. State regulations prohibit "*any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment*" any species or subspecies listed as state endangered or threatened. The CPW also has identified State Species of Special Concern, which are species or subspecies of native wildlife that are currently vulnerable in their Colorado range and have the potential to become threatened or endangered. Species of Special Concern are not protected under State regulations but the 'take' of individuals and disturbance of their habitat is strongly discouraged.

All state listed species were screened as potential inhabitants of the survey area based on general habitat requirements and CPW Species Profiles (CPW 2023c). ERC evaluated the species listed by CPW as threatened or endangered that could potentially exist within the survey area. All animal species listed above as threatened or endangered by the USFWS are also listed by the CPW as threatened or endangered, respectively, therefore were not duplicated below.

Species Not Present

The following listed threatened and endangered species are identified to occur within the state (CPW 2023d). However, these species are not known to exist within the specific vicinity of the survey area and/or have specific habitat requirements (i.e., elevation range) that are not common in the vicinity of the survey area (CPW 2023c and USFWS 2023).

Common Name	Scientific Name	Status*
Boreal toad	*Bufo boreas boreas*	SE
Southwestern willow flycatcher	*Empidonax traillii extimus*	SE
Lesser prairie-chicken	*Tympanuchus pallidicinctus*	ST
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*	SE
Arkansas darter	*Etheostoma cragini*	ST
Bonytail	*Gila elegans*	SE
Razorback sucker	*Xyrauchen texanus*	SE
Humpback chub	*Gila cypha*	ST
Colorado pikeminnow	*Ptychocheilus lucius*	ST
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	ST
Rio grande sucker	*Catostomus plebeius*	SE
Lake chub	*Couesius plumbeus*	SE
Plains minnow	*Hybognathus placitus*	SE
Suckermouth minnow	*Phenacobius mirabilis*	SE
Northern redbelly dace	*Phoxinus eos*	SE
Southern redbelly dace	*Phoxinus erythrogaster*	SE
Brassy minnow	*Hybognathus hankinsoni*	ST
Common shiner	*Luxilus cornutus*	ST
Grizzly bear	*Ursus arctos*	SE
Lynx	*Lynx canadensis*	SE
Wolverine	*Gulo gulo*	SE

Common Name	Scientific Name	Status*
Kit fox	*Vulpes macrotis*	SE
River otter	*Lontra canadensis*	ST

*Status key:
ST – State listed as threatened
SE – State listed as endangered

- The survey area does not contain the specific habitat characteristics necessary to support the species listed above. These species and/or critical habitat is not present within the survey area. Therefore, any future land use changes will have no effect on the species, their habitats, or proposed or designated critical habitat.

Species Potentially within Range

The following state listed threatened and endangered species are identified to occur or historically occur within Weld County. The survey area is located within the potential known range for these species. Further analysis was conducted to determine if the species or habitat has the potential to exist on the survey area considering site-specific conditions and characteristics. A brief explanation is provided as to the species life cycle, habitat requirements and potential occurrence within the survey area.

Common Name	Scientific Name	Status*
Black-footed ferret	*Mustela nigripes*	SE
Burrowing owl	*Athene cunicularia*	ST

*Status key:
ST – State listed as threatened
SE – State listed as endangered

BLACK-FOOTED FERRET (MUSTELA NIGRIPES)

The black-footed ferret (BFF) *(Mustela nigripes)* is a medium-sized mustelid (a member of the weasel family). The BFF is the only ferret species native to the Americas. Its historical range spanned much of western North America's intermountain and prairie grasslands, extending from Canada to Mexico. Historically, BFF habitat coincided with habitats of black-tailed prairie dog *(C. ludovicianus)*, Gunnison's prairie dog *(C. gunnisoni)*, and white-tailed prairie dog *(C. leucurus)*. Prairie dogs make up more than 90% of the BFF's diet. BFF's are limited to open habitat, the same habitat used by prairie dogs: grasslands, steppe, and shrub steppe. It depends largely on prairie dogs: ferrets prey on prairie dogs and utilize their burrows for shelter and denning (Hillman and Clark, 1980). It has been estimated that about 40-60 hectares of prairie dog colony are needed to support one ferret (Belant and Biggins 2008). BFF's once numbered in the tens of thousands, but due to a combination of human-induced threats they were believed to be extinct twice in the 20th century. As of 2015, BFFs have been reintroduced in the wild at 24 sites across 8 states, Canada, and Mexico.

- No BFF individuals were observed on or surrounding the survey area. The survey area is located within the overall range of the black-tailed prairie dog; however, no colonies were observed within the survey area. Further, the survey area occurs within the block clearance zone for black-footed ferret surveys (USFWS 2009). Any future land use changes within the survey area should have no effect on the continued existence or potential habitat of this species.

BURROWING OWL (ATEHENE CUNICULARIA)

The burrowing owl (Owl) is listed as a state threatened species in Colorado. The Owl is small (length of 24 centimeters), long-legged, boldly spotted, and barred with brown and white. The Owl is a breeding species across the plains of eastern Colorado however rarely winters in the state. Nesting habitat is in burrows, especially in both active and inactive prairie dog colonies, located in grasslands, mountain parks, well-drained steppes, deserts, prairies and agricultural lands from late March through October. The Owl can usually be observed on low perches such as fence posts, dirt mounds or the ground. Clutch size of this Owl averages six to seven and incubation lasts up to 30 days. The owlets usually run and forage at 4 weeks and fly at 6 weeks. Primary threats to existence of this species are habitat loss due to intensive agriculture, habitat degradation and fragmentation due to control of burrowing mammals and predation by cats and dogs.

- No Owl individuals were observed on or surrounding the survey area. The survey area is located within the overall range of the black-tailed prairie dog; however, no black-tailed prairie dog colonies are located within the survey area. Much of the land within the survey area is regularly plowed/tilled which further limits the potential use of the survey area by this species. Therefore, any future land use changes within the survey area should have no effect on the continued existence or potential habitat of this species.

8.0 SUMMARY

ERC has conducted this screening for federal and state listed threatened and endangered species and general wildlife for the approximately 393-acre survey area. The survey area is under consideration for potential residential development which includes single-family detached homes, and attached unit townhomes which will likely alter a majority of the current survey area landscape. The following provides key items identified as part of this report:

1. Four primary land use class/vegetation cover types exist within the survey area. Habitat within the survey area is characterized as Cultivated Cropland (98%), Great Plains Ruderal Grassland and Shrubland (<1%), Mesic Graminoids Western Wet Shrubland (<1%) and Disturbed (1%). Historic land use for agricultural practices has led to degradation of the native vegetation community.
2. Generally, there are features on the survey area and the surrounding area that provide general habitat for local songbirds, raptors, and small to mid-size mammals. However, habitat within the survey area is somewhat degraded and of lower ecological value from a wildlife perspective due to historic and current land use for agriculture, which has restricted overall growth and establishment of vegetation. Per the CPW SAM data, no High Priority Habitat was mapped or observed within the survey area (CPW 2023b). The survey area has been subject to frequent agricultural practices and is fragmented on all sides. Therefore, impacts to HPH associated with the listed species is not anticipated.
3. Non-raptor birds
   No non-raptor migratory bird nests were observed within the survey area. However, prior to vegetation removal a nest survey should be completed to ensure that no nests have become established within the survey area and active nests, if any, are not disturbed.

Non-eagle Raptors

No non-eagle raptor nests were observed and no CPW mapped non-eagle raptor nest protection zones are located within the survey area (CPW 2023b). However, nest activity status can vary seasonally and from year-to-year. Future land use changes may require additional nest surveys (generally between February 1 and September 15 (CPW 2020)) to determine activity status within ½ to ¼ mile of the survey area to ensure compliance with CPW recommendations.

Eagles

No eagle nests or eagles were observed and no CPW mapped eagle nests are located within the survey area (2023a). However, nest activity status can vary seasonally and from year-to-year. If a nest does become established within a ½-mile of the survey area or within the survey area, CPW recommends a "No Surface Occupancy" and "No Human Encroachment" within ¼-mile radius of active nest sites from December 1 through July 31. Future land use changes may require an additional nest survey (generally between December 1 and July 31 (CPW 2020) to determine activity status within ½-mile of the survey area to ensure compliance with CPW recommendations.

4. No federally listed threatened and endangered species and/or habitat protected under the ESA were identified within the survey area. The survey area is not within designated critical habitat of any federally listed species (USFWS 2008). The vegetation community and features within the survey area were investigated as potential habitat for federally listed species. Any future land use changes will result in No Take on any federal listed species, their habitats, or proposed or designated critical habitat.

5. No State listed threatened or endangered species and/or habitat protected by CPW under Colorado Statute Title 33 were identified within the survey area. The vegetation communities within the survey area were investigated as potential habitat for state listed species. Any future land use changes will have no effect on any state listed species, their habitats, or proposed or designated critical habitat.

This report has been prepared by:

ECOLOGICAL RESOURCE CONSULTANTS, LLC.

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(303) 679-4820 x 105 / tyler@erccolorado.net

Reviewed and approved by:

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9.0 REFERENCES

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USFWS. US Fish & Wildlife Service. 2023. Official Species List. List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project. Project Code: 2024-0026445. December 13, 2023.

Ecological Resource Consultants, LLC
2820 Wilderness Place, Suite A~ Boulder, CO 80301~ (303) 679-4820

October 1, 2024

Care of:
Carli Garcia-Rodriguez
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RE: Update: Native and Specimen Tree and Vegetation Survey-North Westerly Site, Weld County, CO (ERC# 1155-2403)

Ecological Resource Consultants, Inc. (ERC) provides this update of current conditions for a survey of existing trees and shrubs on the Site known as the North Westerly Site, located in Weld County, Colorado originally performed on December 20, 2023 (ERC 2023). The purpose of the survey was to locate and identify the species of trees/shrubs present, measure the trunk diameter at breast height (dbh), visually estimate height, and evaluate the general health of the trees and shrubs identified on the subject Site. The vegetation survey was completed in general accordance with Title 10 Section 10.6.2(C)(4) of the Town of Erie Unified Development Code (UDC).

General Site Description
The Site is approximately 392.8 acres in size and made up of predominantly agricultural land consisting mainly of planted with row crop vegetation. Two oil and gas installations were observed in the northern portion of the Site, and one was observed in the eastern portion. Community Ditch forks to the west and east as it enters the Site from the south with the eastern branch flowing northeast out of the Site and the western branch generally meandering north out of the Site. A dirt road parallels Community Ditch for most of the Site other than the northern most portion where the road continues north as the ditch flows to the northeast. The northern boundary is formed by County Road 10 and residential properties, the western boundary by County Road 5 and the Erie High School and Soaring Heights school campuses, the southern boundary by Erie Pkwy and the Soaring Heights school campus, and the eastern boundary by County Road 7 and residential properties. The majority of the Site has been heavily impacted by agricultural practices, nearly all herbaceous vegetation within the Site is either planted row crop vegetation, crop stubble, and/or ruderal herbaceous species. No significant areas of native plant communities exist within the Site. The weather was cool and cloudy, and the deciduous trees/shrubs were in a dormant state.

Method
ERC performed the vegetation survey field evaluation on September 25, 2024. ERC inventoried, per the UDC, each tree with a diameter of 4 inches and over by identifying the species, measuring the trunk diameter at breast height (dbh) (at approximately 54 inches above the ground) using a 20-foot diameter tape, and evaluating the general condition (health) of each tree. In addition, shrub species were identified to species and classified into a general condition (health) category. All trees and shrubs identified within the Site were given a range of height displayed in **Table 1.**

All trees/shrubs inventoried were categorized into one of five groups: excellent, good, fair, poor, and very poor. The tree/shrub condition categories are defined as follows:

Excellent
- Healthy, vigorous tree/shrub.
- No apparent signs of insect, disease or mechanical injury.
- No corrective work required.
- Form representative of the species.

Good
- Better than average vigor.
- Little corrective work needed.
- Not quite perfect form.

Fair
- Average condition and vigor for the area.
- May be in need of some corrective pruning or repair.
- May lack desirable form characteristics of the species.
- May show minor insect injury, disease, or physiological problem.

Poor
- General state of decline.
- May show severe mechanical, insect or disease damage.
- Death not imminent.
- May require major repair or renovation.

Very Poor
- Includes "poor" above but is more extreme in that no amount of repair or renovation will lead to a desirable and sustainable tree/shrub. Costs would exceed any benefit.

Specific tree/shrub information is provided in the enclosed table titled **Table 1.- Onsite Existing Tree/Shrub Vegetation.** A Tree/Shrub Location Map was prepared by ERC and is enclosed as **Figure 1. – North Westerly Site – Vegetation Survey.** The mapping depicts the location of each tree/shrub and provides an identification number that corresponds to the tree/shrub described in **Table 1.** Tree species and health were verified by a Licensed Certified Arborist (Contractor License # RM-0753A) on September 25, 2024. The location of each tree/shrub as identified in **Figure 1** is only approximate and has not been formally surveyed.

Summary of Results

In total, 32 individual trees (4" and larger DBH), and approximately 230 shrubs, composed of 7 separate species, were identified within the Site and immediate vicinity. The species include plains cottonwood (*Populus deltoides ssp. monilifera*), green ash (*Fraxinus penssylvanicus*), Siberian elm (*Ulmus pumila*), crack willow (*Salix fragilis*), Russian olive (*Elaeagnus angustifolia*), matrimony vine (*Lycium babarum*), and narrowleaf willow (*Salix exigua*).

Trees on the Site are generally located within near Community Ditch in four clusters. One in the northwestern portion of the Site near the Soaring Heights school campus, one near the central portion of the Site south of a bend in the western fork of Community Ditch, and two along the eastern fork of Community Ditch. Although trees located within the Site do not show signs of regular maintenance, most trees (29) exhibit significant reproductive structures and were categorized as having "Good" condition ratings. Two (2) trees were categorized as "Fair", and it is

recommended that these trees be regularly maintained to remove dead branches and/or be treated for disease that will improve overall health of the tree. No trees were categorized as either "Poor" and/or "Very Poor" (i.e., in a general state of decline).

Additionally, two (2) small section of shrubs was identified within the Site, one to the southeast of the eastern fork of Community Ditch and one in the western portion of the Site north of Community Ditch. These shrubs are contained within depressions that appears to receive water from the ditch and surrounding irrigation runoff. Due to the high density, and relatively small size of the species (narrowleaf willow and matrimony vine), individual shrubs counts were estimated in the field and the values given for caliper are intended to be an estimated average for the entire row. All shrubs appeared to be in the range of fair to good condition and health.

Native species (as listed by the US Department of Agriculture (USDA) PLANTS Database 2024 for Weld County and Colorado) present on the Site include plains cottonwood and narrowleaf willow. During any future land use changes, landscape plans should utilize native, Town of Erie approved tree species and remove or manage undesirable tree species.

Non-native species such as green ash, Siberian elm and crack willow are generally considered to be undesirable trees due to their clump or multi-stem growth and/or non-native status. These trees are easily damaged by storms, and prone to insect and disease infestations.

Report completed by:

Ecological Resource Consultants, Inc.



Matthew Boyer, Project Ecologist



David J. Blauch, V.P., Senior Ecologist



Chris Becker, Certified Arborist (Contractor License # RM-0753A)
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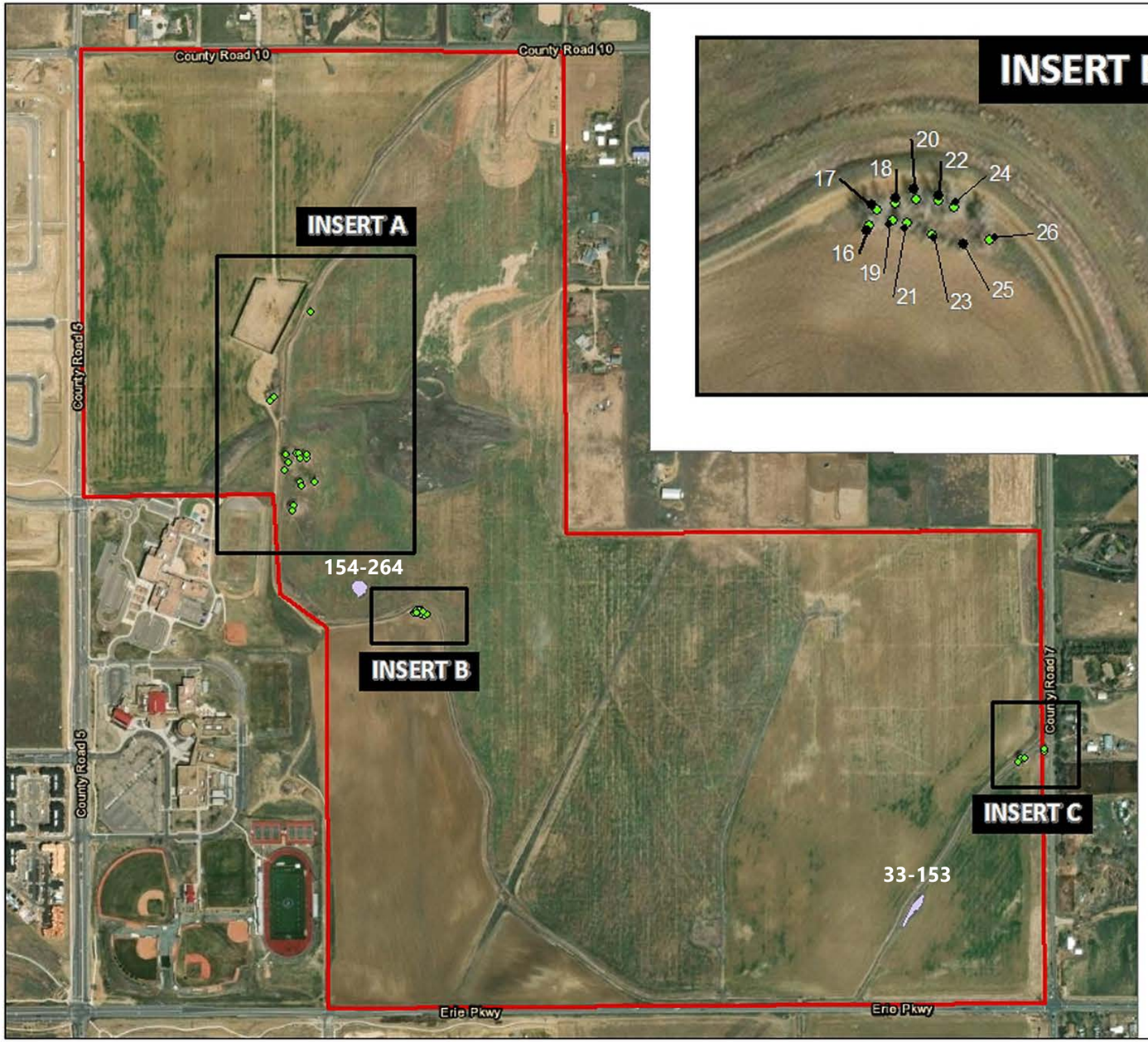
Table 1. Onsite Existing Tree/Shrub Vegetation

ID#	Common Name	Scientific Name	DBH (in)	Approx. Height (ft)	Condition	Comments
1	Plains cottonwood	*Populus deltoides ssp. monilifera*	31.0	30-40	Good	Native
2	Plains cottonwood	*Populus deltoides ssp. monilifera*	55.0	50-60	Good	Native
3	Plains cottonwood	*Populus deltoides ssp. monilifera*	46.0	45-55	Good	Native
4	Plains cottonwood	*Populus deltoides ssp. monilifera*	60.0	50-60	Good	Native
5	Plains cottonwood	*Populus deltoides ssp. monilifera*	12.0	5-15	Good	Native
6	Plains cottonwood	*Populus deltoides ssp. monilifera*	22.0	10-20	Good	Native
7	Plains cottonwood	*Populus deltoides ssp. monilifera*	42.0	30-40	Good	Native
8	Plains cottonwood	*Populus deltoides ssp. monilifera*	42.0	20-30	Good	Native
9	Plains cottonwood	*Populus deltoides ssp. monilifera*	22.0	15-25	Fair	Native
10	Plains cottonwood	*Populus deltoides ssp. monilifera*	41.0	20-30	Good	Native
11	Plains cottonwood	*Populus deltoides ssp. monilifera*	43.0	25-35	Good	Native
12	Plains cottonwood	*Populus deltoides ssp. monilifera*	6.0	5-15	Good	Native
13	Plains cottonwood	*Populus deltoides ssp. monilifera*	60.0	35-45	Good	Native
14	Plains cottonwood	*Populus deltoides ssp. monilifera*	33.0	30-40	Good	Native
15	Crack willow	*Salix fragilis*	26.0	10-20	Fair	Nonnative
16	Plains cottonwood	*Populus deltoides ssp. monilifera*	1.0	5-15	Good	Native
17	Plains cottonwood	*Populus deltoides ssp. monilifera*	7.5	5-15	Good	Native
18	Plains cottonwood	*Populus deltoides ssp. monilifera*	7.0	2.5-7.5	Good	Native
19	Plains cottonwood	*Populus deltoides ssp. monilifera*	6.0	2.5-7.5	Good	Native
20	Plains cottonwood	*Populus deltoides ssp. monilifera*	5.5	2.5-7.5	Good	Native
21	Plains cottonwood	*Populus deltoides ssp. monilifera*	6.0	2.5-7.5	Good	Native
22	Plains cottonwood	*Populus deltoides ssp. monilifera*	9.0	5-15	Good	Native
23	Plains cottonwood	*Populus deltoides ssp. monilifera*	8.0	5-15	Good	Native
24	Plains cottonwood	*Populus deltoides ssp. monilifera*	8.5	5-15	Good	Native
25	Plains cottonwood	*Populus deltoides ssp. monilifera*	6.0	2.5-7.5	Good	Native
26	Plains cottonwood	*Populus deltoides ssp. monilifera*	19.0	10-20	Good	Native
27	Plains cottonwood	*Populus deltoides ssp. monilifera*	52.0	50-60	Good	Native
28	Green ash	*Fraxinus pennsylvanicus*	36.0	15-25	Good	Native
31	Siberian elm	*Ulmus pumila*	10.0	5-15	Good	Nonnative
32	Plains cottonwood	*Populus deltoides ssp. monilifera*	44.0	45-55	Good	Native
33-153	Narrowleaf willow	*Salix exigua*	0.5-2	2.5-7.5	Good	Native; Labeled as Shrubs on map
154-264	Matrimony vine	*Lycium barbarum*	0.5-2	2.5-7.5	Fair-Good	Native; Labeled as Shrubs on map

-ID# refers to Figure 1. North Westerly Site Vegetation Survey Update
-DBH refers to diameter at breast height measured 54 inches above ground
*DBH and Approx. Height Range is an estimated average/height range for the entire area. Shrubs are relatively uniform in approximate height and DBH.







Prepared By:

ERC

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ERC # 1155-2403

Refer to Table 1 for tree ID, species identification and description.

Imagery Source: ESRI

FIGURE 1. NORTH WESTERLY SITE – VEGETATION SURVEY UPDATE

WELD COUNTY, COLORADO

Date: October 1, 2024

Ecological Resource Consultants, LLC
2820 Wilderness Place, Suite A~ Boulder, CO 80301~ (303) 679-4820

Date: December 20, 2023

To: North Westerly Owner, LLC
Attn: Heidi Majerik

Project: **North Westerly Project – Cultural Historic Resources Screening (ERC Project #1155-2304)**

Ecological Resource Consultants, LLC (ERC), on behalf of North Westerly Owner, LLC, completed an initial cultural/historic resource screening for the 392.8-acre project area (See **Figure 1** below). The project area is located northwest of the intersection with Erie Parkway and County Road 7 and includes parcels 146716200076 and 146716400004 in Weld County, Colorado. More specifically, the project area is in **Section 16, Township 1 North, Range 68 West**, in Weld County **(latitude 40.05081° north, longitude -105.0089° west).**

On December 13, 2023, A&B Cultural Consultants, LLC (A&B) reviewed the online records in the Office of Archaeology and Historic Preservation (OAHP) Compass database in addition to several other historic databases and maps to identify any listed or eligible historic properties on or within the project area. A field investigation for archaeological and historical resources was not performed. The results of the screening are summarized as follows:

- The search of the Compass database revealed that two surveys had been performed and one cultural resource was previously recorded within Section 16, T1N, R68W, 6th P.M. (hereafter Section 16).

- The previously recorded resource within Section 16 is a segment of the Community Ditch (**5WL.2247.15**) that has been officially determined eligible for the NRHP. A portion of this segment along with an additional unrecorded segment is located within the project area.

- The real estate property records of the Weld County Assessor indicate that there are no structures located within the project area.

- Based on the results of previous archaeological surveys in the vicinity and the general geomorphological characteristics of the project area, it can be concluded that there is very little likelihood of significant prehistoric deposits being located within the project area. Because of the small probability of prehistoric resources within the project area, A&B does not recommend a Class III survey of the project area.

- Other records reviewed showed that the Clayton Mine was located within the project area and the ALTA survey provided by the client notes that concrete remnants related to this mine are located within the project area.

- If a federal nexus such as a Section 404 Clean Water Act permit or federal funding is required for the project, A&B recommends consultation with SHPO to evaluate NRHP eligibility for the Clayton Mine site and the additional segment of the Community Ditch through the project. If no federal

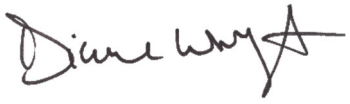
nexus or federal funding is required for the project, SHPO consultation would not be required however project review with the Erie Historical Society would be recommended.

- The Cultural Resource Screening from A&B is enclosed as **Attachment A**.

If you have any questions or require additional information, please feel free to contact me.

Sincerely,

ECOLOGICAL RESOURCE CONSULTANTS, LLC



Diane Wright, Project Ecologist

Reviewed and approved by:



David J. Blauch, V.P., Senior Ecologist

ATTACHMENT A



A & B Cultural Consultants, LLC

1608 Sunset Drive
Louisville, CO 80027

office: 303-666-0437
cell: 303-968-7880
email: rmutaw@comcast.net

TO: Diane Wright, Ecological Resource Consultants
FROM: Robert Mutaw, Ph.D., A&B Cultural Consultants, LLC (A&B)
DATE: December 15, 2023
RE: Archaeological and Historical Records Review for Westerly, Weld County, Colorado

At your request, A&B conducted an archaeological and historic records and literature review for the Westerly Study Area located as illustrated in Figure 1. This Study Area is located on private land in portions of Section 16, Township (T) 1 North (N), Range (R) 68 West (W) of the 6th Principal Meridian (P.M.). The Study Area appears to be located within two real estate parcels (Weld County Assessor Parcel Numbers: 146716200076 and 146716400004) encompassing a total of approximately 401 acres.

On December 13, 2023, A&B reviewed the records in Compass, the on-line database of Colorado cultural resources maintained by the Office of Archaeology and Historic Preservation (OAHP) at History Colorado and the following sources:

- Weld County Assessor Real Estate Parcel Records
- General Land Office (GLO) 1864 Plat Map for T1N, R68W of the 6th P.M.
- Historic trail map of the Greeley 1° x 2° quadrangle (Scott and Shwayder 1993)
- USGS Niwot 1:62,500 Quadrangle Map of 1902
- USHS Greeley 1:125,000 Quadrangle Map of 1902
- USGS Erie 1:24,000 Quadrangle Maps of 1950 and 1967
- USGS Frederick 1:24,000 Quadrangle Maps of 1950 and 1969 photorevised
- Maps Showing the Extent of Mining in the Boulder-Weld Coal Field (Roberts et al. 2001)

The purpose of this review was to determine if any resources listed in the National Register of Historic Places (NRHP) or State Register of Historic Properties (SRHP) have been previously recorded within the Study Area and to assess the potential for qualifying resources to be present based on existing information. A field investigation for archaeological and historical resources was not performed.

The search of the Compass database revealed that two surveys had been performed and one cultural resource was previously recorded within Section 16, T1N, R68W, 6th P.M. (hereafter Section 16). One of the surveys was a countywide survey of farms and ranches and the other was for a gas pipeline. Neither of these surveys covered any portion of the Study Aera. The previously recorded resource within Section 16 is a segment of the Community Ditch (**5WL.2247.15**) that has been officially determined eligible for the NRHP. A portion of this segment along with an additional unrecorded segment is located within the Study Area. An excerpt from the map of sites and surveys available through Compass is attached as Figure 2 shows the site and surveys in relation to Study Area.

The real estate property records of the Weld County Assessor indicate that there are no structures located within the Study Area.

The 1864 GLO Plat map for T1N, R68W shows various unnamed drainages originating just outside of Section 16 but no cultural features are shown within it or in the surrounding sections (Figure 3).

The historic trails map covering this area (Scott and Shwayder 1993) shows the Community Ditch running through the Study Area, several mines surrounding it, and a railroad spur entering it from the northwest where is connects with the Boulder Valley Branch of the Union Pacific Railroad (Figure 4).

The USGS Niwot 1902 and Greeley 1902 maps show a road along the southern edge of the Study Area and a railroad to the northeast of it (Figure 5).

The USGS Erie and Frederick 1950 quadrangle maps show that roads have been developed along all for sides of Section 16, the Clayton Mine (Inactive) within the Study Area near the center of the section, and the Community Ditch running through the Study Area (Figure 6).

The USGS Erie 1967 and Frederick 1950 (photorevised 1969) quadrangle maps shows essentially the same features as the previous maps (Figure 7).

A map depicting the extent of coal mine workings in the Boulder-Weld Coal Field (Roberts et al. 2001) shows coal mines in the vicinity of the Study Area and M30 - the Clayton Mine that operated from 1920 to 1942, within the Study Area. Portions of the Study Area have been mapped as being undermined by the underground workings of the Clayton and other mines to the southeast and northeast (Figure 8).

Based on the results of previous archaeological surveys in the vicinity and the general geomorphological characteristics of the Study Area, it can be concluded that there is very little likelihood of significant prehistoric deposits being located within the Study Area. Previous surveys in the general vicinity resulted in the discovery of few, if any prehistoric sites, and generally only documented occasional prehistoric isolated artifacts (Angulski 1989; Halisi 2008, Mutaw 2012, 2014, 2017, 2018; Phillips 1996; URS 2002) or sites in deflated contexts (Chambellan and Mehls 2000). Additionally, the geomorphology of the Study Area is predominantly characterized by wind borne deposits that can be suitable for the preservation of archaeological sites, but if these surfaces are stable, as it appears to be in this case, it makes discovery of such deposits unlikely. Sites have occasionally been found in areas with this type of setting on ridge crests and hill tops where they have been exposed by wind erosion and upon stream terraces along water courses where exposed by water erosion, neither setting appears to apply to the Study Area. Because of the small probability of prehistoric resources within the Study Area, we do not recommend a Class III survey of the Study Area.

The search of the Compass records revealed that a previously documented segment of the Community Ditch (**5WL.2247.15**) that has been officially determined to be eligible for the NRHP is located within the Study Area. Another segment of this ditch that has not been recorded extends north from this previously recorded segment through the Study Area. When evaluating segments of linear resources, such as ditches, the question is asked if the particular segment under study retains sufficient integrity to demonstrate its significance and thereby support the eligibility of the entire resource of which it is a part. If the particular segment lacks sufficient integrity, it is said to be unable to support the eligibility of the overall resource and is thereby considered not eligible for listing in the NRHP. We recommend that

this additional segment of the Community Ditch through the Study Area be recorded and evaluated for NRHP eligibility.

Other records reviewed showed that the Clayton Mine was located within the Study Area and the ALTA survey provided by ERC notes that concrete remnants related to this mine are located within the Study Area. Archaeological sites are generally eligible under NRHP criterion d when they can produce data through analysis of artifacts and features found in an original context, i.e., *in situ*, that can be used in answering important research questions. We recommend that the Clayton Mine site be recorded and evaluated for NRHP eligibility.

REFERENCES

Angulski, Debra
1989 *Cultural Resource Survey of a Bridge over Coal Creek, Boulder County*. CDOT, Denver.

Chambellan, Collette C., and Steven F. Mehls
2000 *A Class III Cultural Resource Inventory of the Vista Pointe Subdivision, Weld County, Colorado (Original and Addendum)*. Western Cultural Resource Management, Boulder.

General Land Office (GLO
1864 Plat Map for T1N, R68W, 6th P.M. General Land Office, Washington, D.C.

Halisi, Judith
2008 *Cultural Resources Report County Line Business Park Bonnell Avenue and East County Line Road, Erie, Colorado*. Prepared by Smith Environmental and Engineering, Westminster, Colorado.

Mutaw, Robert J.
2012 *Erie Farms, Cultural Resources Report, Boulder County, Colorado*. Prepared by A&B Cultural Consultants, LLC, Louisville, Colorado.
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1996 *Cultural Resource Inventory of the Meadow Sweet Farm Parcels, Boulder County, Colorado.* Report on file, Colorado Historical Society, Denver.

Roberts, S.B., J.L. Hynes and C.L. Woodward
2001 *Maps Showing the Extent of Mining, Locations of Mine Shafts, Adits, Air Shafts, and Bedrock Faults, and Thickness of Overburden above Abandoned Coal Mines in the Boulder-Weld Coal Field, Boulder, Weld, and Adams Counties, Colorado*. United States Geological Survey, Geologic Investigations Series I-2735. Washington, D.C.

Scott, G.R., and Shwayder, C.R.,
1993 *Historic trail map of the Greeley 1° x 2° quadrangle, Colorado and Wyoming*. U.S. Geological Survey Miscellaneous Investigations Series Map I-2326, scale: 1:250,000. Washington, D.C.

URS Corporation (URS)
2002 *Erie Commons Development: Results of an Intensive Cultural Resource Inventory, Weld County, Colorado*. URS Corporation, Denver.

FIGURES

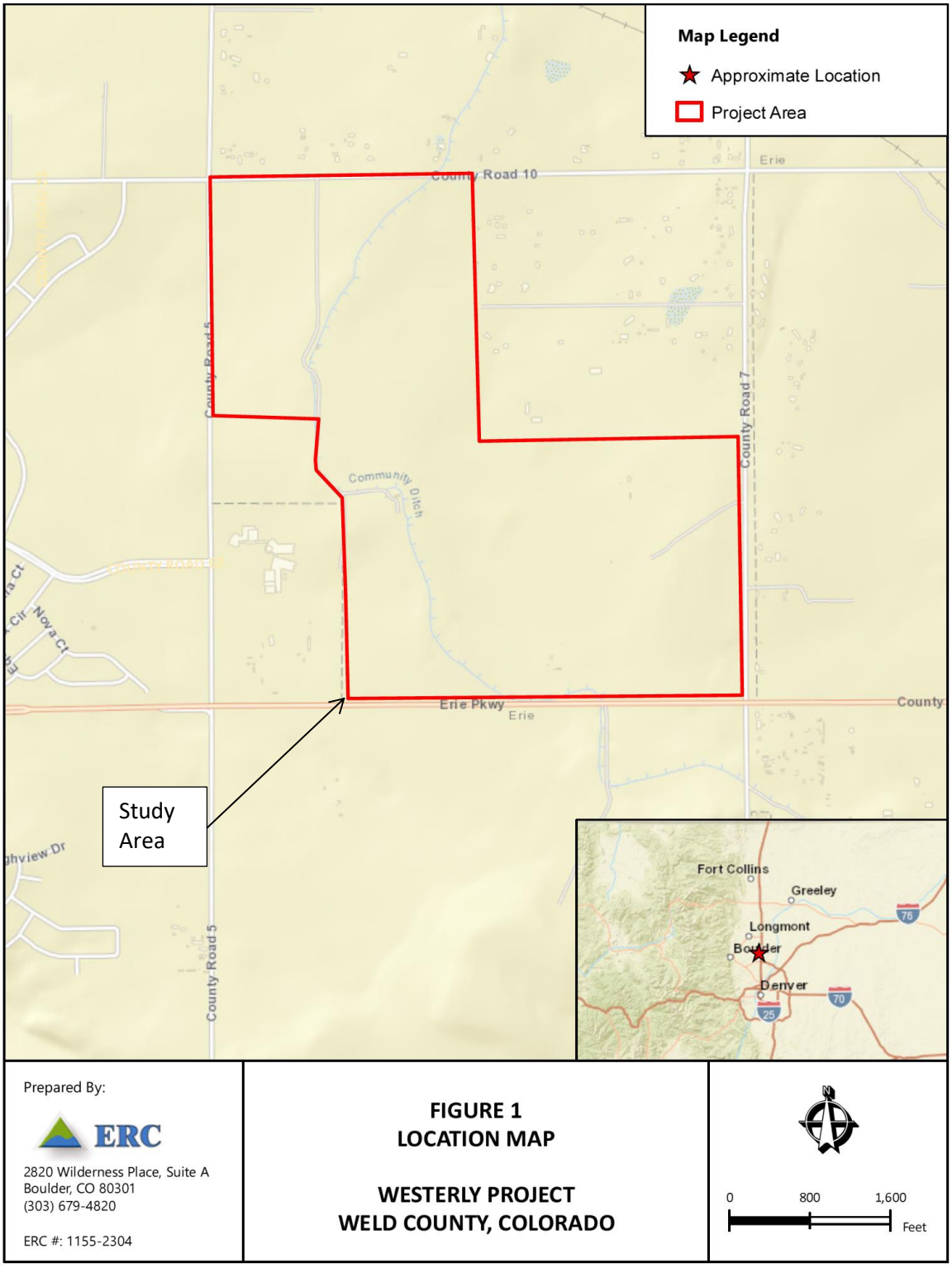


Figure 1. Study Area Location Map (from ERC).

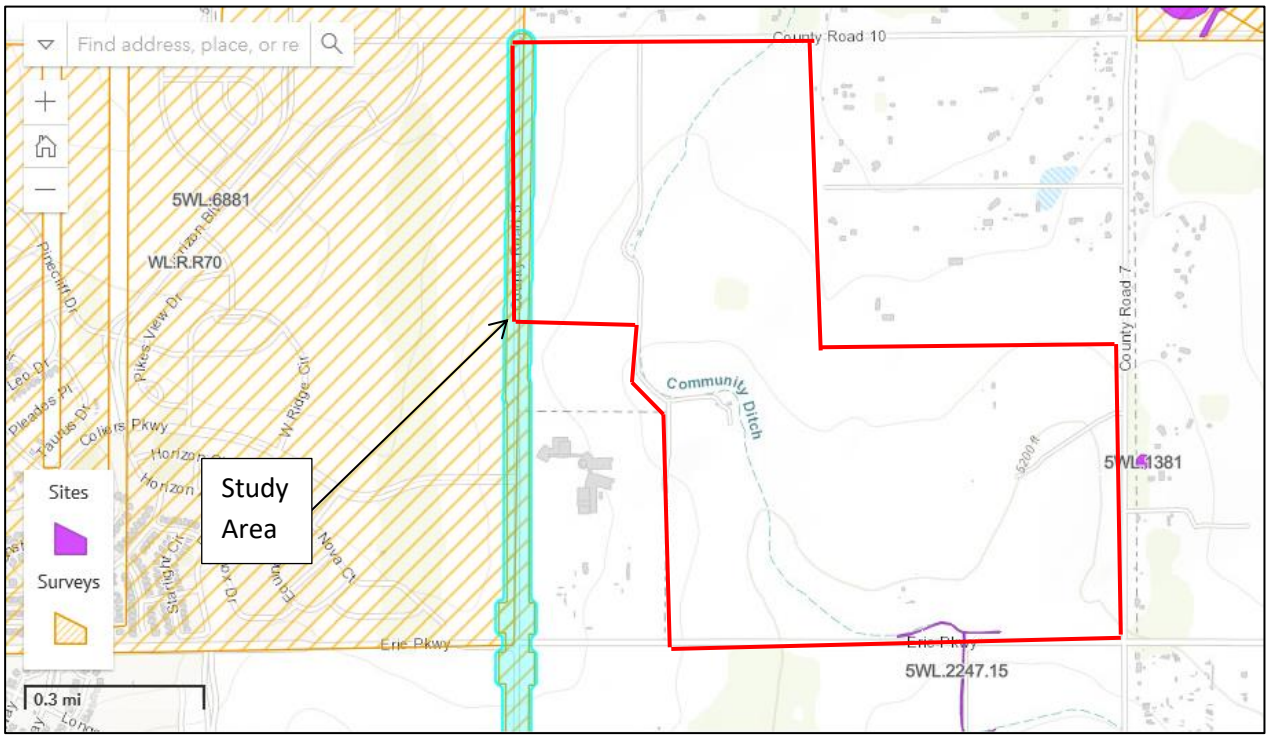


Figure 2. Excerpt from Compass Map.

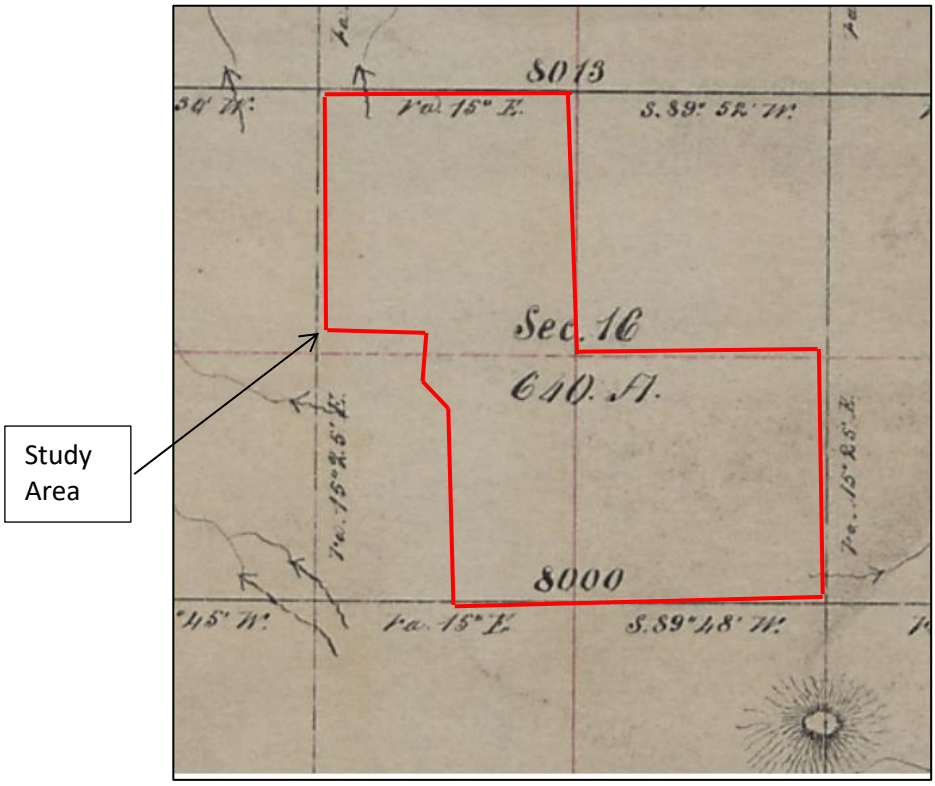


Figure 3. Excerpt from 1864 GLO Plat Map (GLO 1864).

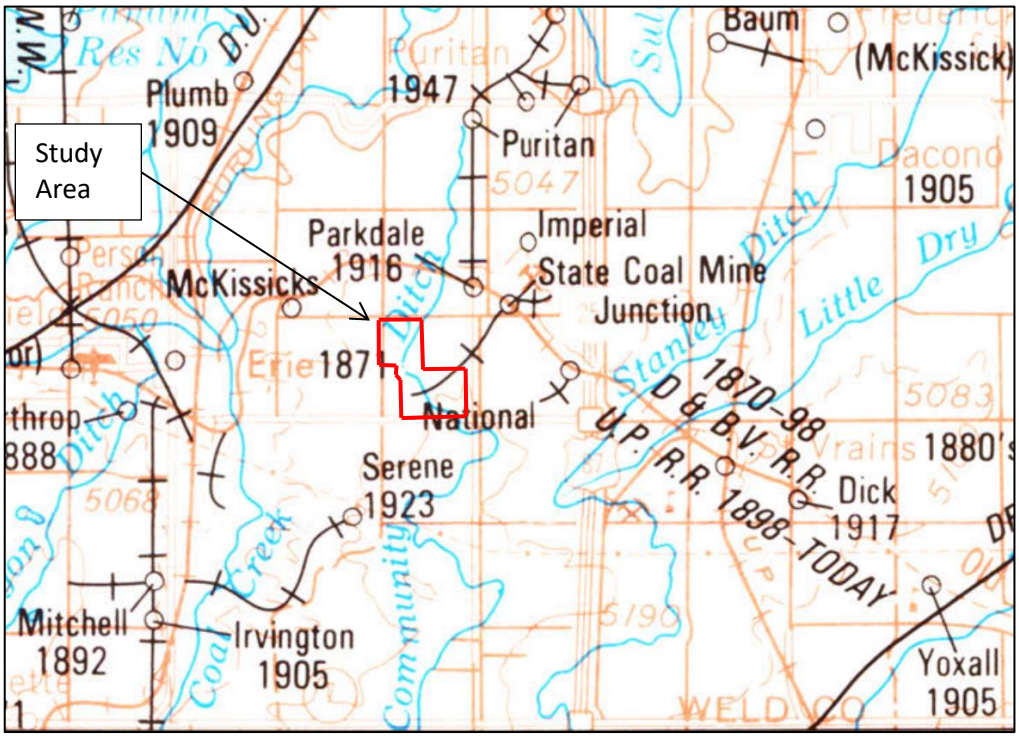


Figure 4. Excerpt from Historic Trails Map (Scott and Shwayder1993).

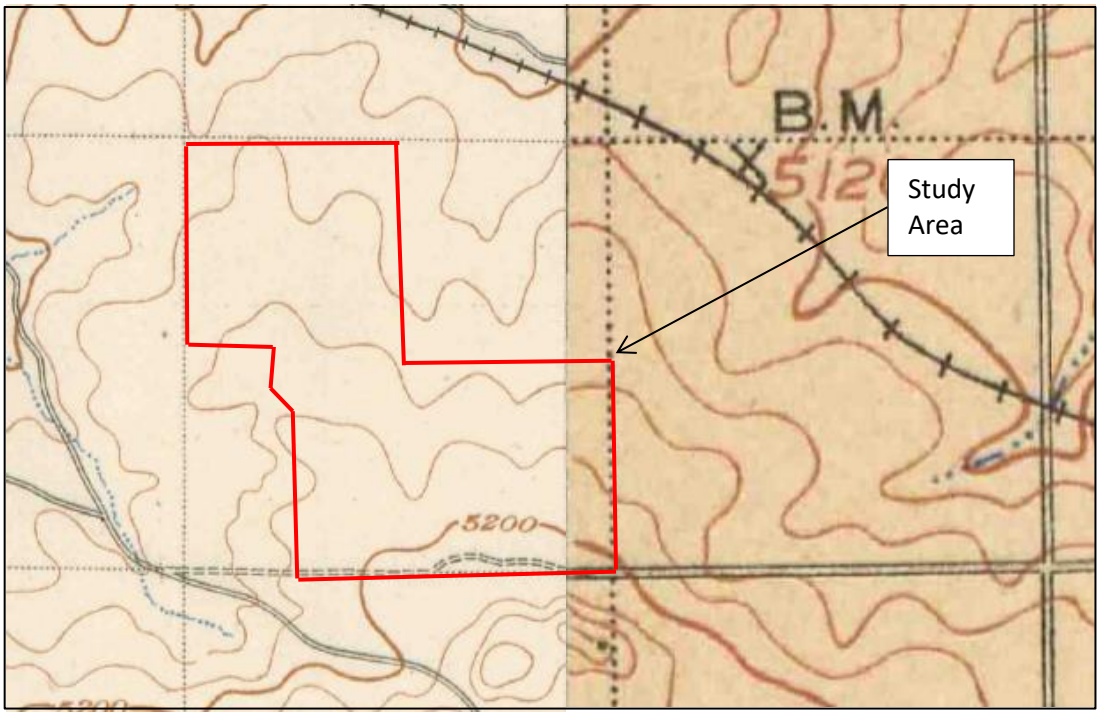


Figure 5. Excerpts from USGS Niwot (1902) and Greeley (1902) Maps.

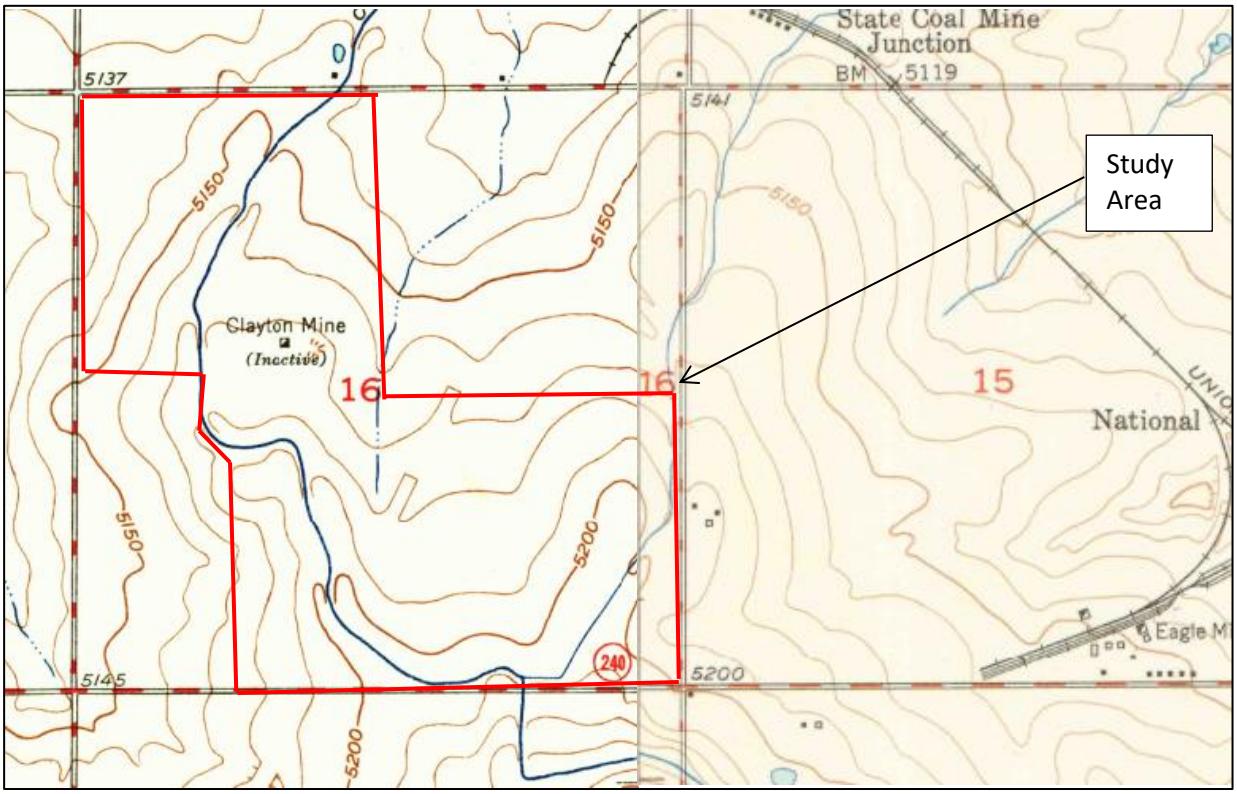


Figure 6. Excerpts from USGS Erie (1950) and Frederick (1950) Maps.

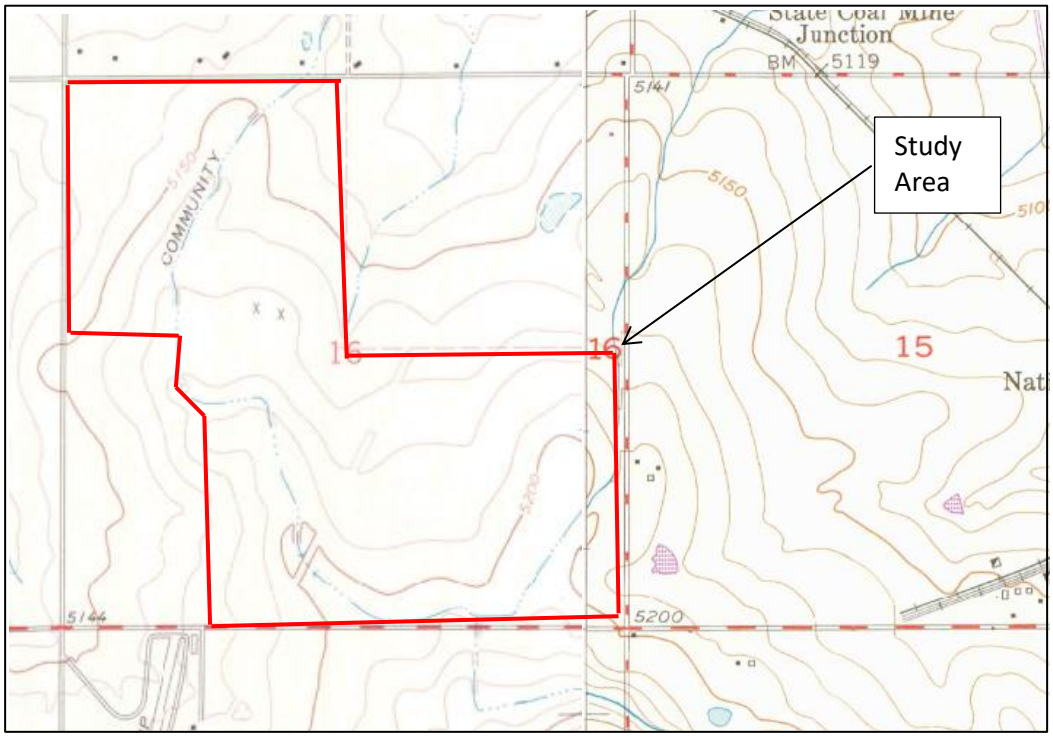


Figure 7. Excerpts from USGS Erie (1967) and Frederick (1969pr) Maps.

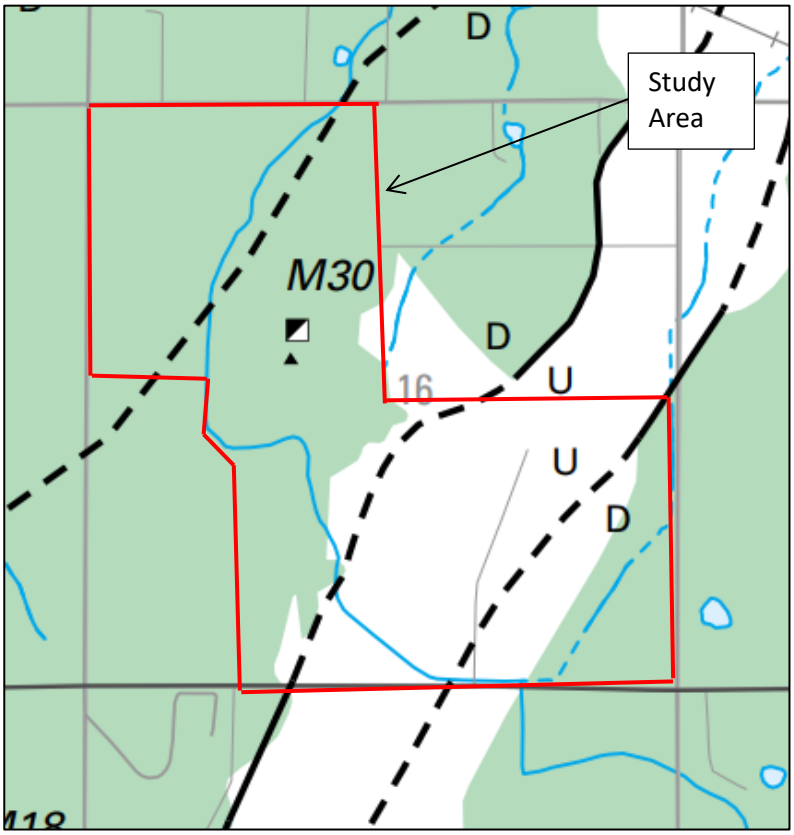
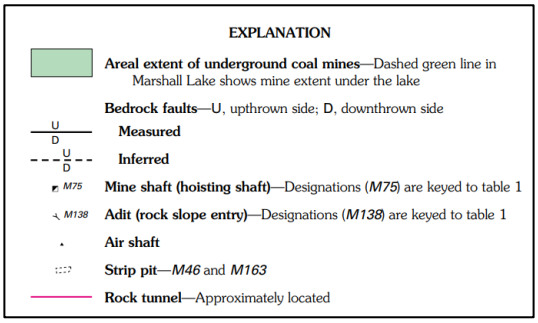


Figure 8. Excerpt from Roberts et al. 2001.



Phase I Environmental Site Assessment

393.16 Acres within Section 16,
Township 1 North, Range 68 West,
Weld County, Colorado 80516



Prepared for:

ERIE LAND COMPANY LLC

1225 17th Street, Suite 2420
Denver, Colorado 80202

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Phase I Environmental Site Assessment

393.16 Acres within Section 16, Township 1 North, Range 68 West, Weld County, Colorado 80516

Western Environment and Ecology, Inc.
Project Number: 778-005-01

November 18th, 2022

Prepared for:

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APPENDIX A	Reference Lists
APPENDIX B	Air Photo Documentation
APPENDIX C	Environmental Issues Inquires/Supporting Documents
APPENDIX D	Western Environment and Ecology, Inc. - Statement of Qualifications

1.0 INTRODUCTION

The purpose of this Phase I Environmental Site Assessment is to identify, to the extent feasible, recognized environmental conditions associated with the subject property. A Phase I Environmental Site Assessment has four components: Records Review, Site Reconnaissance, Interviews, and a Report. These specific activities are further defined by the American Society for Testing and Materials (ASTM 1527-21, Standard Practice for Environmental Site Assessments; Phase I Environmental Site Assessment Process, November, 2021).

The U.S. Environmental Protection Agency issued a final rule governing "All Appropriate Inquiries" (AAI) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on November 1st, 2006 (40 C.F.R. Part 312). The EPA has determined that a Phase I Environmental Site Assessment prepared in accordance with ASTM 1527-13 meets the AAI requirements. Western Environment has performed this assessment in compliance with both ASTM 1527-13 and ASTM 1527-21 standards.

The following document was prepared at the request of Heidi Majerik, Vice President and General Manager for the Southern Land Company. Ms. Majerik indicated that this report was in response to the purchase and potential residential single family residential development of the property. On November 10th, 2022, Western Environment and Ecology, Inc. (Western Environment) sent an User Environmental Questionnaire to Gracy Weil of Southern Land Company and requested she forward an Owner Questionnaire to the current property owner. These questionnaires request copies of past environmental assessment reports and asked for any information regarding environmental issues, liens, covenants, or hazardous material spills associated with the sites. The Weld County Assessors Office currently lists the owner of the site as the State of Colorado.

On November 10th, 2022 Ms. Majerik, returned the User questionnaire (attached) stating that she has no knowledge of environmental issues regarding the site. On November 14th, 2022, Mr. Matthew LaFontaine, Acquisition and Disposition Manager for the Colorado State Land Board, returned the Owner Questionnaire, indicating the State has owned the property for over100 years. Mr. LaFontaine stated that current and historic use of the property includes agriculture, coal mining, petroleum production, and a former National Oceanic and Atmospheric Administration (NOAA) 300 meter research tower. Mr. LaFontaine also provided a previous Phase I Environmental Site Assessment, Performed by Terracon Consultants, Inc., dated July 1st, 2008. This report (attached) identified a leaking pad mounted transformer and the presence of petroleum production wells as REC's.

2.0 SITE DESCRIPTION

This Phase I Environmental Site Assessment was conducted for approximately 393.16 acres within Section 16, Township 1 North, Range 68 West, unincorporated Weld County, Colorado (Figure 1). According to the Weld County Assessor's Office, the property, which is vacant, is currently zoned for agricultural use. The Community Ditch forms a portions of the eastern, southern and western border of the property.

The site is located between Erie Parkway on the south Weld County Road (WCR) 10 on the north, WCR's 5 and WCR 7 on the west and east respectively (Figure 2). Portions of the site had recently been cultivated in alfalfa hay. Remnants of the abandoned Clayton Coal Mine production facilities, including hoist house and load out tipple and main and air shafts foundations occur on the property. A Union Pacific State Coal Mine rail spur right-of-way, the Community Ditch, and a communication line right-of-way bisect the site (see attached ALTA Survey, 2008). Surrounding properties include the Erie Junior and High School to the west, rural acreage residences to the north and east, a large single family residential development to the west and southwest. Currently, agricultural land is present to the south, across Erie Parkway. The Public Service Company of Colorado Valmont Power Station, 230 kv high tension electric transmission power line is present along the northern boundary. Panhandle Eastern Pipeline Company, Amoco Oil and Vessels Oil have natural gas and liquid petroleum gathering lines along the parameter of the property.



View to north showing 230 kv powerline, Community ditch, and mine debris

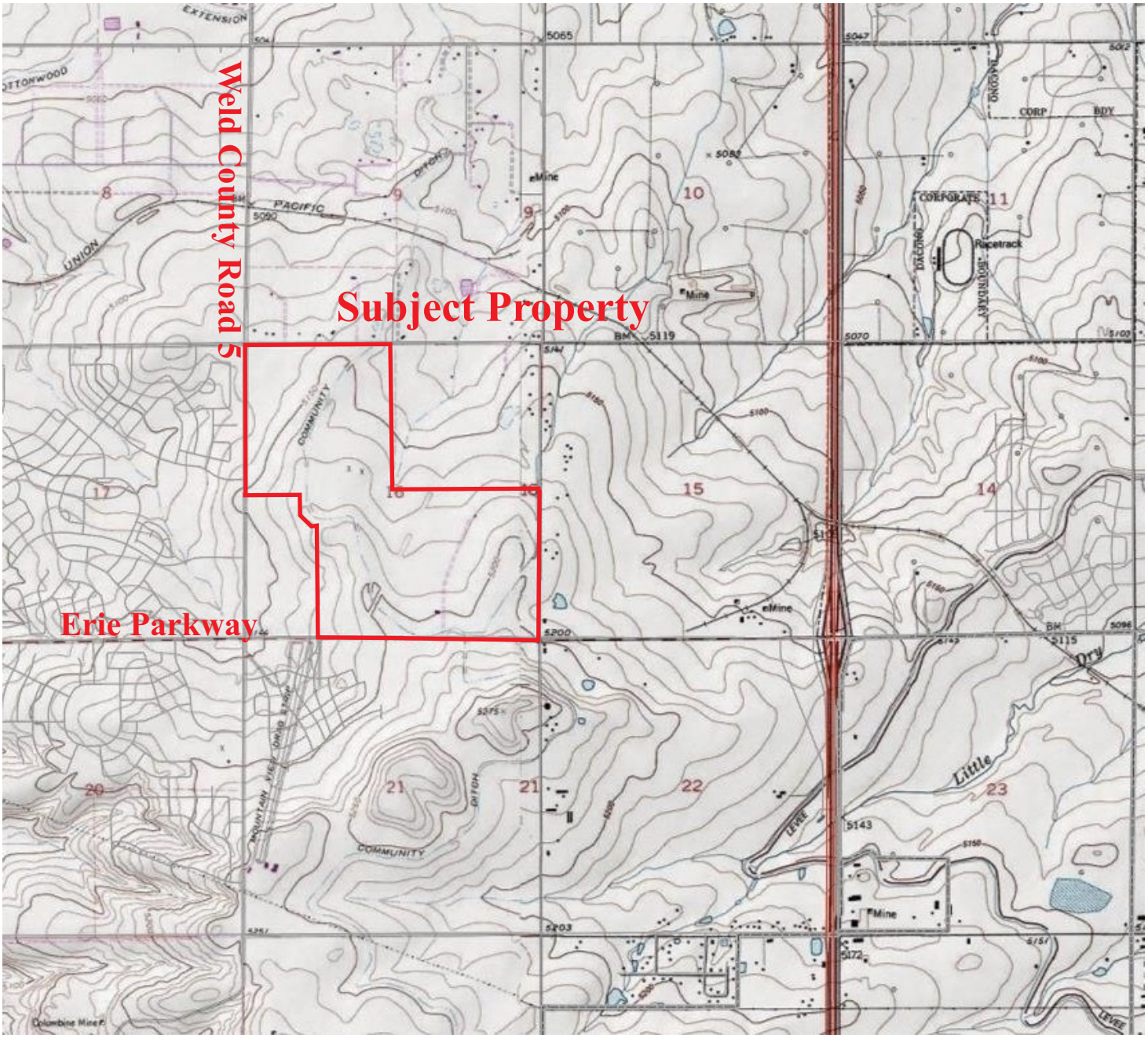

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Figure 1 -Location Map
393.16 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156





Approximate Scale in Feet

0 1320 2640

WESTERN ENVIRONMENT AND ECOLOGY, INC.
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Figure 2 - Site Map
393.16 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156

The site occurs at an elevation range of approximately 5,140 to 5,200 feet above sea level (USGS Erie 7.5 Minute Quadrangle, 2016). The topography is generally flat, with a gradual slope to the north. The site geology consists of the Cretaceous Age Laramie Formation and Fox Hills Sandstone (Ogden Tweto, 1979). The USRCS classifies the site soils as Weld loam on 1 to 3 percent slopes, Nunn loam on 1-3% slopes, Ulm clay loam on 0 to 3 and 3 to 5 percent slopes, Wiley-Colby complex on 3 to 5 percent slopes, and Renohill clay loam on 3 to 9 percent slopes. Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Maps indicate that the site is not located within the 100-year flood plain.

Records maintained by the Colorado Division of Water Resources records identified a piezometer well constructed by the Town of Erie and three groundwater monitoring wells constructed by Kerr McGee Oil & Gas Onshore LP are located on the property. Lithologic logs for the wells (attached) identified clay from the surface to between 7 and 15 feet below grade. Weathered claytone to silty sandstone was described between 7 to 22 feet below grade, where clay and claystone were penetrated to the depths of the wells. Static groundwater was measured between 10 and 21 feet.



View to south

3.0 RECORDS REVIEW

The purpose of the records review is to obtain and review information that will help identify the potential for recognized environmental conditions in connection with the property. Availability of records varies from information source to information source, including governmental jurisdictions. Western Environment did not identify, obtain or review every possible record that might exist with respect to the property. Instead, record information from reasonably ascertainable standard sources was reviewed. The approximate minimum search distance utilized in the review, the resources utilized, and the number of sites found are listed below:

Lists Reviewed	ASTM Standard Minimum Search Distance	Number of Site Within Search Distance
Federal and Colorado NPL List	1.0 mile	0
Federal Delisted NPL site List	1.0 mile	0
Federal and State CERCLIS List	0.5 Mile	0
Federal RCRA TSD Facilities List	1.0	0
Federal RCRA Generators List	Property and Adjoining Property	0
Federal RCRA Corrective Action List	1.0	0
Federal and State Institutional Control/Engineering Control Registry	Property and Adjoining Property	0
Federal ERNS List	Property and Adjoining Property	0
State Landfill and/or Solid Waste Disposal Site List	0.5	0
State Leaking UST List	0.5	0
State Registered UST List	Property and Adjoining Property	0
State Brownfield / Voluntary Cleanup List	0.5	0

Definitions:

NPL:	*National Priority List (Superfund)*
CERCLIS:	*Comprehensive Environmental Response, Compensation and Liability Information System*
RCRA:	*Resource Conservation and Recovery Act*
TSD:	*Hazardous Waste Transport, Storage, and Disposal*
UST:	*Underground Storage Tank*
ERNS:	*Emergency Response Notification System*

3.1 Results

No results were identified within the ASTM search radius. A complete listing of all environmental records is attached in the Appendix A.

3.2 Colorado Oil and Gas Conservation Commission (COGCC)

Western Environment reviewed records maintained by the Colorado Oil and Gas Conservation Commission (COGCC) for petroleum wells permitted on the subject property.

Facility ID	Facility Name	Operator	Status	Releases or Violations
05-123-12626	State of Colorado AL #2	Kerr-McGee Oil & Gas Onshore LP	PA 1/26/2018	None
05-123-15592	State of Colorado AZ #1	Kerr-McGee Oil & Gas Onshore LP	PA 8/30/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-15597	State of Colorado AY #1	Kerr-McGee Oil & Gas Onshore LP	AL 6/13/1992	None
05-123-16105	State #16-9V	Kerr-McGee Oil & Gas Onshore LP	PA 8/28/2015	None
05-123-24339	State #4-16	Kerr-McGee Oil & Gas Onshore LP	AL 7/24/2008	None
05-123-24338	State #6-16	Kerr-McGee Oil & Gas Onshore LP	AL 7/24/2008	None
05-123-24397	State #11-16	Kerr-McGee Oil & Gas Onshore LP	PA 12/17/2018	None
05-123-24396	State #3-16	Kerr-McGee Oil & Gas Onshore LP	AL 7/24/2008	None
05-123-24481	State #5-16	Kerr-McGee Oil & Gas Onshore LP	PA 8/30/2008	Corrective Action - stained soil at crude oil tank, produced water tank, and pcc load pot (<5bbls) - closed 9/29/2014
05-123-24511	State #14-16	Kerr-McGee Oil & Gas Onshore LP	AL 7/15/2008	None
05-123-29021	State #14-16	Kerr-McGee Oil & Gas Onshore LP	PA 2/13/2018	None
05-123-29022	State #13-16	Kerr-McGee Oil & Gas Onshore LP	PA 3/7/2018	None
05-123-29023	State #12-16	Kerr-McGee Oil & Gas Onshore LP	PA 2/13/2018	None
05-123-29024	State #25-16	Kerr-McGee Oil & Gas Onshore LP	PA 12/14/2018	None
05-123-29025	State #22-16	Kerr-McGee Oil & Gas Onshore LP	PA 12/14/2018	None
05-123-29026	State #33-16	Kerr-McGee Oil & Gas Onshore LP	PA 2/14/2018	None

05-123-29027	State #35-16	Kerr-McGee Oil & Gas Onshore LP	PA 2/13/2018	None
05-123-29112	State #35-9	Kerr-McGee Oil & Gas Onshore LP	PA 11/13/2019	Corrective Action - Weed Control - closed 10/27/2015
05-123-29113	State #21-16	Kerr-McGee Oil & Gas Onshore LP	PA 2/15/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-29114	State #6-16	Kerr-McGee Oil & Gas Onshore LP	PA 8/31/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-29115	State #30-16	Kerr-McGee Oil & Gas Onshore LP	PA 8/17/2021	Corrective Action - Weed Control - closed 10/27/2015 **Release - Active**
05-123-29116	State #32-16	Kerr-McGee Oil & Gas Onshore LP	PA 8/30/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-29117	State #3-16	Kerr-McGee Oil & Gas Onshore LP	PA 8/31/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-29118	State #4-16	Kerr-McGee Oil & Gas Onshore LP	PA 6/19/2018	Corrective Action - Weed Control - closed 10/27/2015
05-123-29119	State #28-16	Kerr-McGee Oil & Gas Onshore LP	PA 11/13/2019	Corrective Action - Weed Control - closed 10/27/2015
05-123-30936	State #7-16	Kerr-McGee Oil & Gas Onshore LP	PA 7/13/2019	Corrective Action - No Secondary Containment around workover/blowdown tanks - closed 8/20/2014
05-123-30937	State #8-16	Kerr-McGee Oil & Gas Onshore LP	SI 8/1/2020	Corrective Action - Casing appeared to be leaking around pipe - securely fasten - closed 12/10/2019
05-123-30942	State #2-16	Kerr-McGee Oil & Gas Onshore LP	SI 12/1/2020	Corrective Action - Casing appeared to be leaking around pipe - securely fasten - closed 12/10/2019

05-123-30943	State #1-16	Kerr-McGee Oil & Gas Onshore LP	PA 11/29/2017	Corrective Action - No Secondary Containment around workover/blowdown tanks - closed 8/20/2014
05-123-30946	State #26-16	Kerr-McGee Oil & Gas Onshore LP	PA 11/20/2020	Corrective Action - Casing appeared to be leaking around pipe - securely fasten - closed 12/10/2019

PA (plugged and abandoned) SI (shut in) AL (abandoned location permit)

The State #30-16 facility, located in the center of the Northwest 1/4 of Section 16 (Figure 2), reported a release of thermogenic methane in soil vapor on May 26th, 2021 during site closure activities. Assessment activities have included the installation of several soil vapor probes and three soil vapor monitoring wells. Currently, the source of the contamination is under investigation, and future remediation will be performed based on additional assessment. This release represents a **Recognized Environmental Condition** (REC).

3.3 Government Inquiries

On November 10th, 2022, Western Environment submitted an Environmental Issues Inquiry to the Weld County Department of Public Health and Environment and the Mountain View Fire Rescue District. On November 16th, 2022, Ms. LuAnn Penfold, the Fire Prevention Specialist for Mountain View Fire Rescue, responded stating that no records of hazardous material responses were found for the project site. However, she did indicate a response to a natural gas "leak" within the middle school adjacent to the southwest at 3280 WCR 5, on December 4th, 2019. No response has been received from Weld County Department of Public Health and Environment.

3.4 Aerial Photography Review

Western Environment reviewed aerial photography to document past uses of the subject property. The available first photo dated June 22nd, 1947, showed the subject site and surrounding properties were in agricultural use. An active coal mine was observed on the site. Community Ditch and a railroad bisected the property.

No significant changes were observed until the photos from October 15th, 1975, in which the coal mine and rail road appeared to be abandoned. The image dated September 5th, 1985 showed single family residences constructed to the northeast.

Google Earth historic photos were reviewed for years following 1985. The image dated June 29th, 1992 showed several petroleum production facilities present on the subject property. Additionally, the NOAA tower and adjacent equipment buildings were observed on the site. In the August 5th, 2004 image, Erie High School was constructed adjacent to the southwest. No changes were observed until the image dated June 9th, 2017, which showed the middle school under construction adjacent to the southwest. Additionally, residential development was seen to the west, across WCR 5. The NOAA tower and several petroleum production facilities had been removed in the May 31st, 2018 image. Additional residential development was observed to the west and southwest in the most recent image, dated April 21st, 2022. A list of the photos reviewed is presented in Appendix B.

3.5 Historic Topographic Maps

Western Environment reviewed historical topographic maps to document past uses of the subject property. The first available map, dated 1950 showed the Clayton Mine (inactive) and Community Ditch on the subject property. The Mountain View Drag Strip occupied the property to the southwest in the 1967 maps. No significant changes were observed in the 1979 map.

3.6 Previous Assessment

Western Environment reviewed the provided previous Phase I Environmental Site Assessment, Performed by Terracon Consultants, Inc., dated July 1st, 2008. This report (attached) identified a leaking pad mounted transformer located adjacent to the NOAA tower and petroleum production as REC's. No evidence of the transformer or stained soil were observed during this assessment.



NOAA site

4.0 SITE INSPECTIONS / INTERVIEWS

The purpose of an environmental inspection is to obtain information indicating the likelihood of identifying recognized environmental conditions (REC's) in connection with the property. Western Environment and Ecology personnel inspected the property to the extent not obstructed by bodies of water, obstacles or debris. During a visit to the site on November 1st, 2022, Western Environment staff evaluated the project specifically for evidence of the site features listed in the following table. Those features which were observed on the site are also discussed in further detail below.

	Storage Tanks		Placed Fill or Imported Soils
	Vent Piping/Air Emissions Sources	**X**	**Stockpiles of Soil or Debris**
	Unidentified Piping	**X**	**Ditches,** Surface Water, Streams, Pits, Ponds, Lagoons
	Drains, Sumps		Waste Water and/or Storm Water Discharge
	Stained Soil and/or Pavement		Waste Treatment Processes
	Stressed Vegetation		Sand Traps, Septic Systems or Leach Fields
	Solid Waste or Disposal Areas		Wells (Agricultural, Water Supply, Monitoring)
	Hazardous Material Storage	**X**	**Wells (Petroleum Production Facilities)**
	Petroleum Products Storage	**X**	**Petroleum Pipelines**
	Drums	**X**	**High Power Transmission Lines**
	Unidentified Substance Containers		Transformers (Potential PCB)
	Vehicle Maintenance Areas		Odors

At the time of the inspection, the subject property was vacant agricultural land. Recently tilled soil, in preparation for spring planting, was present in the southern half of the site. The **Community Ditch** bisected the property along the western border. Several large cottonwood trees are clustered on the western portion of the property adjacent to the ditch. A red tailed hawk was observed roosting in the trees.



Cottonwood grove with Middle School to west

An active **petroleum production** facility (State #5-16, 21-16, 28-16, 30-16 32-16 and AZ-1) surrounded by a temporary construction barrier, was present in the northwestern portion of the site. At the time of the inspection a "work over" rig was operating within the barrier. Concrete foundations and **debris** from the abandoned Clayton Mine was present in just east of the Community Ditch (Figure 2). Debris included broken concrete, metal, bricks and wire. This area had been left uncultivated due to the amount of trash and **mine waste consisting of coal and clinker (oxidized coal)**. What appeared to be a mine runoff holding pond was observed to the north of the abandoned coal load out rail spur.



Clayton Mine debris

Western Environment inspected the location of the support and equipment building associated with the NOAA tower site. No structures were observed with only crushed rock road base and small (less than 2-3 inches) plastic and ceramic debris, likely electric insulators used to protect the tower from lighting strikes.



Aerial view of NOAA site

Directly south of the Clayton Mine site, a large circular depression was observed in aerial views. Upon inspection, this depression was filled with **debris** including automotive parts, tires, bed springs and wood scrap. This material was likely the reason that no cultivation was possible, resulting the circular shape of the feature. Western Environment reviewed the original mine maps of the Clayton Mine to determine if this feature might be mine related. No correlation to any mine structures, shafts or de-watering wells, were made. This feature may be a low area that due to surface runoff or moisture from the adjacent irrigation ditch, could not be farmed.



Circular depression aerial view to the south

The site was bounded to the north by WCR 10, the south by Erie Parkway, the east by WCR 7 and the west by WCR 5. Review of the ALTA survey provided by Southern Land confirmed that several **petroleum and natural gas pipelines** are located along the adjacent highway right-of-ways. to the Erie High School was present to the southwest. A Public Service of Colorado 230 kv high tension **electric transmission power** lines run along the northern property border.

5.0 CONCLUSIONS

Western Environment and Ecology, Inc. performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-21 for approximately 393.16 acres within Section 16, Township 1 North, Range 68 West, Erie, Colorado. Any exceptions to, or deletions from, this practice are described in Section 5.1 of this report. This assessment has revealed **the following recognized environmental condition in connection with the subject property:**

- **The State #30-16 petroleum production facility has an active releases of thermogenic methane within soil vapor. Assessment of the source of the contamination is ongoing. This active release represents a REC.** According to Title 34, Article 60 (As Amended) of the Oil and Gas Conservation Act, Section 34-06-102, the State of Colorado gives the Oil and Gas Commission legislative declaration over the development, production, and utilization of the natural resources in the state of Colorado. Moreover, this legislation gives the Commission the authority to force the operator to perform remediation activities deemed necessary in compliance with all Federal and State health regulations. **Therefore, it is the opinion of Western Environment that no additional assessment, outside of the on-going remedial actions of the operator, are required.**

5.1 Deviations from Standard Practices

A response has yet to be received from the Weld County Health Department. Should a response be received that significantly changes our conclusions, an addendum to the report will be issued. It is the opinion of Western Environment that this lack of information does not constitute a Data Failure as defined by ASTM E-1527-21, Section 8.3.2.3. No other significant "Data Gaps" as defined in ASTM E-1527-21, Section 12.7 were identified.

5.2 Recommendations

It has been our experience that undetected releases from petroleum production sites, flowlines and crude oil/produced water storage facilities are common. The potential future remediation of these "orphan" events and enforcement actions remains the obligation of the Oil and Gas Operator. However, we recommend developers be aware of these potential conditions

and have procedures in place to limit construction downtime and assure remediation to unrestricted (residential) use standards.

The debris and mine waste adjacent to the Clayton Mine is not considered "hazardous waste" based upon Western Environments past experience. However, due to the coal waste not being geo-technically acceptable for construction, it should be removed. Additionally, the concrete, metal and other debris will need to be removed and properly disposed prior to development.

APPENDICES

APPENDIX A

REFERENCE LISTS

Section 16

prepared for: Erie Land
Ref: 778-005-01

2022-11-09

Environmental Radius Report

NETRONLINE

2055 E. Rio Salado Pkwy
Tempe, AZ 85381
480-967-6752

Summary

Federal

	< 1/4	1/4 - 1/2	1/2 - 1
Lists of Federal NPL (Superfund) sites	0	0	0
Lists of Federal Delisted NPL sites	0	0	-
Lists of Federal sites subject to CERCLA removals and CERCLA orders	0	0	-
Lists of Federal CERCLA sites with NFRAP	0	0	-
Lists of Federal RCRA facilities undergoing Corrective Action	0	0	-
Lists of Federal RCRA TSD facilities	0	0	-
Lists of Federal RCRA generators	0	-	-
Federal institutional control/engineering control registries	0	-	-
Federal ERNS list	0	-	-

State

	< 1/4	1/4 - 1/2	1/2 - 1
Lists of state and tribal Superfund equivalent sites	0	0	0
Lists of state and tribal hazardous waste facilities	0	2	-
Lists of state and tribal landfills and solid waste disposal facilities	0	0	-
Lists of state and tribal leaking storage tanks	0	0	-
Lists of state and tribal registered storage tanks	0	-	-
State and tribal institutional control/engineering control registries	0	-	-
Lists of state and tribal voluntary cleanup sites	0	0	-
Lists of state and tribal brownfields sites	0	0	-

Other

	< 1/4	1/4 - 1/2	1/2 - 1

Lists of Federal NPL (Superfund) sites

The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation. The NPL is updated periodically, as mandated by CERCLA.

There were no Federal NPL sites found within a one-mile radius of the target property.

Lists of Federal Delisted NPL sites

The EPA may delete a final NPL site if it determines that no further response is required to protect human health or the environment. Under Section 300.425(e) of the NCP (55 FR 8845, March 8, 1990), a site may be deleted when no further response is appropriate if EPA determines that one of the following criteria has been met: 1) EPA, in conjunction with the state, has determined that responsible parties have implemented all appropriate response action required, 2) EPA, in consultation with the state, has determined that all appropriate Superfund-financed responses under CERCLA have been implemented and that no further response by responsible parties is appropriate, 3) A remedial investigation/feasibility study (RI/FS) has shown that the release poses no significant threat to public health or the environment and, therefore, remedial measures are not appropriate.

There were no Federal Delisted NPL sites found within a half-mile radius of the target property.

Lists of Federal sites subject to CERCLA removals and CERCLA orders

CERCLA identifies the classes of parties liable under CERCLA for the cost of responding to releases of hazardous substances. In addition, CERCLA contains provisions specifying when Federal installations must report releases of hazardous substances and the cleanup procedures they must follow. Executive Order No. 12580, Superfund Implementation, delegates response authorities to EPA and the Coast Guard. Generally, the head of the Federal agency has the delegated authority to address releases at the Federal facilities in its jurisdiction.

There were no Federal sites subject to CERCLA removals and/or orders found within a half-mile radius of the target property.

Lists of Federal CERCLA sites with NFRAP

No Further Remedial Action Planned (NFRAP) is a decision made as part of the Superfund remedial site evaluation process to denote that further remedial assessment activities are not required and that the facility/site does not pose a threat to public health or the environment sufficient to qualify for placement on the National Priorities List (NPL) based on currently available information. These facilities/sites may be re-evaluated if EPA receives new information or learns that site conditions have changed. A NFRAP decision does not mean the facility/site is free of contamination and does not preclude the facility/site from being addressed under another federal, state or tribal cleanup program.

There were no Federal CERCLA sites with No Further Remedial Action Planned (NFRAP) decisions found within a half-mile radius of the target property.

Lists of Federal RCRA facilities undergoing Corrective Action

Corrective action is a requirement under the Resource Conservation and Recovery Act (RCRA) that facilities that treat, store or dispose of hazardous wastes investigate and cleanup hazardous releases into soil, ground water, surface water and air. Corrective action is principally implemented through RCRA permits and orders. RCRA permits issued to TSDFs must include provisions for corrective action as well as financial assurance to cover the costs of implementing those cleanup measures. In addition to the EPA, 44 states and territories are authorized to run the Corrective Action program.

There were no Federal RCRA facilities undergoing corrective action(s) found within a half-mile radius of the target property.

Lists of Federal RCRA TSD facilities

The final link in RCRA's cradle-to-grave concept is the treatment, storage, and disposal facility (TSDF) that follows the generator and transporter in the chain of waste management activities. The regulations pertaining to TSDFs are more stringent than those that apply to generators or transporters. They include general facility standards as well as unit-specific design and operating criteria.

There were no Federal RCRA treatment, storage and disposal facilities (TSDFs) found within a half-mile radius of target property.

Lists of Federal RCRA generators

A generator is any person who produces a hazardous waste as listed or characterized in part 261 of title 40 of the Code of Federal Regulations (CFR). Recognizing that generators also produce waste in different quantities, EPA established three categories of generators in the regulations: very small quantity generators, small quantity generators, and large quantity generators. EPA regulates hazardous waste under the Resource Conservation and Recovery Act (RCRA) to ensure that these wastes are managed in ways that protet human health and the environment. Generators of hazardous waste are regulated based on the amount of hazardous waste they generate in a calendar month, not the size of their business or facility.

There were no Federal RCRA generators found at the target property and/or adjoining properties.

Federal institutional control/engineering control registries

Institutional Controls (IC) are defined as non-engineered and/or legal controls that minimize the potential human exposure to contamination by limiting land or resource use. Whereas, Engineering Controls (EC) consist of engineering measures (e.g, caps, treatment systems, etc.) designed to minimize the potential for human exposure to contamination by either limiting direct contact with contaminated areas or controlling migration of contaminants through environmental media.

There were no Federal institutional or engineering controls found at the target property.

Federal ERNS list

The Emergency Response Notification System (ERNS) is a database used to store information on notification of oil discharges and hazardous substances releases. The ERNS program is a cooperative data sharing effort encompassing the National Response Center (NRC), operated by the US Coast Guard, EPA HQ and EPA regional offices. ERNS data is used to analyze release notifications, track EPA responses and compliance to environmental laws, support emergency planning efforts, and assist decision-makers in developing spill prevention programs.

There were no Federally recorded releases of oil and/or hazardous substances at the target property.

Lists of state and tribal Superfund equivalent sites

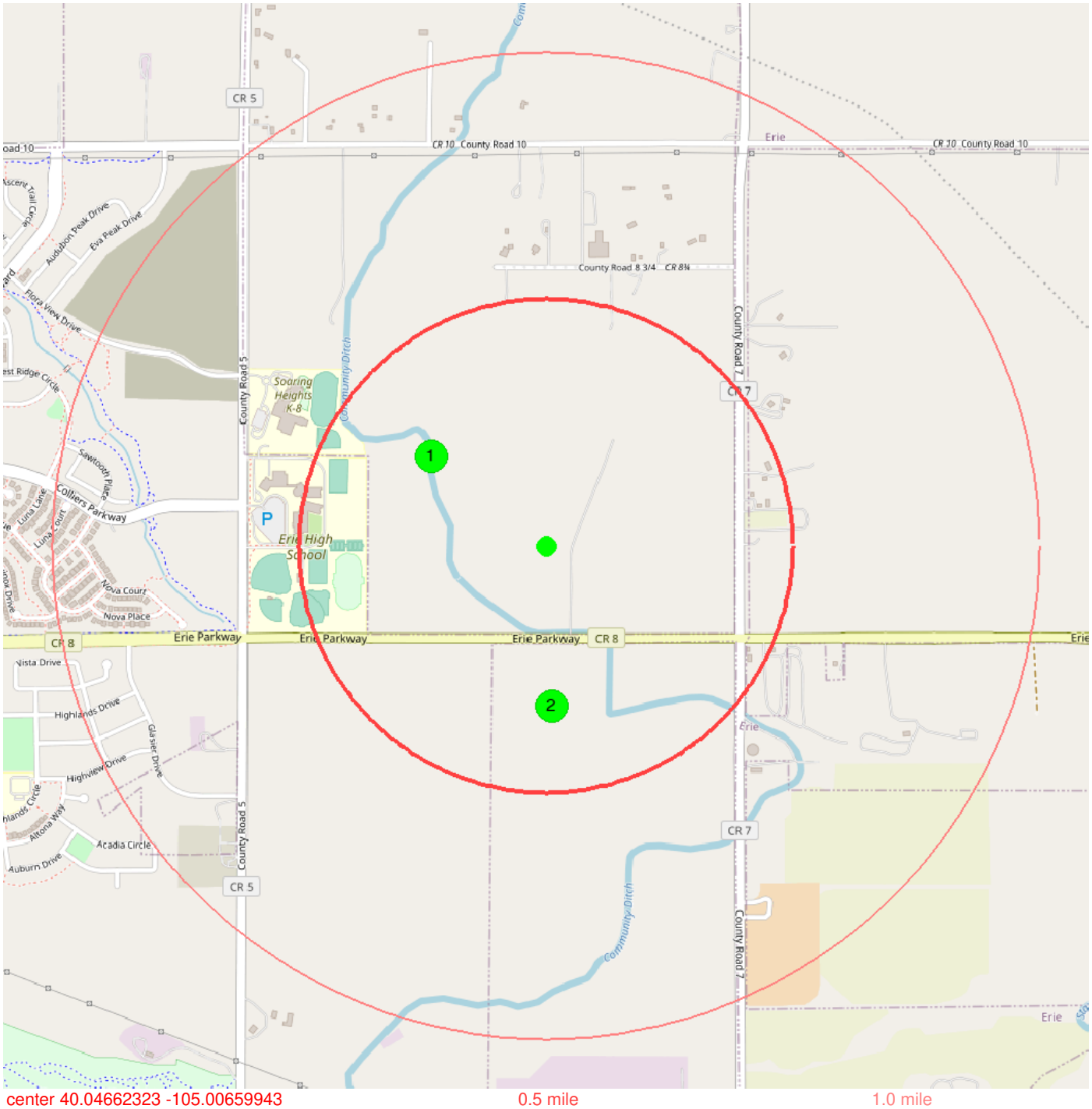
In order to maintain close coordination with the states and tribes in the NPL listing decision process, the EPA's policy is to determine the position of states and tribes on sites that EPA is considering for listing. Consistent with this policy, since 1996, it has been the EPA's general practice to seek the state or tribe's position on sites under consideration for NPL listing by submitting a written requiest to the governor/state environmental agency or tribe. Various states may have their own program for identifying, investigating and cleaning up sites where consequential amounts of hazardous waste may have been disposed that work in conjunction with the EPA's Superfund remedial program.

There were no State and/or tribal Superfund equivalent sites found within a one-mile radius of target property.

Lists of state and tribal hazardous waste facilities

CDPHE - RCRA REGULATED SITES

The Resource Conservation and Recovery Act (RCRA) gives the Colorado Department of Public Health and Environment (CDPHE) the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage and disposal of hazardous waste. To achieve this, EPA develops regulations, guidance and policies that ensure the safe management and cleanup of solid and hazardous waste, and programs that encourage source reduction and beneficial reuse.



center 40.04662323 -105.00659943 0.5 mile 1.0 mile

1

Registry ID	**110041630410**
Primary Name	**KERR-MCGEE 35016776 - STATE OF COLO A.**
Address	**NESW-16-1N-68W**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**AIR, AIRS/AFS, EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.2957
data source	last updated 2021-11-08 from CDPHE-RCRA

2

Registry ID	**110027220530**
Primary Name	**KERR-MCGEE - 36156476**
Address	**NWNE SEC 21 T1N R68W**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**AIR, AIRS/AFS, EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.3239
data source	last updated 2021-11-08 from CDPHE-RCRA

Lists of state and tribal landfills and solid waste disposal facilities

Title 40 of the CFR parts 239 through 259 contain the regulations for non-hazardous solid waste programs set up by the states. EPA has requirements for state solid waste permit programs, guidelines for the processing of solid waste, guidelines for storage and collection of commercial, residential and institutional solid waste, and the criteria for municipal solid waste landfills. State solid waste programs may be more stringent than the federal code requires.

There were no State and/or tribal landfills or solid waste disposal facilities found within a half-mile radius of the target property.

Lists of state and tribal leaking storage tanks

A typical leaking underground storage tank (LUST) scenario involves the release of a fuel product from an underground storage tank (UST) that can contaminate surrounding soil, groundwater, or surface waters, or affect indoor air spaces. Once a leak is confirmed, immediate response actions must be taken to minimize or eliminate the source of the release and to reduce potential harm to human health, safety, and the environment. Each state has unique requirements for initiating responses to a release, and it is up to the UST owner or operator to conduct actions in compliance with his/her local rules.

There were no State and/or tribal leaking storage tanks found within a half-mile radius of the target property.

Lists of state and tribal registered storage tanks

EPA initially issued UST regulations in 1988. In 2015, EPA modified the UST regulation, which was effective October 13, 2015 in Indian Country and states without State Program Approval. EPA recognizes that, because of the size and diversity of the regulated community, state and local governments are in the best position to oversee USTs: 1) State and local authorities are closer to the situation in their domain and are in the best position to set priorities, 2) Subtitle I of the Solid Waste Disposal Act allows state UST programs approved by EPA to operate in lieu of the federal program, 3) the state program approval (SPA) regulations set criteria for states to obtain the authority to operate in lieu of the federal program. State programs must be at least as stringent as EPA's. A complete version of the law that governs USTs can be found in U.S. Code, Title 42, Chapter 82, Subchapter IX.

There were no State and/or tribal registered storage tanks found at subject and adjoining properties.

State and tribal institutional control/engineering control registries

Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Engineering controls consist of engineering measures (e.g, caps, treatment systems, etc.) designed to minimize the potential for human exposure to contamination by either limiting direct contact with contaminated areas or controlling migration of contaminants through environmental media. It is EPA's expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable.

There were no State and/or tribal institutional and/or engineering controls found filed against the target property.

Lists of state and tribal voluntary cleanup sites

State cleanup programs play a significant role in assessing and cleaning up contaminated sites. State cleanup programs typically are programs authorized by state statutes to address brownfields and other lower-risk sites that are not of federal interest. The EPA has historically supported the use of state cleanup programs and continues to provide grant funding to establish and enhance the programs. This approach was codified in 2002 as Section 182 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

There were no State and/or tribal voluntary cleanup sites found within a half-mile radius of the target property.

Lists of state and tribal brownfields sites

Since its inception in 1995, EPA's Brownfields and Land Revitalization Program has grown into a proven, results-oriented program that has changed the way communities address and manage contaminated property. The program is designed to empower states, tribes, communities, and other stakeholders to work together to prevent, assess, safely clean up, and sustainably reuse brownfields. Beginning in the mid-1990s, EPA provided small amounts of seed money to local governments that launched hundreds of two-year Brownfields pilot projects and developed guidance and tools to help states, communities and other stakeholders in the cleanup and redevelopment of brownfields sites.

There were no State and/or tribal brownfields sites found within a half-mile radius of the target property.

This report contains certain information obtained from a variety of public and other sources reasonably available to Nationwide Environmental Title Research, LLC (NETR). It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC, BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC, IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT**. Purchaser accepts this report "AS-IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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Section 16

prepared for: Erie Land
Ref: 778-005-01

2022-11-09

Environmental Radius Report

NETRONLINE

2055 E. Rio Salado Pkwy
Tempe, AZ 85381
480-967-6752

Summary

Federal

	< 1/4	1/4 - 1/2	1/2 - 1
Lists of Federal NPL (Superfund) sites	0	0	0
Lists of Federal Delisted NPL sites	0	0	-
Lists of Federal sites subject to CERCLA removals and CERCLA orders	0	0	-
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Lists of Federal RCRA facilities undergoing Corrective Action	0	0	-
Lists of Federal RCRA TSD facilities	0	0	-
Lists of Federal RCRA generators	0	-	-
Federal institutional control/engineering control registries	0	-	-
Federal ERNS list	0	-	-

State

	< 1/4	1/4 - 1/2	1/2 - 1
Lists of state and tribal Superfund equivalent sites	0	0	0
Lists of state and tribal hazardous waste facilities	1	5	-
Lists of state and tribal landfills and solid waste disposal facilities	0	0	-
Lists of state and tribal leaking storage tanks	0	0	-
Lists of state and tribal registered storage tanks	0	-	-
State and tribal institutional control/engineering control registries	0	-	-
Lists of state and tribal voluntary cleanup sites	0	0	-
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The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation. The NPL is updated periodically, as mandated by CERCLA.

There were no Federal NPL sites found within a one-mile radius of the target property.

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Corrective action is a requirement under the Resource Conservation and Recovery Act (RCRA) that facilities that treat, store or dispose of hazardous wastes investigate and cleanup hazardous releases into soil, ground water, surface water and air. Corrective action is principally implemented through RCRA permits and orders. RCRA permits issued to TSDFs must include provisions for corrective action as well as financial assurance to cover the costs of implementing those cleanup measures. In addition to the EPA, 44 states and territories are authorized to run the Corrective Action program.

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The final link in RCRA's cradle-to-grave concept is the treatment, storage, and disposal facility (TSDF) that follows the generator and transporter in the chain of waste management activities. The regulations pertaining to TSDFs are more stringent than those that apply to generators or transporters. They include general facility standards as well as unit-specific design and operating criteria.

There were no Federal RCRA treatment, storage and disposal facilities (TSDFs) found within a half-mile radius of target property.

Lists of Federal RCRA generators

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There were no Federal RCRA generators found at the target property and/or adjoining properties.

Federal institutional control/engineering control registries

Institutional Controls (IC) are defined as non-engineered and/or legal controls that minimize the potential human exposure to contamination by limiting land or resource use. Whereas, Engineering Controls (EC) consist of engineering measures (e.g, caps, treatment systems, etc.) designed to minimize the potential for human exposure to contamination by either limiting direct contact with contaminated areas or controlling migration of contaminants through environmental media.

There were no Federal institutional or engineering controls found at the target property.

Federal ERNS list

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There were no Federally recorded releases of oil and/or hazardous substances at the target property.

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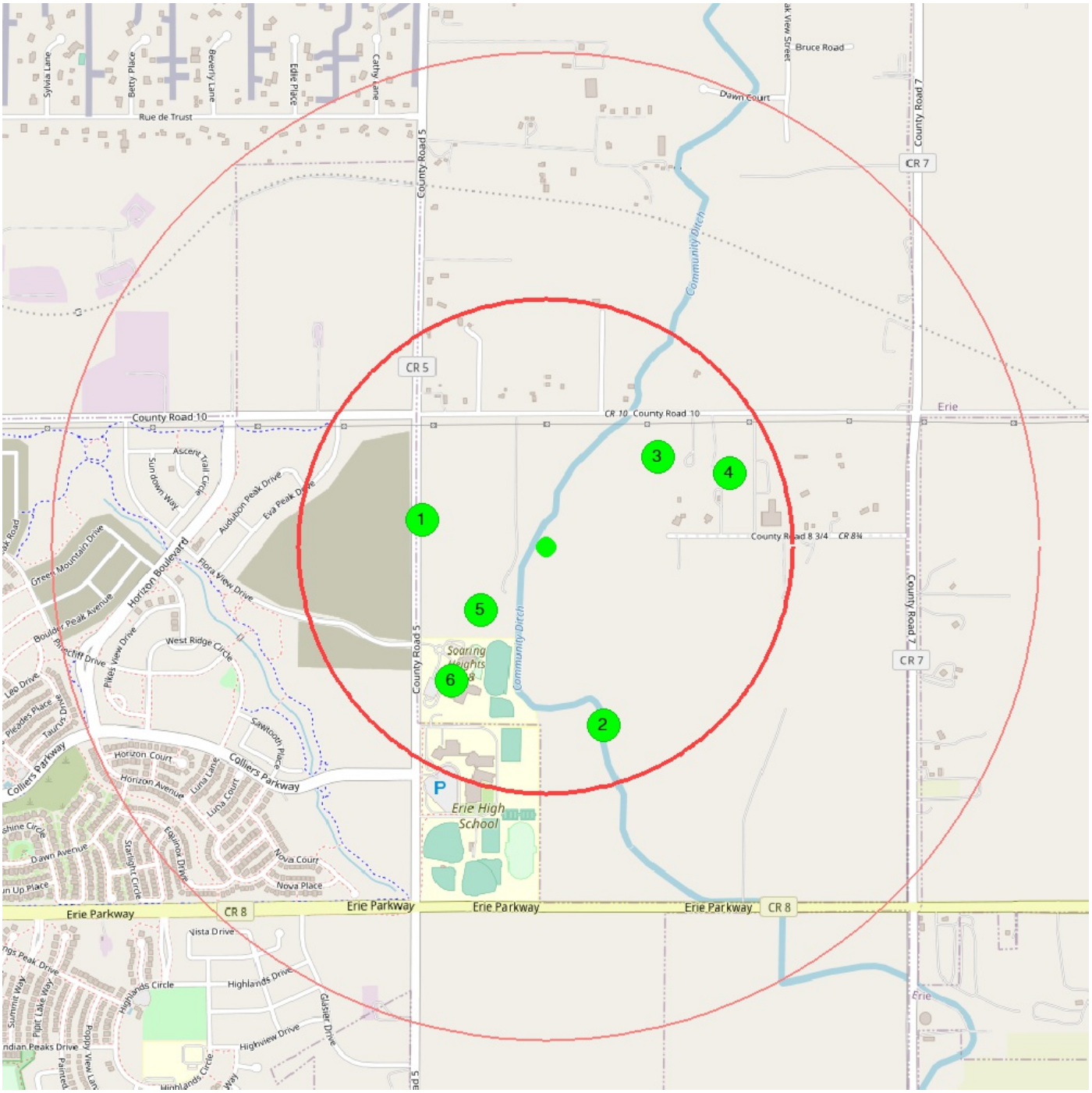
There were no State and/or tribal Superfund equivalent sites found within a one-mile radius of target property.

Lists of state and tribal hazardous waste facilities

CDPHE - RCRA REGULATED SITES

The Resource Conservation and Recovery Act (RCRA) gives the Colorado Department of Public Health and Environment (CDPHE) the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage and disposal of hazardous waste. To achieve this, EPA develops regulations, guidance and policies that ensure the safe management and cleanup of solid and hazardous waste, and programs that encourage source reduction and beneficial reuse.



center 40.05448914 -105.01324463 0.5 mile 1.0 mile

1

Registry ID	**110063016052**
Primary Name	**ERIE HUB PIPELINE**
Address	**I 25 AND LEON A WURL PKWY**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**NPDES**
FRS Link	**Site Detail**
distance from center (miles)	0.2560
data source	last updated 2021-11-08 from CDPHE-RCRA

2

Registry ID	**110041630410**
Primary Name	**KERR-MCGEE 35016776 - STATE OF COLO A.**
Address	**NESW-16-1N-68W**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**AIR, AIRS/AFS, EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.3801
data source	last updated 2021-11-08 from CDPHE-RCRA

3

Registry ID	**110054270837**
Primary Name	**KERR-MCGEE 35027179**
Address	**NENW-16-1N-68W**
City	**ERIE AREA**
Site Type	**STATIONARY**
Program System	**EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.2903
data source	last updated 2021-11-08 from CDPHE-RCRA

4

Registry ID	**110030743453**
Primary Name	**KERR-MCGEE 61778**
Address	**NWNE-16-1N-68W**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**AIR, AIRS/AFS, EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.4010
data source	last updated 2021-11-08 from CDPHE-RCRA

5

Registry ID	**110023147977**
Primary Name	**KERR-MCGEE 62475**
Address	**SWNW-16-1N-68W**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**AIR, AIRS/AFS, EIS**
FRS Link	**Site Detail**
distance from center (miles)	0.1827
data source	last updated 2021-11-08 from CDPHE-RCRA

6

Registry ID	**110069999498**
Primary Name	**SVVSD ERIE PK 8**
Address	**23298 CR 5**
City	**ERIE**
Site Type	**STATIONARY**
Program System	**NPDES**
FRS Link	**Site Detail**
distance from center (miles)	0.3317
data source	last updated 2021-11-08 from CDPHE-RCRA

Lists of state and tribal landfills and solid waste disposal facilities

Title 40 of the CFR parts 239 through 259 contain the regulations for non-hazardous solid waste programs set up by the states. EPA has requirements for state solid waste permit programs, guidelines for the processing of solid waste, guidelines for storage and collection of commercial, residential and institutional solid waste, and the criteria for municipal solid waste landfills. State solid waste programs may be more stringent than the federal code requires.

There were no State and/or tribal landfills or solid waste disposal facilities found within a half-mile radius of the target property.

Lists of state and tribal leaking storage tanks

A typical leaking underground storage tank (LUST) scenario involves the release of a fuel product from an underground storage tank (UST) that can contaminate surrounding soil, groundwater, or surface waters, or affect indoor air spaces. Once a leak is confirmed, immediate response actions must be taken to minimize or eliminate the source of the release and to reduce potential harm to human health, safety, and the environment. Each state has unique requirements for initiating responses to a release, and it is up to the UST owner or operator to conduct actions in compliance with his/her local rules.

There were no State and/or tribal leaking storage tanks found within a half-mile radius of the target property.

Lists of state and tribal registered storage tanks

EPA initially issued UST regulations in 1988. In 2015, EPA modified the UST regulation, which was effective October 13, 2015 in Indian Country and states without State Program Approval. EPA recognizes that, because of the size and diversity of the regulated community, state and local governments are in the best position to oversee USTs: 1) State and local authorities are closer to the situation in their domain and are in the best position to set priorities, 2) Subtitle I of the Solid Waste Disposal Act allows state UST programs approved by EPA to operate in lieu of the federal program, 3) the state program approval (SPA) regulations set criteria for states to obtain the authority to operate in lieu of the federal program. State programs must be at least as stringent as EPA's. A complete version of the law that governs USTs can be found in U.S. Code, Title 42, Chapter 82, Subchapter IX.

There were no State and/or tribal registered storage tanks found at subject and adjoining properties.

State and tribal institutional control/engineering control registries

Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Engineering controls consist of engineering measures (e.g, caps, treatment systems, etc.) designed to minimize the potential for human exposure to contamination by either limiting direct contact with contaminated areas or controlling migration of contaminants through environmental media. It is EPA's expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable.

There were no State and/or tribal institutional and/or engineering controls found filed against the target property.

Lists of state and tribal voluntary cleanup sites

State cleanup programs play a significant role in assessing and cleaning up contaminated sites. State cleanup programs typically are programs authorized by state statutes to address brownfields and other lower-risk sites that are not of federal interest. The EPA has historically supported the use of state cleanup programs and continues to provide grant funding to establish and enhance the programs. This approach was codified in 2002 as Section 182 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

There were no State and/or tribal voluntary cleanup sites found within a half-mile radius of the target property.

Lists of state and tribal brownfields sites

Since its inception in 1995, EPA's Brownfields and Land Revitalization Program has grown into a proven, results-oriented program that has changed the way communities address and manage contaminated property. The program is designed to empower states, tribes, communities, and other stakeholders to work together to prevent, assess, safely clean up, and sustainably reuse brownfields. Beginning in the mid-1990s, EPA provided small amounts of seed money to local governments that launched hundreds of two-year Brownfields pilot projects and developed guidance and tools to help states, communities and other stakeholders in the cleanup and redevelopment of brownfields sites.

There were no State and/or tribal brownfields sites found within a half-mile radius of the target property.

This report contains certain information obtained from a variety of public and other sources reasonably available to Nationwide Environmental Title Research, LLC (NETR). It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC, BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF NATIONWIDE ENVIRONMENTAL TITLE RESEARCH, LLC, IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT**. Purchaser accepts this report "AS-IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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APPENDIX B

AIR PHOTO DOCUMENTATION

APPENDIX C

ENVIRONMENTAL ISSUES INQUIRIES/SUPPORTING DOCUMENTS

Greg Sherman

From:	LaFontaine - DNR, Matthew <matthew.lafontaine@state.co.us>
Sent:	Tuesday, November 15, 2022 1:29 PM
To:	Gracy Weil
Cc:	Heidi Majerik; Greg Sherman
Subject:	Re: Environmental Questionnaire
Attachments:	Phase I ESA Erie Property.pdf; 19-008 Owner Questionnaire.pdf

Hello All,

Please find attached the requested questionnaire and a 2008 phase 1 previously completed.

Matt

Matthew LaFontaine
Acquisition and Disposition Manager

COLORADO
State Land Board
An innovative land trust funding Colorado schools since 1876.

P 303.866.3454 x 3335
1127 Sherman Street, Suite 300, Denver, CO 80203
matthew.lafontaine@state.co.us | www.colorado.gov/statelandboard

On Thu, Nov 10, 2022 at 10:55 AM Gracy Weil <Gracy.Weil@southernland.com> wrote:

> Matt,
>
> Please find attached the Owner (State Land Board) Environmental Questionnaire for Section 16. It would be great to have this filled out and returned to Greg Sherman, copied, and I at your earliest convenience.
>
> Thank you,
> Gracy
>
> **Gracy Weil** | Office Manager/ Executive Assistant

Southern Land Company
1225 17th Street, Suite 2420 | Denver, CO 80202
| **O** | 720-531-8938 | **M** | 843-568-6383
| **E** | Gracy.Weil@southernland.com

www.southernland.com
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Western Environment and Ecology, Inc.
User Questionnaire for a Phase I Environmental Site Assessment, ASTM 1527-21

Subject Property Address or Description:

Approximately 414.380 acres in Section 16, Township 1 North, Range 68 West Weld County

In order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, The user of a Phase I Environmental Site Assessment must provide the following information (if available) to the environmental professional. Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

1. Environmental cleanup liens that are filed or recorded against the site:

Are you aware of any environmental cleanup liens against the subject property that are filed or recorded under federal, tribal, state, or local law? No

If yes, please describe the lien and provide supporting documentation:

_____

_____

_____

2. Activity and land use limitations (AULs) that are in place on the site or that have been filed or recorded in a registry:

Are you aware of any AULs, such as engineering controls, land use restrictions, or institutional controls that are in place at the subject property and/or have been filed or recorded in a registry under federal, tribal, state, or local law? No

If yes, please describe the AUL and provide supporting documentation:

_____

_____

_____

3. Specialized knowledge or experience of the person seeking to qualify for the LLP

As the potential user of the subject property, do you have any specialized knowledge or experience related to the subject property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or adjoining property so that you would have specialized knowledge of the chemicals, processes, etc., used by this type of business?

No

If yes, please describe this specialized knowledge or experience:

4. Relationship of the purchase price to the fair market value of the subject property if it were not contaminated.

Has the purchase price of this property been lowered below fair market value because of any contamination or some type of environmental issue? No

If yes, please describe the reasons for the lower purchase price:

5. Commonly known or reasonably ascertainable information about the property.

Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

A. Do you know the past uses of the property? (if "Yes", what?)

No

B. Do you know of chemicals that are present or once were present at the property? No

8. Are you aware or have you ever been notified that another property around the subject site has caused or had an environmental impact to the property.

NO

If yes, please describe which property and a brief description of the issue: _____

9. Are there any prior environmental reports concerning the subject property or related addresses? NO

If yes, can you provide copies of these reports or know where there are copies of these reports? _____

Additional Information

How long have you had interest in acquiring the subject property?

May 2022

Description of current activity on the subject property? dryland farming

Do you have any knowledge of past ownership or activity on the subject property that would be of environmental concern? No

What is the reason the Phase I is being conducted? due diligence

List all parties who will rely on the Phase I ESA report:

Southern Land Company

Completed by:

Signature: Heidi Majerik

Printed Name: Heidi Majerik

Date: 11/10/22

C. Do you know of any petroleum based products that are present or were once present on the subject property (in 5-gal or greater size containers, barrels, or tanks)? NO

D. Do you know of any spills or other chemical releases that have taken place at the property? NO

E. Do you know of any environmental cleanups that have taken place at the property? NO

If yes, please describe the information:

6. Do you know of any special permits need for the operation of the business or businesses that have occupied the subject property?

- **Waste water discharge permit?** NO
- **Air emissions permit?** NO
- **Any other type of permits?** NO

7. The degree of obviousness of the presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.

As the potential user of the subject property, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?

NO

If yes, please describe the information:

Western Environment and Ecology, Inc.
Owner Questionnaire for a Phase I Environmental Site Assessment, ASTM 1527-21

Subject Property Address or Description:
393 +/- **Approximately ~~414.380~~ Acres in Section 16, Township 1 North, Range 68 West, Weld County, Colorado**

In order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001, The user of a Phase I Environmental Site Assessment must provide the following information (if available) to the environmental professional. Failure to provide this information could result in a determination that "all appropriate inquiry" is not complete.

1. Environmental cleanup liens that are filed or recorded against the site:

Are you aware of any environmental cleanup liens against the subject property that are filed or recorded under federal, tribal, state, or local law? No

If yes, please describe the lien and provide supporting documentation:

_____

_____

_____

2. Activity and land use limitations (AULs) that are in place on the site or that have been filed or recorded in a registry:

Are you aware of any AULs, such as engineering controls, land use restrictions, or institutional controls that are in place at the subject property and/or have been filed or recorded in a registry under federal, tribal, state, or local law? No

If yes, please describe the AUL and provide supporting documentation:

_____

_____

_____

3. Specialized knowledge or experience of the person seeking to qualify for the LLP

As the owner of the subject property, do you have any specialized knowledge or experience related to the subject property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or adjoining property so that you would have specialized knowledge of the chemicals, processes, etc., used by this type of business?

No

If yes, please describe this specialized knowledge or experience:

_____

_____

_____

4. Relationship of the purchase price to the fair market value of the subject property if it were not contaminated.

Has the purchase price of this property been lowered below fair market value because of any contamination or some type of environmental issue? No

If yes, please describe the reasons for the lower purchase price:

_____

_____

_____

5. Commonly known or reasonably ascertainable information about the property.

Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as the owner:

A. Do you know the past uses of the property? (if "Yes", what?)
YES; AG, MINING, O&G, NOAA TOWER + SITE, ROW, PIPELINES

B. Do you know of chemicals that are present or once were present at the property? CRUDE OIL PER 2008 PHASE I,
LIKELY O&G, MINING, AG

C. Do you know of any petroleum based products that are present or were once present on the subject property (in 5-gal or greater size containers, barrels, or tanks)? SEE PHASE I

D. Do you know of any spills or other chemical releases that have taken place at the property? " "

E. Do you know of any environmental cleanups that have taken place at the property? " "

If yes, please describe the information:

6. Do you know of any special permits need for the operation of the business or businesses that have occupied the subject property?

- **Waste water discharge permit?** NO
- **Air emissions permit?** NO
- **Any other type of permits?** COGCC, NOAA(FCC), LOCAL

7. The degree of obviousness of the presence of contamination at the property, and the ability to detect the contamination by appropriate investigation.

As the owner of the subject property, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?

D&G OPS, PLUG & ABANDON, RECLAMATION/REMEDIATION

If yes, please describe the information:

EXTENSIVE D&G; SEE COGCC + LESSEE

8. Are you aware or have you ever been notified that another property around yours has caused or had an environmental impact to your property.

No

If yes, please describe which property and a brief description of the issue: _____

9. Are there any prior environmental reports (Phase 1 Environmental Site Assessments or documentation of remedial activities) concerning the subject property or related addresses? Y

If yes, can you provide copies of these reports or know where there are copies of these reports? SEE ATTACHED

Additional Information

How long have you owned the subject property? 100 + YRS

Description of current activity on the subject property? AG, O&G, ROW

Do you have any knowledge of past ownership or activity on the subject property that would be of environmental concern? AG, MINING, NOAA, O&G

What is the reason the Phase I is being conducted? BUYER DILIGENCE

List all parties who will rely on the Phase I ESA report:

COLORADO STATE LAND BOARD

Completed by:

Signature: M. Lafontaine

Printed Name: MATTHEW LAFONTAINE

Date: 11/14/2022

AS ACQUISITION/DISPOSITION MGR
COLORADO STATE LAND BOARD

Western Environment and Ecology, Inc.
Owner Questionnaire for a Phase I Environmental Site Assessment, ASTM 1527-21

Additional Notes:

EXTENSIVE O+G & AG HISTORY. SEE LOCAL + LESSEE FOR UP TO DATE INFO.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

ERIE PROPERTY
TOWNSHIP 1 NORTH, RANGE 68 WEST, SECTION 16
ERIE, WELD COUNTY, COLORADO

Project Number: 25087780
Report Date: July 1, 2008



Prepared for:

COLORADO STATE LAND BOARD
Denver, Colorado

Prepared by:

Terracon
Wheat Ridge, Colorado

July 1, 2008

Terracon
Consulting Engineers & Scientists

Terracon Consultants, Inc.
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Wheat Ridge, Colorado 80033
Phone 303.423.3300
Fax 303.423.3353
www.terracon.com

Mr. David Rodenberg
Colorado State Land Board
Governers Center II 600 Grant St
Suite 306
Denver, Colorado 80203

Telephone: 303-318-0706

Re: Phase I Environmental Site Assessment
Erie Property
Township 1 North, Range 68 West, Section 16
Erie, Weld County, Colorado
Project No. 25087780

Dear Mr. Rodenberg:

Terracon Consultants, Inc. (Terracon) is pleased to submit the enclosed Phase I Environmental Site Assessment (ESA) report for the above-referenced site. This assessment was performed in accordance with our proposal dated June 25, 2008.

We appreciate the opportunity to perform these services for you. Please contact us if you have questions regarding this information or if we can provide any other services.

Sincerely,
Terracon Consultants, Inc.

Darren G. Bruns, MBA
Environmental Scientist

Russell Pickering, MS
Environmental Department Manager

Attachments

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COMMON ACRONYMS [1]

ACM ..... Asbestos containing material
AST ..... Aboveground storage tank
ASTM ..... American Society for Testing and Materials
AUL ..... Activity and use limitation
BGS..... Below ground surface
BTEX..... Benzene, toluene, ethylbenzene, and xylenes
CERCLA..... Comprehensive Environmental Response, Compensation, and Liability Act
CFR..... Code of Federal Regulations
DOT..... United States Department of Transportation
EPA..... United States Environmental Protection Agency
HREC..... Historical recognized environmental condition
LUST..... Leaking underground storage tank
MCL..... Maximum contaminant level
MSDS..... Material safety data sheet
NGVD..... National Geodetic Vertical Datum
NOV ..... Notice of violation
NPL ..... National Priority List
NRCS..... USDA Natural Resource Conservation Service
OSHA..... Occupational Safety and Health Administration
PCB..... Poly-chlorinated biphenyl
RCRA..... Resource Conservation and Recovery Act
REC..... Recognized environmental condition
SPCC ..... Spill Prevention, Control and Countermeasure
SWPPP ..... Stormwater pollution prevention plan
TEPH..... Total extractable petroleum hydrocarbons
TPH..... Total petroleum hydrocarbons
TVPH..... Total volatile petroleum hydrocarbons
TRI ..... Toxic release inventory
TSCA..... Toxic Substances Control Act
USGS..... United States Geological Survey
UST..... Underground storage tank
VCP..... Voluntary cleanup program
VOC ..... Volatile organic compound

Units of measure

sq ft or ft^2..... square feet
mg/kg ..... milligrams per kilogram
mg/l ..... milligrams per liter
ug/l ..... micrograms per liter
ppb ..... parts per billion
ppm……parts per million

[1] An additional list of acronyms and definitions is included in Appendix B.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
ERIE PROPERTY
TOWNSHIP 1 NORTH, RANGE 68 WEST, SECTION 16
ERIE, WELD COUNTY, COLORADO

Project No. 25087780
Report Date: July 1, 2008

EXECUTIVE SUMMARY

This Phase I ESA was performed in accordance with our proposal dated June 25, 2008, and was conducted consistent with the procedures included in ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The ESA was conducted under the supervision or responsible charge of Russell Pickering, MS, environmental professional. Darren G. Bruns performed the site reconnaissance on June 24, 2008.

A cursory summary of findings is provided below. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein.

- The site is located at Township 1 North, Range 68 West, Section 16 in Erie, Weld County, Colorado. The site is an approximate 420-acre tract of land that has been improved with a guyed tower and two oil and/or natural gas wells.
- During Terracon's site reconnaissance, one leaking pad-mounted transformer and two oil and/or natural gas wells were observed on the site. De minimis staining was observed beneath the crude oil AST at the oil and/or natural gas well on the eastern portion of the site. The leaking pad-mounted transformer and the oil and/or natural gas operations present RECs to the site.
- Based on review of the historical information, the site was developed with residential farm houses and a coal mining operation on the west-central portion of the site as early as 1937. The coal mining operations terminated between 1974 and 1984. A guyed communications tower was constructed between 1974 and 1984. Two oil and/or natural gas wells have operated on the site since at least 1992. The two oil and/or natural gas wells present RECs to the site.
- Residential farm houses and Weld County Road 10, followed by residential farm houses, bound the site to the north. Weld County Road 7, followed by residential properties bound the site to the east. Weld County Road 8 and a high school, followed by undeveloped property bound the site to the south. Weld County Road 5, followed by undeveloped property bound the site to the west. None of the adjoining properties present RECs to the site.

- The regulatory database review identified no facilities listed within the ASTM 1527-05 search radii.

Recommendations

Terracon recommends contacting the electricity provider regarding the leaking pad-mounted transformer located within the NOAA lease compound.

Terracon recommends conducting a subsurface investigation to determine if the soil and/or groundwater have been impacted by the two oil and/or natural gas wells.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
ERIE PROPERTY
TOWNSHIP 1 NORTH, RANGE 68 WEST, SECTION 16
ERIE, WELD COUNTY, COLORADO

Project No. 25087780
Report Date: July 1, 2008

1.0 INTRODUCTION

1.1 Site Description

Site Description

Site Name	Erie Property
Site Location/Address	Township 1 North, Range 68 West, Section 16, Erie, Weld County, Colorado
Land Area	Approximately 420 acres
Site Improvements	A guyed tower and two oil and/or natural gas wells

The site location is depicted on Figure 1 of Appendix A, which was reproduced from a portion of the USGS 7.5-minute series topographic map. A diagram of the site and adjoining properties is included as Figure 2 of Appendix A. Acronyms and terms used in this report are described in Appendix B.

1.2 Scope of Services

This Phase I ESA was performed in accordance with our proposal dated June 25, 2008, and was conducted consistent with the procedures included in ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The purpose of this ESA was to assist the client in developing information to identify RECs in connection with the site as reflected by the scope of this report. This purpose was undertaken through user-provided information, a regulatory database review, historical and physical records review, interviews, including local government inquiries, as applicable, and a visual noninvasive reconnaissance of the site and adjoining properties. Limitations, ASTM deviations, and significant gaps (if identified) are evident from reviewing the applicable scope of services and the report text.

1.3 Standard of Care

This ESA was performed in accordance with generally accepted practices of this profession, undertaken in similar studies at the same time and in the same geographical area. We have endeavored to meet this standard of care, but may be limited by conditions encountered during performance, a client-driven scope of work, or inability to review information not

received by the report date. When appropriate, these limitations are discussed in the text of the report, and an evaluation of their significance with respect to our findings has been conducted.

Phase I ESAs, such as the one performed at this site, are of limited scope, are noninvasive and cannot eliminate the potential that hazardous, toxic, or petroleum substances are present or have been released at the site beyond what is identified by the limited scope of this ESA. In conducting the limited scope of services described herein, certain sources of information and public records were not reviewed. It should be recognized that environmental concerns may be documented in public records that were not reviewed. No ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of this practice is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs. No warranties, express or implied, are intended or made. The limitations herein must be considered when the user of this report formulates opinions as to risks associated with the site or otherwise uses the report for any other purpose. These risks may be further evaluated - but not eliminated - through additional research or assessment. We will, upon request, advise you of additional research or assessment options that may be available and associated costs.

1.4 Additional Scope Limitations, ASTM Deviations and Significant Data Gaps

Based upon the agreed-on scope of services, this ESA did not include subsurface or other invasive assessments, business environmental risk evaluations, or other services not particularly identified and discussed herein. Reasonable attempts were made to obtain information within the scope and time constraints set forth by the client; however, in some instances, information requested is not, or was not, received by the issuance date of the report. Consideration of such information is beyond the scope of this assessment. Information obtained for this ESA was received from several sources that we believe to be reliable; nonetheless, the authenticity or reliability of these sources cannot and is not warranted hereunder. This ESA was further limited by the following:

- *Credentials of the company (Statement of Qualifications) have not been included in this report but are available upon request.*
- *Pertinent documents are referred to in the text of this report, and a separate reference section has not been included.*
- *A written request was submitted to the local government agency regarding documented RECs on the site. Records were not requested for off-site properties.*

An evaluation of the significance of these limitations and missing information with respect to our findings has been conducted, and where appropriate, significant data gaps are identified and discussed in the text of the report. However, it should be recognized that an evaluation of significant data gaps is based on the information available at the time of report issuance, and an evaluation of information received after the report issuance date may result in an alteration of our conclusions, recommendations, or opinions. We have no obligation to provide information obtained or discovered by us after the issuance date of the report, or to perform any additional services, regardless of whether the information would affect any conclusions, recommendations, or opinions in the report. This disclaimer specifically applies to any information that has not been provided by the client.

This report represents our service to you as of the report date and constitutes our final document; its text may not be altered after final issuance. Findings in this report are based upon the site's current utilization, information derived from the most recent reconnaissance and from other activities described herein; such information is subject to change. Certain indicators of the presence of hazardous substances or petroleum products may have been latent, inaccessible, unobservable, or not present during the most recent reconnaissance and may subsequently become observable (such as after site renovation or development). Further, these services are not to be construed as legal interpretation or advice.

1.5 Reliance

This ESA report is prepared for the exclusive use and reliance of Colorado State Land Board. Use or reliance by any other party is prohibited without the written authorization of Colorado State Land Board and Terracon Consultants, Inc. (Terracon).

Reliance on the ESA by the client and all authorized parties will be subject to the terms, conditions and limitations stated in the proposal, ESA report, and Terracon's Agreement for Services. The limitation of liability defined in the Agreement for Services is the aggregate limit of Terracon's liability to the client and all relying parties.

Continued viability of this report is subject to ASTM E 1527-05 Sections 4.6 and 4.8. If the ESA will be used by a different user (third party) than the user for whom the ESA was originally prepared, the third party must also satisfy the user's responsibilities in Section 6 of ASTM E 1527-05.

1.6 Client Provided Information

Prior to the site visit, Mr. David Rodenberg, client's representative, provided the following information.

1.6.1 Specialized Knowledge or Experience

Mr. Rodenberg was not aware of specialized knowledge or experience that is material to RECs in connection with the site.

1.6.2 Actual Knowledge of Environmental Liens or AULs

Mr. Rodenberg did not have actual knowledge of environmental liens or AULs encumbering the site or in connection with the site.

1.6.3 Reason for Significantly Lower Purchase Price

Mr. Rodenberg was not aware of a significantly lower purchase price because of the presence of hazardous substances or petroleum products.

1.6.4 Commonly Known or Reasonably Ascertainable Information

Mr. Rodenberg was not aware of commonly known or reasonably ascertainable information within the local community about the site that is material to RECs in connection with the site.

1.6.5 Obvious Indicators of Contamination at the Site

Mr. Rodenberg was not aware of obvious indicators that point to the presence or likely presence of contamination at the site.

2.0 PHYSICAL SETTING

Physical Setting

PHYSICAL SETTING INFORMATION FOR SITE AND SURROUNDING AREA		SOURCE
Topography (Refer to Appendix A for an excerpt of the Topographic Map)		
Site Elevation	Approximately Between 5,150 and 5,210 feet (NGVD)	USGS Topographic Map, Erie and Frederick Quadrangle, 1967 Map revised 1979
Surface Runoff/ Topographic Gradient	Sloping towards the north-northwest	
Closest Surface Water	An intermittent stream flowing from the southern border to the northern border	
Soil Characteristics		
Soil Type	Weld loam, 1 to 3 percent slopes, Nunn loam, 1 to 3 percent slopes, Ulm clay loam, 0 to 3 percent slopes, and Wiley-Colby complex, 3 to 5 percent slopes	Weld County, Colorado USDA, Natural Resources Conservation Service Soil Survey issued February 11, 2008
Description	These well-drained soils are located on plains and terraces	

PHYSICAL SETTING INFORMATION FOR SITE AND SURROUNDING AREA		SOURCE
Geology/Hydrogeology		
Formation	Eolium (Holocene and Pleistocene) and Artificial Fill (Upper Holocene)	Preliminary Geologic Map of the Erie Quadrangle, Boulder County, Weld, and Adams Counties, Colorado by Colton and Anderson, 1977
Description	**Eolium (Holocene and Pleistocene):** Light reddish-brown to olive-gray deposits of windblown clay, silt, and sand-sized particles of late Pinedale to Pinedale-Bull Lake interglacial age **Artificial Fill (Upper Holocene):** Includes compacted fill and uncompacted coal mine tailings	
Estimated Depth to First Occurrence of Ground water	Generally ranges between 5 feet and 20 feet below ground surface (bgs)	Depth to the Water Table (1976-1977) in the Boulder - Fort Collins - Greeley Area, Front Range Urban Corridor, Colorado, 1979
Primary Aquifer	Colluvial, landslide, and windblown deposits, and in consolidated sedimentary rocks	
**Hydrogeologic Gradient:*	Not known - may be inferred to be parallel to topographic gradient (primarily to the north-northwest)	

* The groundwater flow direction and the depth to shallow, unconfined groundwater, if present, would likely vary depending upon seasonal variations in rainfall and other hydrogeological features. Without the benefit of on-site groundwater monitoring wells surveyed to a datum, groundwater depth and flow direction beneath the site cannot be directly ascertained.

3.0 HISTORICAL USE INFORMATION

Terracon reviewed the following historical sources for indications of RECs. A summary of the historical review is included in Section 3.12. Copies of selected historical documents are included in Appendix C.

3.1 Historical Topographic Maps

Readily available historical USGS topographic maps were reviewed to identify RECs in connection with the site. Reviewed historical topographic maps are summarized below.

- Erie, Colorado, published 1950 from **1948/1949** aerials (1:24,000)
- Frederick, Colorado, published 1950 from **1950** aerials (1:24,000)
- Erie, Colorado, published 1967 from **1966** aerials (1:24,000)
- Frederick, Colorado, published 1950 from 1950 aerials, photorevised in 1969 from **1969** aerials (1:24,000)

- Erie, Colorado, published 1967 from 1966 aerials, photorevised in 1971 from **1971** aerials (1:24,000)
- Erie, Colorado, published 1967 from 1966 aerials, photorevised in 1979 from **1978** aerials (1:24,000)
- Frederick, Colorado, published 1950 from 1950 aerials, photorevised in 1994 from **1988** aerials (1:24,000)

Historical Topographic Maps

Direction	Description
Site	The inactive Clayton Mine, Community Ditch, and undeveloped property (1948/1949) Community Ditch and undeveloped property (1966 and 1971) Community Ditch, undeveloped property, and two small structures in the southeast portion of the site (1978)
North	Undeveloped property and a medium-duty road, followed by undeveloped property (1948/1949) Undeveloped property and a light-duty road, followed by undeveloped property with six small buildings (1966) Undeveloped property and a light-duty road, followed by undeveloped property with seven small buildings (1971 and 1978)
East	A light-duty road, followed by three small structures (1950 and 1969) A light-duty road, followed by eight small structures (1988)
South	Undeveloped property and a medium-duty road, followed by undeveloped property (1948/1949, 1966, 1971 and 1978)
West	Undeveloped property and a medium-duty road, followed by undeveloped property (1948/1949) Undeveloped property and a light-duty road, followed by undeveloped property (1966, 1971, and 1978)

3.2 Historical Aerial Photographs

Selected historical aerial photographs from Colorado Aerial Photo Service (CAPS) were reviewed at approximately 10- to 15-year intervals, if readily available, to obtain information concerning the history of development on and near the site. Evaluation of these aerials may be limited by a photo's quality and scale. Selected photographs are summarized below.

- CAPS 1937, 1965, 1974, 1984, 1994, and 2005

Historical Aerial Photographs

Direction	Description
Site	A mining operation on the west-central portion of the site, four small structures in the southeastern corner of the site, four small structures on the northwestern corner of the site, and one dirt road that transects the site from the east to the west (1937) A mining operation on the west-central portion of the site, six small structures along the northern border of the site, ten small structures along the southern border of the site, three small structures along the western border, and four small structures along the eastern border (1965) A mining operation on the west-central portion of the site, two small structures along the northern border of the site, and one small structure along the eastern border (1974) One guyed communications tower in the southeastern corner of the site, the remnants of a mining operation in the west-central portion of the site, three small structures along the southern boundary, and three small structures along the northern boundary of the site (1984) One guyed communications tower in the southeastern corner of the site, the remnants of a mining operation in the west-central portion of the site, three small structures along the southern boundary, and five small structures along the northern boundary of the site with a transmission line (1994) One guyed communications tower in the southeastern corner of the site, one oil and/or natural gas well in the southeastern corner and one oil and/or natural gas well in the northwestern corner of the site (2005)
North	A mining operation to the northeast, four small structures, and a dirt road, followed by undeveloped property (1937 and 1965) Six small structures and a road, followed by 11 small structures and undeveloped property (1974) Ten small structures and a road, followed by 14 small structures and undeveloped property (1984) Fourteen small structures and a road, followed by 27 small structures and undeveloped property (1994) Fifteen small structures and a road, followed by 29 small structures and undeveloped property (2005)
East	A dirt road, followed by undeveloped property (1937 and 1965) A dirt road, followed by three small structures and undeveloped property (1974) A dirt road, followed by eight small structures and undeveloped property (1984) A dirt road, followed by 11 small structures and undeveloped property (1994) A dirt road, followed by 18 small structures and undeveloped property (2005)
South	A dirt road, followed by undeveloped property (1937 and 1965) A road, followed by a canal and undeveloped property (1974, 1984, and 1994) A school with athletic field and a road, followed by undeveloped property and a canal (2005)
West	A dirt road, followed by undeveloped property (1937, 1965, 1974, 1984, 1994, and 2005)

3.3 Historical City Directories

The Bresser's and Cole Companies annually publish city directories that contain listings of residences and businesses organized both alphabetically by name similar to a telephone book, and alphanumerically by street name then specifically by street address. Given the rural location of the site and the lack of historic development, city directories were not reviewed for this site.

3.4 Historical Fire Insurance Maps

Historical fire insurance maps produced by the Sanborn Map Company were requested from Environmental Data Resources Inc. (EDR) to evaluate past uses and relevant characteristics of the site and surrounding properties. Based upon inquiries to the above-listed Sanborn provider, Sanborn Maps were not available for the site.

3.5 Property Tax File Information

Based on a review of information obtained from Weld County Assessor's records, the current site owner is The State of Colorado.

3.6 Title Search

At the direction of the client, a title search was not included as part of the scope of services. Unless notified otherwise, we assume that the client is evaluating this information outside the context of this report.

3.7 Environmental Liens

Environmental lien records recorded against the site were not provided by the client. At the direction of the client, performance of a review of these records was not included as part of the scope of services and unless notified otherwise, we assume that the client is evaluating this information outside the context of this report.

3.8 Zoning/Land Use Records

According to Weld County Assessor, the site is currently zoned agricultural.

3.9 Historical Interviews

The following individuals were interviewed regarding historical use of the site.

Interviewees

Interviewer	Interviewee/Phone #	Title	Date/Time
Darren Bruns	Bruce Bartram	Owner Representative	June 23, 2008

Mr. Bartram was not aware of any pending, threatened or past environmental litigation, proceedings or notices of possible violations of environmental laws or liability in connection with the site.

3.10 Prior Report Review

Previous environmental reports, permits and registrations, or geotechnical reports for the site were not provided by the client to Terracon for review.

3.12 Historical Use Information Summary

Based on review of the historical information, the site was developed with residential farm houses and a coal mining operation on the west-central portion of the site as early as 1937. The coal mining operations terminated between 1974 and 1984. A guyed communications tower was constructed between 1974 and 1984. Two oil and/or natural gas wells were operated on the site since at least 1992. The two oil and/or natural gas wells present RECs to the site and are further discussed in Section 5.1.

4.0 RECORDS REVIEW

Regulatory database information was provided by EDR, a contract information services company. Information in this section is subject to the accuracy of the data provided by the information services company and the date at which the information is updated, and the scope herein did not include confirmation of facilities listed as "unmappable" by regulatory databases.

In some of the following subsections, the words up-gradient, cross-gradient and down-gradient refer to the topographic gradient in relation to the site. As stated previously, the groundwater flow direction and the depth to shallow groundwater, if present, would likely vary depending upon seasonal variations in rainfall and the depth to the soil/bedrock interface. Without the benefit of on-site groundwater monitoring wells surveyed to a datum, groundwater depth and flow direction beneath the site cannot be directly ascertained.

4.1 Federal and State/Tribal Databases

Listed below are the facility listings identified on federal and state/tribal databases within the ASTM-required search distances from the approximate site boundaries. Database definition, descriptions, and the database search report are included in Appendix D.

Federal and State Databases

Database	Description	Radius (miles)	Listings
Federal			
NPL	The NPL is the EPA's database of uncontrolled or abandoned hazardous waste facilities that have been listed for priority remedial actions under the Superfund Program.	1.0	0
NPL (Delisted)	The NPL (Delisted) refers to facilities that have been removed from the NPL.	0.5	0
CERCLIS	The CERCLIS database is a compilation of facilities which the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the CERCLA of 1980.	0.5	0
CERCLIS / NFRAP	CERCLIS/NFRAP refers to facilities that have been removed and archived from EPA's inventory of CERCLA sites.	0.5	0
RCRA CORRACTS/ TSD	The EPA maintains a database of RCRA facilities associated with treatment, storage, and disposal (TSD) of hazardous waste that are undergoing "corrective action." A "corrective action" order is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility.	1.0	0
RCRA Non-CORRACTS/ TSD	The RCRA Non-CORRACTS/TSD Database is a compilation by the EPA of facilities which report storage, transportation, treatment, or disposal of hazardous waste. Unlike the RCRA CORRACTS/TSD database, the RCRA Non-CORRACTS/TSD database does not include RCRA facilities where corrective action is required.	0.5	0
RCRA Generators	The RCRA Generators database, maintained by the EPA, lists facilities that generate hazardous waste as part of their normal business practices. Generators are listed as either large (LQG), small (SQG), or conditionally exempt (CESQG). LQG produce at least 1000 kg/month of non-acutely hazardous waste or 1 kg/month of acutely hazardous waste. SQG produce 100-1000 kg/month of non-acutely hazardous waste. CESQG are those that generate less than 100 kg/month of non-acutely hazardous waste.	Site and adjoining properties	0

Database	Description	Radius (miles)	Listings
IC / EC	A listing of sites with institutional and/or engineering controls in place. IC include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls. EC include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.	Site	0
ERNS	The Emergency Response Notification System (ERNS) is a listing compiled by the EPA on reported releases of petroleum and hazardous substances to the air, soil and/or water.	Site	0
State			
SHWS	The State of Colorado does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.	0.5	0
SWF/LF	State and/or Tribal database of solid waste facilities located within Colorado. The database information may include the facility name, class, operation type, area, estimated operational life, and owner.	0.5	0
LUST	State and/or Tribal database of leaking underground storage tanks in the state of Colorado.	0.5	0
UST	State and/or Tribal database of registered storage tanks in the State of Colorado which may include the owner and location of the tanks.	Site and adjoining properties	0
CO ERNS	Listing of spills reported to the CDPHE. Information includes releases of hazardous or potential hazardous chemical/materials into the environment.	Site	0
AUL	Activity and use limitations include both engineering controls and institutional controls. The Department of Public Health & Environment approve requests to restrict the future use of a property using an enforceable agreement called an environmental real covenant. When a contaminated site is not cleaned up completely, land use restrictions may be used to ensure that the selected cleanup remedy is adequately protective of human health and the environment.	Site	0
VCP	State and/or Tribal facilities included as Voluntary Cleanup Program sites.	0.5	0

In addition to the above ASTM-required listings, Terracon reviewed other federal, state, local and proprietary databases provided by the database firm. A list of the additional reviewed databases is included in the regulatory database report included in Appendix D.

No facilities were listed within the specified search distances.

Unmapped facilities are those that do not contain sufficient address or location information to evaluate the facility listing locations relative to the site. The report listed no facilities in the unmapped section.

4.2 Local Agency Inquiries

4.2.1 Health Department/Environmental Division

The Colorado Department of Public Health and Environment – Hazardous Materials and Waste Management Division (CDPHE) was contacted by phone regarding environmental records or information indicating environmental concerns for the site. According to Diana Huber, records center manager, no facilities were listed on the site.

4.3 Records Review Summary

The regulatory database review identified no facilities within the ASTM 1527-05 search radii.

5.0 SITE RECONNAISSANCE

5.1 General Site Information

Information contained in this section is based on a visual reconnaissance conducted while walking through the site and the accessible interior areas of structures, if any, located on the site. Figure 2 in Appendix A is a diagram of the site. Photo documentation of the site at the time of the visual reconnaissance is provided in Appendix E. Credentials of the individuals planning and conducting the site visit are included in Appendix F.

General Site Information

Site Reconnaissance	
Field Personnel	Darren G. Bruns
Reconnaissance Date	June 24, 2008
Weather Conditions	Sunny and warm
Site Contact/Title	None

Site Description	
Site Name	Erie Property
Site Location/Address	Township 1 North, Range 68 West, Section 16, Erie, Weld County, Colorado
Land Area	Approximately 420 acres
Site Improvements	A guyed tower and two oil and/or natural gas wells
Zoning	Agricultural
Site Topographic Relief	North-northwest
Site Utilities	
Electricity	United Power
Drinking Water	Lefthand Water District
Wastewater	Septic System
Natural Gas	United Power

5.2 General Description of Site, Occupants, and Operations

The site consists of a guyed communications tower, two oil and/or natural gas wells, and agricultural land.

5.3 Site Observations

The following table summarizes site observations and interviews. Affirmative responses (designated by an "X") are discussed in more detail following the table.

Site Characteristics

Category	Item or Feature	Observed
Site Operations, Processes, and Equipment	Emergency generators	
	Elevators	
	Air compressors	
	Hydraulic lifts	
	Dry cleaning	
	Photo processing	
	Laboratory hoods and/or incinerators	
	Waste treatment systems and/or water treatment systems	
	Heating and/or cooling systems	

Category	Item or Feature	Observed
	Other processes or equipment	
Aboveground Chemical or Waste Storage	Aboveground storage tanks	X
	Drums, barrels and/or containers ≥ 5 gallons	
	MSDS	
Underground Chemical or Waste Storage, Drainage or Collection Systems	Underground storage tanks or ancillary UST equipment	
	Sumps, cisterns, catch basins and/or dry wells	
	Grease traps	
	Septic tanks and/or leach fields	
	Oil/water separators	
	Pipeline markers	
	Interior floor drains	
Electrical Transformers/ PCBs	Pad or pole mounted transformers and/or capacitors	X
	Other equipment	
Releases or Potential Releases	Stressed vegetation	
	Stained soil	X
	Stained pavement or similar surface	
	Leachate and/or waste seeps	
	Trash, debris and/or other waste materials	
	Dumping or disposal areas	
	Construction/demolition debris and/or dumped fill dirt	
	Surface water discoloration, odor, sheen, and/or free floating product	
	Strong, pungent or noxious odors	
	Exterior pipe discharges and/or other effluent discharges	
Other Notable Site Features	Surface water bodies	
	Quarries or pits	
	Wells	X

Aboveground storage tanks

Two ASTs were observed on the site during the site reconnaissance. The ASTs are associated with the two oil and/or natural gas wells on the site. The oil and natural gas wells are further discussed below.

Pad or pole mounted transformers and/or capacitors

During Terracon's site visit, four pad-mounted transformers, owned and serviced by United Power, were observed in the NOAA communication tower lease area; however, no information with regard to PCB content of the transformer fluids was observed. Transformers contain mineral oil which may contain minor amounts of PCB and could be considered "PCB contaminated" (PCB content of 50-500 ppm).

United Power maintains responsibility for the transformers, and if the transformers were "PCB contaminated," the utility company is not required to replace the transformer fluids until a release is identified. Dark staining was observed on one of the four transformers in the NOAA lease area. The remaining transformers had no evidence of current or prior release. Based on the visual observations, the leaking transformer presents a REC to the site. The remaining transformers do not present a REC to the site.

Stained soil

Stained soil was observed immediately beneath the eastern oil AST during the site reconnaissance. The area was approximately 6-square feet in area. The potential cause of this release is oil and gas operations. The oil and/or natural gas well presents a REC to the site and is further discussed below.

Other Notable Site Features

Wells

Two oil and/or natural gas wells were observed at the site. One oil and/or natural gas well was on the eastern portion of the site and one oil and/or natural gas well was on the western portion of the site. No soil staining above de minimis levels was observed around the oil and gas equipment.

Terracon reviewed records from the Colorado Oil and Gas Information System (COGIS) for the observed facilities (included in Appendix C). According to Colorado Oil and Gas Conservation Commission (COGCC), the wells were installed in 1992. Currently, the wells are producing oil and natural gas. Terracon interviewed Mr. Paul Schneider with Anadarko Petroleum Corp. (formerly Kerr McGee) regarding the oil and/or natural gas well located on the western portion of the site. Mr. Schneider stated Anadarko had no record of material releases of petroleum hydrocarbons associated with the on-site well and equipment (State of Colorado AZ #1).

Terracon interviewed Mr. Curtis Reader with Noble Energy regarding the oil and/or natural gas well located on the eastern portion of the site. At the issuance of this report, a response has not been received from Mr. Reader regarding the State #16-9 well.

Terracon did not identify releases of petroleum hydrocarbons associated with oil and gas operations on the site that would appear to exceed de minimis quantities. Based on historic oil and/or gas industry trends that suggest material releases are relatively common, the on-going oil and gas operations on the site present a REC.

5.4 Site Reconnaissance Summary

During Terracon's site reconnaissance, one leaking pad-mounted transformer and two oil and/or natural gas wells were observed on the site. De minimis staining was observed beneath the crude oil AST at the oil and/or natural gas well on the eastern portion of the site. The leaking pad-mounted transformer and the oil and/or natural gas operations present RECs to the site.

6.0 ADJOINING PROPERTY RECONNAISSANCE

Visual observations of adjoining properties (from site boundaries) are summarized below.

Adjoining Properties

Direction	Description
North	Residential properties and a dirt road, followed by residential properties
East	A paved road, followed by agricultural property and residential properties
South	A school and a paved road, followed by undeveloped property
West	A paved road, followed by undeveloped property

7.0 ADDITIONAL SERVICES

Per the agreed scope of services specified in the proposal, additional services (e.g., asbestos sampling, lead-based paint sampling, wetlands evaluation, lead in drinking water testing, radon testing, etc.) were not conducted.

8.0 FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

8.1 Findings and Conclusions

This Phase I ESA was performed in accordance with our proposal dated June 25, 2008, and was conducted consistent with the procedures included in ASTM E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The ESA was conducted under the supervision or responsible charge of Russell Pickering, MS, environmental professional. Darren G. Bruns performed the site reconnaissance on June 24, 2008.

A cursory summary of findings is provided below. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein.

- The site is located at Township 1 North, Range 68 West, Section 16 in Erie, Weld County, Colorado. The site is an approximate 420-acre tract of land that has been improved with a guyed tower and two oil and/or natural gas wells.
- During Terracon's site reconnaissance, one leaking pad-mounted transformer and two oil and/or natural gas wells were observed on the site. De minimis staining was observed beneath the crude oil AST at the oil and/or natural gas well on the eastern portion of the site. The leaking pad-mounted transformer and the oil and/or natural gas operations present RECs to the site.
- Based on review of the historical information, the site was developed with residential farm houses and a coal mining operation on the west-central portion of the site as early as 1937. The coal mining operations terminated between 1974 and 1984. A guyed communications tower was constructed between 1974 and 1984. Two oil and/or natural gas wells have operated on the site since at least 1992. The two oil and/or natural gas wells present RECs to the site.
- Residential farm houses and Weld County Road 10, followed by residential farm houses, bound the site to the north. Weld County Road 7, followed by residential properties bound the site to the east. Weld County Road 8 and a high school, followed by undeveloped property bound the site to the south. Weld County Road 5, followed by undeveloped property bound the site to the west. None of the adjoining properties present RECs to the site.
- The regulatory database review identified no facilities listed within the ASTM 1527-05 search radii.

8.2 Recommendations

Terracon recommends contacting the electricity provider regarding the leaking pad-mounted transformer located within the NOAA lease compound.

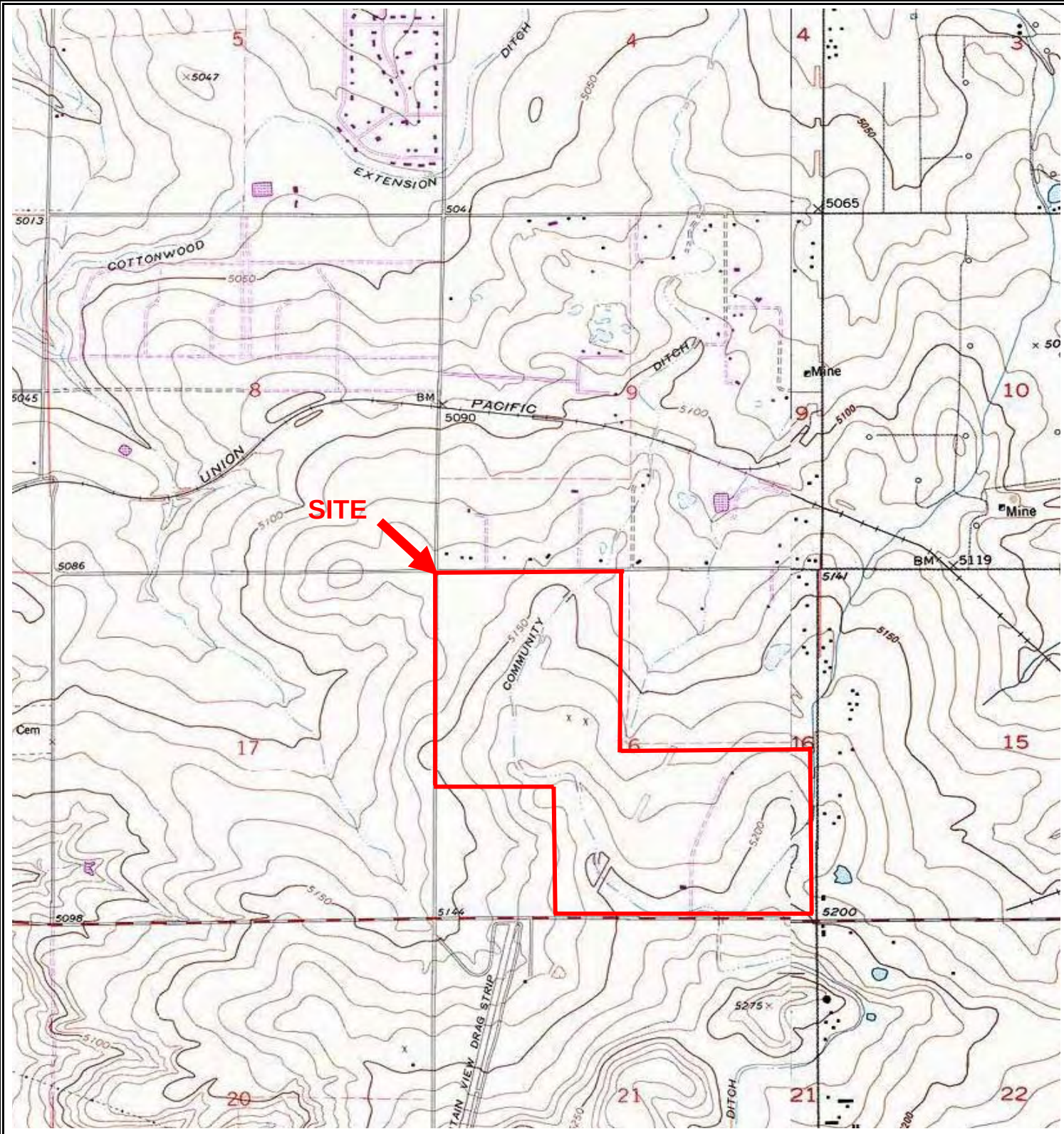
Terracon recommends conducting a subsurface investigation to determine if the soil and/or groundwater have been impacted by the two oil and/or natural gas wells.

9.0 DECLARATION

I, Russell Pickering, MS, declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in Section 312.10 of 40 CFR 312; and I have the specific qualifications based on education, training, and experience to assess a site of the nature, history, and setting of the subject site. I have developed and performed the All Appropriate Inquiries in conformance with the standards and practice set forth in 40 CFR Part 312.

APPENDIX A

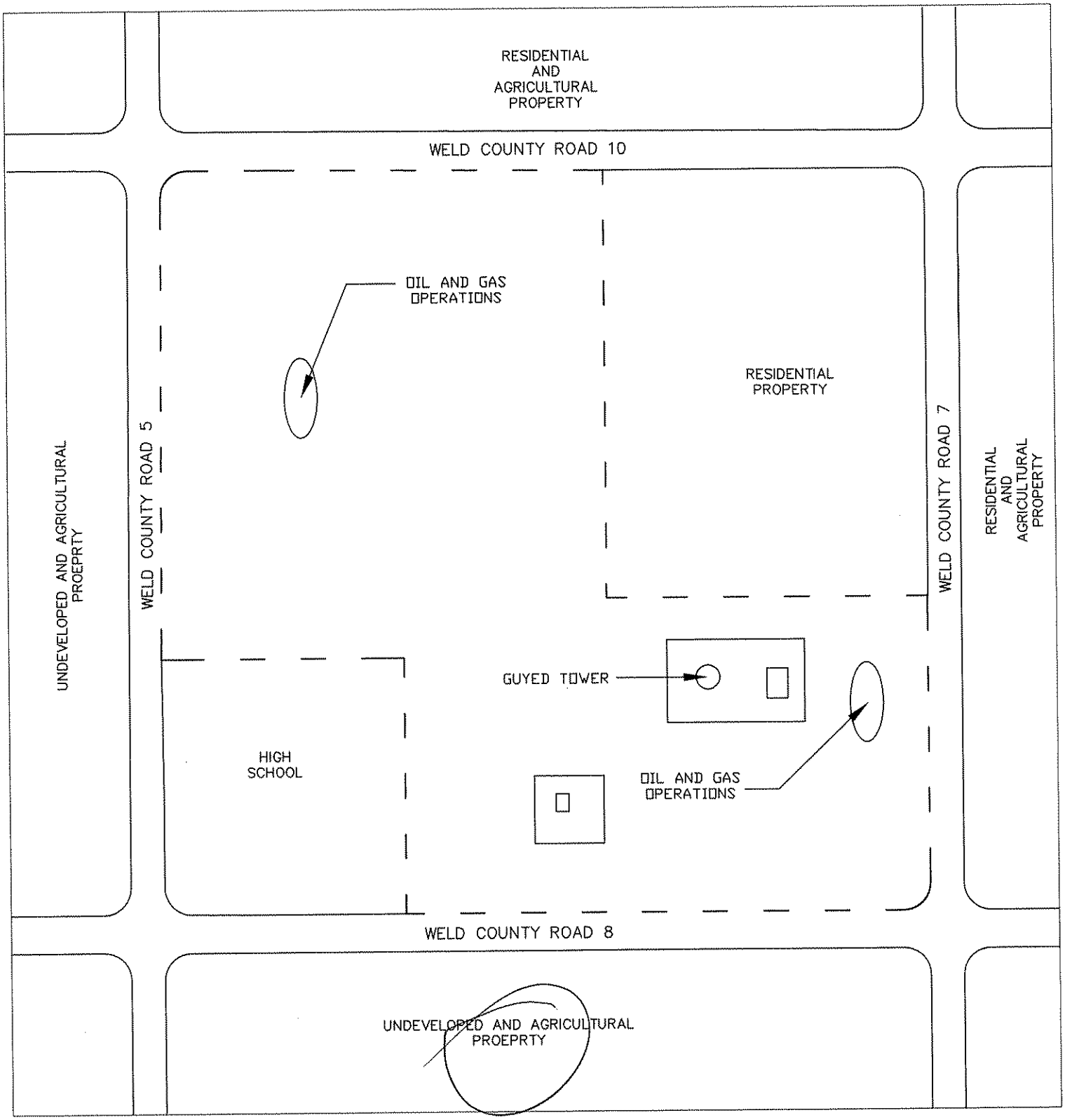
Figure 1 - Topographic Map, Figure 2 – Site Diagram



Source: USGS 7.5-Minute Series Topographic Map:
Erie and Frederick, Colorado Quadrangles

NORTH

Figure 1 **LOCATION/TOPOGRAPHIC MAP** **Published: 1967** **Revised: 1979** **SCALE: 1" = 2,000'**	Terracon	**FIGURE 1** **Erie Property** **Township 1N, Range 68W, Sec. 16** **Erie, Colorado** **Project No. 25087780**



LEGEND

APPROXIMATE SITE BOUNDARY

N

FIGURE 2 - SITE DIAGRAM
ERIE PROPERTY
SECTION 16, TOWNSHIP 1 NORTH, RANGE 68 WEST
ERIE, COLORADO

Project Mngr:	RP	Terracon	Project No. 25087780
Designed By:	--	10625 West I-70 Frontage Road North Wheat Ridge, CO 80033	Scale: NTS
Checked By:	DB		Date: 06/30/08
Approved By:	RP		Drawn By: DGB
File Name: 25087780/FIGURE 2			Figure No. 2

APPENDIX B

Description of Terms and Acronyms

Description of Selected General Terms and Acronyms

Term/Acronym	Description
ACM	Asbestos Containing Material. Asbestos is a naturally occurring mineral, three varieties of which (chrysotile, amosite, crocidolite) have been commonly used as fireproofing or as binding agents in construction materials. Inhalation of asbestos fibers has been documented to cause asbestosis (scarring of the lung), lung cancer, and mesothelioma (a cancer of the chest wall lining). Most Federal and State agencies define ACM as a material containing more that one (1) percent asbestos, although some states, such as California, define ACM as material containing 0.1% or more asbestos. In order to determine the ACM status of suspect building materials, a minimum number of samples must be collected and analyzed, depending on the type and quantity of the suspect material. A suspect material can only be confirmed as non-ACM when analytical results of all required samples are below applicable regulatory limits. Asbestos concentrations are generally determined using polarized light microscopy or transmission electron microscopy. An asbestos containing material may be classified as either friable or non-friable. Friable materials are those that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable ACM are materials in which the asbestos fibers are more firmly bound in a matrix of tar, plastic or other such material, and which have a lower potential for asbestos fiber release. Federal and State regulations require that that an asbestos survey be performed prior to renovation, dismantling, demolition or other activities that may disturb suspect or confirmed ACM unless such materials are removed as ACM prior to planned disturbances. ACM removal may also be required if confirmed ACM becomes damaged, or if renovation or demolition activities could result in damage to confirmed or suspect ACM. Depending upon the quantity, notification to Federal or State regulatory agencies may be required prior to ACM removal (abatement) operations. Abatement of friable or potentially friable ACM must be performed by a licensed abatement contractor in accordance with applicable federal, state, or local regulations. OSHA worker protection regulations will also apply.
AHERA	Asbestos Hazard Emergency Response Act
AST	Above Ground Storage Tanks. ASTs are generally described as storage tanks less than 10% of which are below ground (i.e., buried). Tanks located in a basement, but not buried, are also considered ASTs. Whether, and the extent to which, an AST is regulated, is determined on a case-by-case basis and depends upon tank size, its contents and the jurisdiction of its location.
AULs	Activity and Use Limitations
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethyl benzene, and Xylenes. BTEX are VOC components found in gasoline and commonly used as analytical indicators of a petroleum hydrocarbon release.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (a.k.a. Superfund). CERCLA is the federal act that regulates abandoned or uncontrolled hazardous waste sites. Under this Act, joint and several liability may be imposed on potentially responsible parties for cleanup-related costs.
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System. An EPA compilation of sites having suspected or actual releases of hazardous substances to the environment. CERCLIS also contains information on site inspections, preliminary assessments and remediation of hazardous waste sites. These sites are typically reported to EPA by states and municipalities or by third parties pursuant to CERCLA Section 103.
CFR	Code of Federal Regulations
CESQG	Conditionally exempt small quantity generators.
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System. An EPA-maintained federal database which stores information on notifications of oil discharges and hazardous substance releases in quantities greater than the applicable reportable quantity under CERCLA. ERNS is a cooperative data-sharing effort between EPA, DOT, and the National Response Center.
ESA	Environmental Site Assessment

Description of Terms and Acronyms (cont.)

Term/Acronym	Description
FRP	Fiberglass Reinforced Plastic
Hazardous Substance	As defined under CERCLA, this is (A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title; (C) any hazardous waste having characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (with some exclusions); (D) any toxic pollutant listed under section 1317(a) of Title 33; (E) any hazardous air pollutant listed under section 112 of the Clear Air Act; and (F) any imminently hazardous chemical substance or mixture with respect to which the EPA Administrator has taken action under section 2606 of Title 15. This term does not include petroleum, including crude oil or any fraction thereof which is not otherwise listed as a hazardous substance under subparagraphs (A) through (F) above, and the term does not include natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).
Hazardous Waste	This is defined as having characteristics identified or listed under section 3001 of the Solid Waste Disposal Act (with some exceptions). RCRA, as amended by the Solid Waste Disposal Act of 1980, defines this term as a "solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."
IC / EC	Industrial Controls / Engineering Controls
ILP	Innocent Landowner Program
IOP	Innocent Owner/Operator Program
LQG	Large quantity generators.
LUST	Leaking Underground Storage Tank. This is a federal term set forth under RCRA for leaking USTs. Some states also utilize this term.
MCL	Maximum Contaminant Level. This Safe Drinking Water concept (and also used by many states as a ground water cleanup criteria) refers to the limit on drinking water contamination that determines whether a supplier can deliver water from a specific source without treatment.
MSDS	Material Safety Data Sheets. Written/printed forms prepared by chemical manufacturers, importers and employers which identify the physical and chemical traits of hazardous chemicals under OSHA's Hazard Communication Standard.
NESHAP	National Emissions Standard for Hazardous Air Pollutants (Federal Clean Air Act). This part of the Clean Air Act regulates emissions of hazardous air pollutants.
NFRAP	Facilities where there is "No Further Remedial Action Planned," as more particularly described under the Records Review section of this report.
NGVD	National Geodetic Vertical Datum
NOV	Notice of Violation. A notice of violation or similar citation issued to an entity, company or individual by a state or federal regulatory body indicating a violation of applicable rule or regulations has been identified.
NPDES	National Pollutant Discharge Elimination System (Clean Water Act). The federal permit system for discharges of polluted water.
NPL	National Priorities List, as more particularly described under the Records Review section of this report.
OSHA	Occupational Safety and Health Administration or Occupational Safety and Health Act
PACM	Presumed Asbestos-Containing Material. A material that is suspected of containing or presumed to contain asbestos but which has not been analyzed to confirm the presence or absence of asbestos.
PCB	Polychlorinated Biphenyl. A halogenated organic compound commonly in the form of a viscous liquid or resin, a flowing yellow oil, or a waxy solid. This compound was historically used as dielectric fluid in electrical equipment (such as electrical transformers and capacitors, electrical ballasts, hydraulic and heat transfer fluids), and for numerous heat and fire sensitive applications. PCB was preferred due to its durability, stability (even at high temperatures), good chemical resistance, low volatility, flammability, and conductivity. PCBs, however, do not break down in the environment and are classified by the EPA as a suspected carcinogen. 1978 regulations, under the Toxic Substances Control Act, prohibit manufacturing of PCB-containing equipment; however, some of this equipment may still be in use today.
pCi/l	picoCuries per Liter of Air. Unit of measurement for Radon and similar radioactive materials.
PLM	Polarized Light Microscopy (see ACM section of the report, if included in the scope of services)

Description of Terms and Acronyms (cont.)

Term/Acronym	Description
PST	Petroleum Storage Tank. An AST or UST that contains a petroleum product.
Radon	A radioactive gas resulting from radioactive decay of naturally-occurring radioactive materials in rocks and soils containing uranium, granite, shale, phosphate, and pitchblende. Radon concentrations are measured in picoCuries per Liter of Air. Exposure to elevated levels of radon creates a risk of lung cancer; this risk generally increases as the level of radon and the duration of exposure increases. Outdoors, radon is diluted to such low concentrations that it usually does not present a health concern. However, radon can accumulate in building basements or similar enclosed spaces to levels that can pose a risk to human health. Indoor radon concentrations depend primarily upon the building's construction, design and the concentration of radon in the underlying soil and ground water. The EPA recommended annual average indoor "action level" concentration for residential structures is 4.0 pCi/l.
RCRA	Resource Conservation and Recovery Act. Federal act regulating solid and hazardous wastes from point of generation to time of disposal ("cradle to grave"). 42 U.S.C. 6901 et seq.
RCRA Generators	The RCRA generators list is part of the RCRIS database maintained by EPA and lists facilities that generate hazardous waste as part of their normal business operations, as more particularly defined under Section 5.0 of this report.
RCRA CORRACTS/TSDs	The USEPA maintains a database of RCRA facilities associated with treatment, storage, and disposal (TSD) of hazardous materials, which are undergoing "corrective action". A "corrective action" order is issued when there is a release of hazardous waste or constituents into the environment from a RCRA facility.
RCRA Non-CORRACTS/TSDs	The RCRA Non-CORRACTS/TSD Database is a compilation by the USEPA of facilities, which report storage, transportation, treatment, or disposal of hazardous waste. Unlike the RCRA CORRACTS/TSD database, the RCRA Non-CORRACTS/TSD database does not include RCRA facilities where corrective action is required.
RCRA Violators List	RAATS. RCRA Administrative Actions Taken. RAATS information is now contained in the RCRIS database and includes records of administrative enforcement actions against facilities for noncompliance.
RCRIS	Resource Conservation and Recovery Information System, as defined in the Records Review section of this report.
REC	Recognized Environmental Conditions are defined by ASTM E 1527-05 as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property." The term includes hazardous substances or petroleum products even under conditions of compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to the public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.
SCL	State "CERCLIS" List (see SPL /State Priority List, below).
SPCC	Spill Prevention, Control and Countermeasures. SPCC plans are required under federal law (Clean Water Act and Oil Pollution Act) for any facility storing petroleum in tanks and/or containers of 55-gallons or more that when taken in aggregate exceed 1,320 gallons. SPCC plans are also required for facilities with underground petroleum storage tanks with capacities of over 42,000 gallons. Many states have similar spill prevention programs, which may have additional requirements.
SPL	State Priority List. State list of confirmed sites having contamination in which the state is actively involved in clean up activities or is actively pursuing potentially responsible parties for clean up. Sometimes referred to as a State "CERCLIS" List.
SQG	Small quantity generators.
SWF	Solid Waste Facility. Landfills listed by a state database.
TPH	Total Petroleum Hydrocarbons
TRI	Toxic Release Inventory. Routine EPA report on releases of toxic chemicals to the environment based upon information submitted by entities subject to reporting under the Emergency Planning and Community Right to Know Act.
TSCA	Toxic Substances Control Act. A federal law regulating manufacture, import, processing and distribution of chemical substances not specifically regulated by other federal laws (such as asbestos, PCBs, lead-based paint and radon). 15 U.S.C 2601 et seq.
USACE	United States Army Corps of Engineers

Description of Terms and Acronyms (cont.)

Term/Acronym	Description
USC	United States Code
USGS	United States Geological Survey
USNRCS	United States Department of Agriculture-Natural Resource Conservation Service
UST	Underground Storage Tank. Most federal and state regulations, as well as ASTM E 1527-05, define this as any tank, incl., underground piping connected to the tank, that is or has been used to contain hazardous substances or petroleum products and the volume of which is 10% or more beneath the surface of the ground (i.e., buried).
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound
Wetlands	Areas that are typically saturated with surface or ground water that creates an environment supportive of wetland vegetation (i.e., swamps, marshes, bogs). The Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) defines wetlands as areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. For an area to be considered a jurisdictional wetland, it must meet the following criteria: more than 50 percent of the dominant plant species must be categorized as Obligate, Facultative Wetland, or Facultative on lists of plant species that occur in wetlands; the soil must be hydric; and, wetland hydrology must be present. The federal Clean Water Act which regulates "waters of the US," also regulates wetlands, a program jointly administered by the USACE and the EPA. Waters of the U.S. are defined as: (1) waters used in interstate or foreign commerce, including all waters subject to the ebb and flow of tides; (2) all interstate waters including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, etc., which the use, degradation, or destruction could affect interstate/ foreign commerce; (4) all impoundments of waters otherwise defined as waters of the U. S., (5) tributaries of waters identified in 1 through 4 above; (6) the territorial seas; and (7) wetlands adjacent to waters identified in 1 through 6 above. Only the USACE has the authority to make a final wetlands jurisdictional determination.

Description of Terms and Acronyms (cont.)

Colorado Term/Acronym	Description
SHWS	The State of Colorado does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.
SWF/LF	State and/or Tribal database of solid waste facilities located within Colorado. The database information may include the facility name, class, operation type, area, estimated operational life, and owner.
LUST	State and/or Tribal database of leaking underground storage tanks in the state of Colorado.
UST	State and/or Tribal database of registered storage tanks in the State of Colorado which may include the owner and location of the tanks.
CO ERNS	Listing of spills reported to the CDPHE. Information includes releases of hazardous or potential hazardous chemical/materials into the environment.
AUL	Activity and use limitations include both engineering controls and institutional controls. The Department of Public Health & Environment approve requests to restrict the future use of a property using an enforceable agreement called an environmental real covenant. When a contaminated site is not cleaned up completely, land use restrictions may be used to ensure that the selected cleanup remedy is adequately protective of human health and the environment.
VCP	State and/or Tribal facilities included as Voluntary Cleanup Program sites.

APPENDIX C

Historical Documentation

COGIS - WELL Information

Scout Card | Related | Insp. | MIT | GIS | Doc | Wellbore | Order

Surface Location Data for API # 05-123-15592 Status: F

Well Name/No:	STATE OF COLORADO AZ #1 (click well name for production)		
Operator:	KERR-MCGEE OIL & GAS ONSHORE LP - 47120		
Status Date:	4/14/1998	Federal or State Lease #:	70/8570-S
County:	WELD #123	Location:	SWNW 16 1N 6
Field:	WATTENBERG - #90750	Elevation:	5,158 ft.
Planned Location	1555 FNL 1040 FWL	Lat/Long: 40.054007/-105.014436	Lat/Long Calcula

Wellbore Data for Sidetrack #00 Status: PR 4/1

Spud Date:	2/22/1992	Spud Date is:	ACTUAL

Wellbore Permit

Permit #:	19920173	Expiration Date:	
Prop Depth/Form:	8758	Surface Mineral Owner Same:	Y
Mineral Owner:	STATE	Surface Owner:	
Unit:		Unit Number:	7018570S
Formation and Spacing:	Code: DKJCD , Formation: DAKOTA-J-CODELL , Order: 499 , Unit Acreage: 320, Drill		

Wellbore Completed

Completion Date:	1/11/1994		
Measured TD:	8748	Measured PB depth:	8700
True Vertical TD:	0	True Vertical PB depth:	
Log Types:	DIL, SP, GR, CAL, CNL, LDT		
Casing:	String Type: SURF , Hole Size: 12.25, Size: 8.625, Top: 0, Depth: 1274, Weight: 24		
Cement:	Sacks: 880, Top: 0, Bottom: , Method Grade:		
Casing:	String Type: 1ST , Hole Size: 7.875, Size: 5.5, Top: 0, Depth: 8743, Weight: 17		
Cement:	Sacks: 600, Top: 0, Bottom: , Method Grade: CBL		

Formation	Log Top	Log Bottom	Cc
SUSSEX	4820		
SHANNON	5240		
NIOBRARA	7540		
CODELL	7880		
J SAND	8348		
DAKOTA	8504		

Completed information for formation CODL

1st Production Date:	N/A	Choke Size:	
Status Date:	4/14/1998	Hole Completion:	
Commingled:		Production Method:	
Formation Name:	CODELL	Status:	PR
Formation Treatment:			
Tubing Size:	2.375	Tubing Setting Depth:	8349
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	

No Initial Test Data was found for formation CODL .

Perforation Data:

Interval Bottom:	7822	Interval Top:	7904

# of Holes:	72	Hole Size:	0.5

Completed information for formation DKJCD

1st Production Date:	N/A	Choke Size:	0.000
Status Date:	N/A	Hole Completion:	
Commingled:	Y	Production Method:	
Formation Name:	DAKOTA-J-CODELL	Status:	
Formation Treatment:			
Tubing Size:	2.375	Tubing Setting Depth:	8349
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	
Initial Test Data:			
Test Date:	1/11/1994	Test Method:	FLOWING
Hours Tested:	24	Gas Type:	
Gas Disposal:	SOLD		

Test Type	Measure
BBLS_H2O	120
BBLS_OIL	72
CALC_GOR	13125
CASING_PRESS	821
MCF_GAS	945
TUBING_PRESS	550

Perforation Data:			
Interval Bottom:	8526	Interval Top:	7904
# of Holes:	272	Hole Size:	0.5

Completed information for formation DKTA

1st Production Date:	8/6/1993	Choke Size:	
Status Date:	4/14/1998	Hole Completion:	
Commingled:	Y	Production Method:	FLOWBACK
Formation Name:	DAKOTA	Status:	PR
Formation Treatment:	FRAC DOWN CSG. PAD W/ 15,000 GAL 35# XLINK GAUR. PUMP 18,500 GAL XLINI 10,500# 20/40 M. FLUSH W/ 84 BBL 4% KCL H2O. MAX TUBING PRESS. 5,000 PSI.		
Tubing Size:	2.375	Tubing Setting Depth:	8501
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	
Initial Test Data:			
Test Date:	9/30/1993	Test Method:	FLOWING
Hours Tested:	2	Gas Type:	
Gas Disposal:	SOLD		

Test Type	Measure
BBLS_H2O	10
CALC_BBLS_H2O	120
CALC_MCF_GAS	1320
CASING_PRESS	1648
MCF_GAS	110
TUBING_PRESS	1558

Perforation Data:			
Interval Bottom:	8526	Interval Top:	8504
# of Holes:	88	Hole Size:	0.5

Completed information for formation JSND

1st Production Date:	N/A	Choke Size:	

Status Date:	4/14/1998	Hole Completion:	
Commingled:	Y	Production Method:	
Formation Name:	J SAND	Status:	PR
Formation Treatment:	GAUR W/ 359,140# 20/40 M. FLUSH W/ 89 BBL 2% KCL H2O ATP 2,100 PSI. AIR 35 3,000 GAL 40# SLICK H2O & 4,500# DIVERTAFRAC SAND.		
Tubing Size:	2.375	Tubing Setting Depth:	8501
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	

No Initial Test Data was found for formation JSND .

Perforation Data:

Interval Bottom:	8476	Interval Top:	8348
# of Holes:	112	Hole Size:	0.5

COGIS - Field Inspection Report

			Related GIS Doc
API Number:	05-123-15592-00	Well Name:	STATE OF COLORADO AZ #1
Well Location:	SWNW 16 1N 68W	Lat: 40.054021	Long: -105.013864
Operator #:	47120	Operator Name:	KERR-MCGEE OIL & GAS ONSHORE LP
Inspection Date:	2/5/1996	Inspector:	DAVID SHELTON

Inspection was: **No Satisfactory/Unsatisfactory Indicator**

Insp. Type: **PR** Insp. Stat: **PR** Plugged: Pass/Fail: **P**
Violation: **N** NOAV Sent:
UIC Violation Type: Brhd. Pressure:
Inj. Pressure: T-C Ann. Pressure:
Date Corrective Action Due: Date Remedied:

Field Inspection Comments and Observations

Insp. Comment	Inspection/Violation Comments
HISTORICAL	

COGIS - WELL Information

Scout Card | Related | Insp. | MIT | GIS | Doc | Wellbore | Order

Surface Location Data for API # 05-123-16105 Status: I

Well Name/No:	STATE #16-9V	(click well name for production)	
Operator:	NOBLE ENERGY INC - 100322		
Status Date:	5/4/2005	Federal or State Lease #:	
County:	WELD #123	Location:	NESE 16 1N 68W 6
Field:	WATTENBERG - #90750	Elevation:	5,175 ft.
Planned Location	1450 FSL 990 FEL	Lat/Long: 40.047817/-105.002676	Lat/Long Calculated F

Wellbore Data for Sidetrack #00 Status: PR 5/4

Spud Date:	9/6/1992	Spud Date is:	ACTUAL

Wellbore Permit

Permit #:	19921044	Expiration Date:	
Prop Depth/Form:	8717	Surface Mineral Owner Same:	
Mineral Owner:	STATE	Surface Owner:	
Unit:		Unit Number:	
Formation and Spacing:	Code: DK-J , Formation: DAKOTA-JSND , Order: 499-1 , Unit Acreage: 320, Drill Unit:		
Formation and Spacing:	Code: NB-CD , Formation: NIOBRARA-CODELL , Order: 407-66 , Unit Acreage: 320, D		

Wellbore Completed

Completion Date:	2/22/1993		
Measured TD:	8717	Measured PB depth:	8656
True Vertical TD:	0	True Vertical PB depth:	
Log Types:	CDL/GR, DIFL/GR, VDL/GR		
Casing:	String Type: SURF , Hole Size: 12.25, Size: 8.625, Top: 0, Depth: 715, Weight: 24		
Cement:	Sacks: 500, Top: 0, Bottom: , Method Grade:		
Casing:	String Type: 1ST , Hole Size: 7.875, Size: 4.5, Top: 0, Depth: 8700, Weight: 11.6		
Cement:	Sacks: 370, Top: 0, Bottom: , Method Grade: CBL		

Formation	Log Top	Log Bottom	Cored
PARKMAN	4324		
SUSSEX	4687		
NIOBRARA	7556		
FORT HAYS	7906		
CODELL	7926		
GREENHORN	7997		
J SAND	8357		
DAKOTA	8526		

Completed information for formation CODL

1st Production Date:	N/A	Choke Size:	
Status Date:	2/24/2005	Hole Completion:	N
Commingled:	N	Production Method:	FLOWING
Formation Name:	CODELL	Status:	PR
Formation Treatment:	REMOVE RBP AND COMMINGLE WITH J SAND, 1/27/05.		
Tubing Size:	2.375	Tubing Setting Depth:	8368
Tubing Packer Depth:		Tubing Multiple Packer:	

Open Hole Top:		Open Hole Bottom:	
Initial Test Data:			
Test Date:	2/24/2005	Test Method:	FLOWING
Hours Tested:	24	Gas Type:	WET
Gas Disposal:	SOLD		

Test Type	Measure
BBLS_H2O	5
BBLS_OIL	3
BTU_GAS	1141
CALC_BBLS_H2O	5
CALC_BBLS_OIL	3
CALC_GOR	37333
CALC_MCF_GAS	112
CASING_PRESS	175
GRAVITY_OIL	50
MCF_GAS	112
TUBING_PRESS	175

Perforation Data:			
Interval Bottom:	7950	Interval Top:	7928
# of Holes:	100	Hole Size:	0.42

Completed information for formation J-CDL

1st Production Date:	12/3/1994	Choke Size:	
Status Date:	N/A	Hole Completion:	
Commingled:	Y	Production Method:	FLOWING
Formation Name:	J-CODELL	Status:	
Formation Treatment:			
Tubing Size:	2.375	Tubing Setting Depth:	8256
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	
Initial Test Data:			
Test Date:	3/29/1993	Test Method:	FLOWING
Hours Tested:	12	Gas Type:	
Gas Disposal:	SOLD		

Test Type	Measure
BBLS_H2O	6
BBLS_OIL	35
CALC_BBLS_H2O	12
CALC_BBLS_OIL	70
CALC_GOR	2600
CALC_MCF_GAS	182
CASING_PRESS	150
MCF_GAS	91
TUBING_PRESS	700

Perforation Data:			
Interval Bottom:	8384	Interval Top:	7928
# of Holes:	65	Hole Size:	0.38

Completed information for formation JSND

1st Production Date:	3/26/1993	Choke Size:	
Status Date:	5/4/2005	Hole Completion:	N
Commingled:	Y	Production Method:	

Formation Name:	J SAND	Status:	PR
Formation Treatment:	REMOVE RBP AND COMMINGLE WITH CODELL, 1/27/05.		
Tubing Size:		Tubing Setting Depth:	
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:		Open Hole Bottom:	
Initial Test Data:			
Test Date:	N/A	Test Method:	
Hours Tested:		Gas Type:	
Gas Disposal:			

Test Type	Measure
BBLS_H2O	31
BBLS_OIL	4
CALC_GOR	157250
CASING_PRESS	620
MCF_GAS	629
TUBING_PRESS	380

Perforation Data:			
Interval Bottom:	8384	Interval Top:	8370
# of Holes:	21	Hole Size:	

COGIS - Field Inspection Report

			Related GIS Doc
API Number:	05-123-16105-00	Well Name:	STATE #16-9V
Well Location:	NESE 16 1N 68W	Lat: 40.047826	Long: -105.002097
Operator #:	100322	Operator Name:	NOBLE ENERGY INC
Inspection Date:	8/22/1996	Inspector:	DAVID SHELTON

Inspection was: **No Satisfactory/Unsatisfactory Indicator**

Erie Property
T 1N, R 68W, Section 16
Erie, CO 80516

Inquiry Number: 2254345.2
June 25, 2008

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

6/25/08

Site Name:
Erie Property
T 1N, R 68W, Section 16
Erie, CO 80516

Client Name:
Terracon, Inc.
10625 West I-70 Frontage Rd N
Wheat Ridge, CO 80033

EDR® Environmental Data Resources Inc

EDR Inquiry # 2254345.2

Contact: Darren Bruns

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Certified Sanborn Results:

Site Name: Erie Property
Address: T 1N, R 68W, Section 16
City, State, Zip: Erie, CO 80516
Cross Street:
P.O. # NA
Project: 25087780
Certification # ADAE-45BC-AECA

Sanborn® Library search results
Certification # ADAE-45BC-AECA

UNMAPPED PROPERTY

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- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

Total Maps: 0

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Page 1 of 2
Proposal No: 25080504

In order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Relief and Brownfields Revitalization Act of 2001, the user must respond to the following questions. Failure to provide this information to the environmental professional may result in significant data gaps, which may limit our ability to identify recognized environmental conditions resulting in a determination that "all appropriate inquiry" is not complete. This form represents a type of interview and as such, the user has an obligation to answer all questions in good faith, to the extent of their actual knowledge.

Site Name: Erie School Trust Property Site Address: Township 1N 68W Section 16: NW; SE; E2SW; N2NW4SW4

1) Are you aware of any environmental cleanup liens against the site that are filed or recorded under federal, tribal, state, or local law (40 CFR 312.25)? X No ___Yes If yes, please explain.

2) Are you aware of any activity and use limitations (AULs), such as engineering controls, land use restrictions, or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state, or local law (40 CFR 312.26)? ___No ___Yes If yes, please explain.

3) As the user of this ESA, do you have any specialized knowledge or experience related to the site or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the site or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business (40 CFR 312-28)? X No ___Yes If yes, please explain.

4) Does the purchase price being paid for this site reasonably reflect the fair market value of the site (40 CFR 312.29)? ~~___No~~ ___Yes N/A

If no, have you considered whether the lower purchase price is because contamination is known or believed to be present at the site (40 CFR 312.29)? ___No ___Yes If yes, please explain.

5) Are you aware of commonly known or reasonably ascertainable information about the site that would help the environmental professional to identify conditions indicative of releases or threatened releases (40 CFR 312.30)? X No ___Yes If yes, please explain.

6) As the user of this ESA, based on your knowledge and experience related to the site, are there any obvious indicators that point to the presence or likely presence of contamination at the site (40 CFR 312.31)? X No ___Yes If yes, please explain.

Request for Information and Documentation

In addition to the specific questions outlined above, the user is requested to provide the following information and documentation, as available. ASTM requires that this information, if available, be provided to the environmental professional prior to the site visit.

Please return this form with the signed and completed Agreement for Services.

ASTM E 1527-05 USER QUESTIONNAIRE

Proposal No: 25080504

Item Supplied "X"	Not Applicable, Not Available or Not Known "X"	Item Requested (See Proposal)	Contacts/Comments or Indicate Attachment
	X	Point of Contact for Access	Name/Phone:
X		Current Site Owner Colorado State Land Board	Name/Phone: David Kodenberg 303 3130706
	X	Current Facility Operator	Name/Phone:
	X	Contacts for Prior Owners	Name/Phone:
	X	Contacts for Prior Occupants	Name/Phone:
X		Access Restrictions	Need to Contact Lessee's which Have already Been provided
	X	Notification of Special Requirements Regarding Confidentiality	
X		Legal Description and Diagram / Survey of Site	Survey is Being Conducted. T1N R68W Section 16: NW¼SE¼; E2SW¼; N2NW¼SW¼
X		Chain of Title with Grantor/Grantee Summary (back to 1940 or first developed use)	owned by SLB since statehood
X		Reasons for Conducting ESA	Annexation Zoning of Property

Helpful Documents Checklist
Pursuant to ASTM E 1527-05 § 10.8, do you know whether any of the following documents exist related to the subject property and, if so, whether copies can and will be provided to the environmental professional? Check all that apply.

- ☐ Environmental site assessment reports
- ☐ Environmental compliance audit reports
- ☐ Geotechnical studies
- ☐ Reports regarding hydrogeologic conditions on the property or surrounding area
- ☐ Registrations for above or underground storage tanks
- ☐ Notices or other correspondence from any governmental agency relating to past or current violations of environmental laws with respect to the property or relating to environmental liens encumbering the property
- ☐ Registrations for underground injection systems
- ☐ Environmental permits/plans, solid waste permits, hazardous waste disposal permits, wastewater permits, NPDES permits, underground injection permits, SPCC plans

David Kodenberg
Name (Authorized Client Representative)

Real Estate Portfolio Agent
Title

Signature

June 13, 2008
Date

Please return this form with the signed and completed Agreement for Services.

APPENDIX D

Environmental Database Information

Erie Property
T 1N, R 68W, Section 16
Erie, CO 80516

Inquiry Number: 2254345.1s
June 25, 2008

The EDR Radius Map™ Report

Prepared using the EDR FieldCheck® System

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

GeoCheck - Not Requested

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

The EDR FieldCheck®System enables EDR's customers to make certain online modifications to the maps and text contained in EDR Radius Map Reports. As a result, the maps and text contained in this Report may have been so modified. EDR has not taken any action to verify any such modifications, and this report and the findings set forth herein must be read in light of this fact. The EDR FieldCheck System accesses user-modified records from previously submitted reports. Any user-modified record from a previous report that is plotted outside the search radius of this report may not be included in this report.

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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EXECUTIVE SUMMARY

A search of the environmental records was conducted by Environmental Data Resources, Inc. (EDR). TERRACON, INC. used the EDR FieldCheck System to review and/or revise the results of this search, based on independent data verification by TERRACON, INC.. The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

T 1N, R 68W, SECTION 16
ERIE, CO 80516

COORDINATES

Latitude (North):	40.050690 - 40° 3' 2.5''
Longitude (West):	105.008750 - 105° 0' 31.5''
Universal Tranverse Mercator:	Zone 13
UTM X (Meters):	499253.6
UTM Y (Meters):	4433173.0
Elevation:	5170 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	40105-A1 ERIE, CO
Most Recent Revision:	1979
East Map:	40104-A8 FREDERICK, CO
Most Recent Revision:	1994

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No sites were identified in following databases.

FEDERAL RECORDS

NPL National Priority List
Proposed NPL Proposed National Priority List Sites
Delisted NPL National Priority List Deletions
NPL LIENS Federal Superfund Liens
CERCLIS Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP CERCLIS No Further Remedial Action Planned
LIENS 2 CERCLA Lien Information
CORRACTS Corrective Action Report

EXECUTIVE SUMMARY

RCRA-TSDF RCRA - Transporters, Storage and Disposal
RCRA-LQG RCRA - Large Quantity Generators
RCRA-SQG RCRA - Small Quantity Generators
RCRA-CESQG RCRA - Conditionally Exempt Small Quantity Generator
RCRA-NonGen RCRA - Non Generators
US ENG CONTROLS Engineering Controls Sites List
US INST CONTROL Sites with Institutional Controls
ERNS Emergency Response Notification System
HMIRS Hazardous Materials Information Reporting System
DOT OPS Incident and Accident Data
US CDL Clandestine Drug Labs
US BROWNFIELDS A Listing of Brownfields Sites
DOD Department of Defense Sites
FUDS Formerly Used Defense Sites
LUCIS Land Use Control Information System
CONSENT Superfund (CERCLA) Consent Decrees
ROD Records Of Decision
UMTRA Uranium Mill Tailings Sites
ODI Open Dump Inventory
DEBRIS REGION 9 Torres Martinez Reservation Illegal Dump Site Locations
MINES Mines Master Index File
TRIS Toxic Chemical Release Inventory System
TSCA Toxic Substances Control Act
FTTS FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS FIFRA/TSCA Tracking System Administrative Case Listing
SSTS Section 7 Tracking Systems
ICIS Integrated Compliance Information System
PADS PCB Activity Database System
MLTS Material Licensing Tracking System
RADINFO Radiation Information Database
FINDS Facility Index System/Facility Registry System
RAATS RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

SHWS This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.
METHANE SITE Methane Site Investigations - Jefferson County 1980
SWF/LF Solid Waste Sites & Facilities
Methane Investigation Methane Gas & Swamp Findings
HIST LF Historical Landfill List
LUST Leaking Underground Storage Tank List
LUST TRUST RAP Site Listing
UST Underground Storage Tank Database
LAST Leaking Aboveground Storage Tank Listing
AST Aboveground Tank List
CO ERNS Spills Database
AUL Environmental Real Covenants List
VCP Voluntary Cleanup & Redevelopment Act Application Tracking Report
DRYCLEANERS Drycleaner Facilities
CDL Meth Lab Locations
NPDES Permitted Facility Listing
AIRS Permitted Facility & Emissions Listing
UMTRA Uranium Mill Tailings Sites

EXECUTIVE SUMMARY

ASBESTOS ..... Asbestos Abatement & Demolition Projects

TRIBAL RECORDS

INDIAN RESERV ..... Indian Reservations
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands
INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land
INDIAN UST ..... Underground Storage Tanks on Indian Land
INDIAN VCP ..... Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

Manufactured Gas Plants ... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

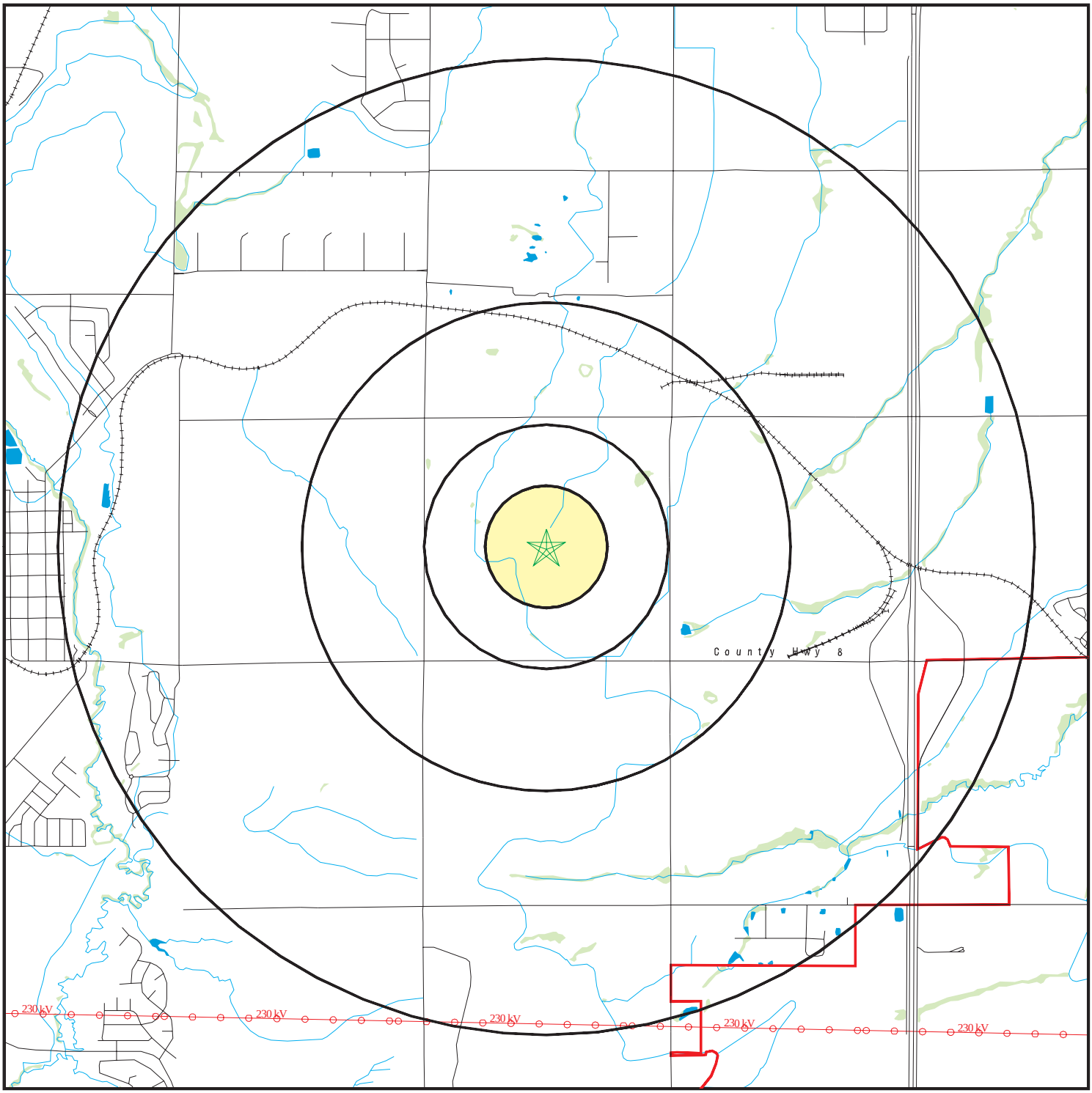
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:
There were no unmapped sites in this report.

OVERVIEW MAP - 2254345.1s



0 1/2 1 2 Miles

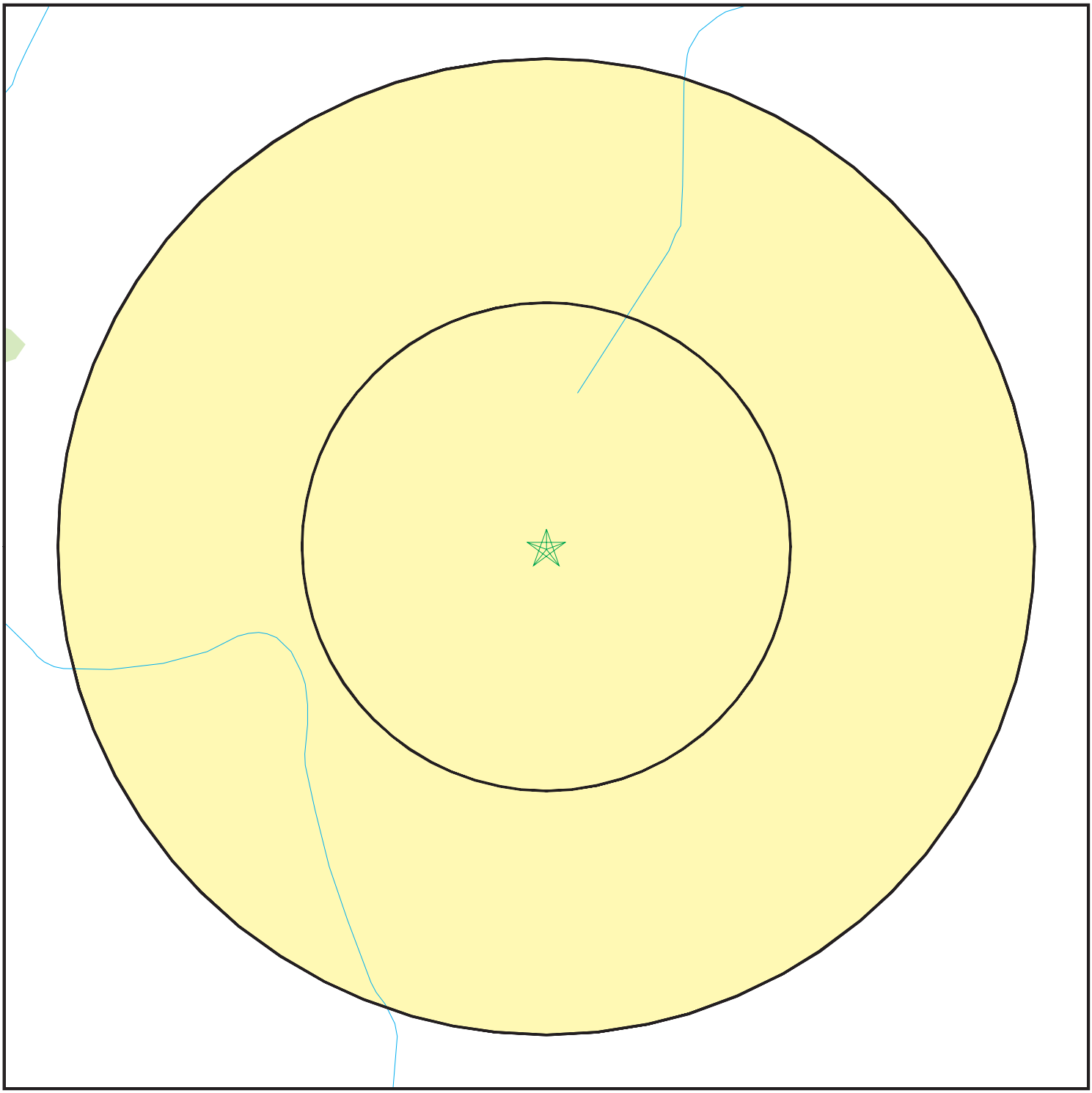
N

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
- Oil & Gas pipelines
- National Wetland Inventory
- State Wetlands

SITE NAME: Erie Property ADDRESS: T 1N, R 68W, Section 16 Erie CO 80516 LAT/LONG: 40.0507 / 105.0088	CLIENT: Terracon, Inc. CONTACT: Darren Bruns INQUIRY #: 2254345.1s DATE: June 25, 2008 12:10 pm

Copyright © 2008 EDR, Inc. © 2007 Tele Atlas Rel. 07/2006.

DETAIL MAP - 2254345.1s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines
- National Wetland Inventory
- State Wetlands

N

SITE NAME: Erie Property	CLIENT: Terracon, Inc.
ADDRESS: T 1N, R 68W, Section 16 Erie CO 80516	CONTACT: Darren Bruns
LAT/LONG: 40.0507 / 105.0088	INQUIRY #: 2254345.1s DATE: June 25, 2008 12:10 pm

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.500	0	0	0	0	0	0
Proposed NPL		1.500	0	0	0	0	0	0
Delisted NPL		1.500	0	0	0	0	0	0
NPL LIENS		0.500	0	0	0	NR	NR	0
CERCLIS		1.000	0	0	0	0	NR	0
CERC-NFRAP		1.000	0	0	0	0	NR	0
LIENS 2		0.500	0	0	0	NR	NR	0
CORRACTS		1.500	0	0	0	0	0	0
RCRA-TSDF		1.000	0	0	0	0	NR	0
RCRA-LQG		0.750	0	0	0	0	NR	0
RCRA-SQG		0.750	0	0	0	0	NR	0
RCRA-CESQG		0.750	0	0	0	0	NR	0
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
US ENG CONTROLS		1.000	0	0	0	0	NR	0
US INST CONTROL		1.000	0	0	0	0	NR	0
ERNS		0.500	0	0	0	NR	NR	0
HMIRS		0.500	0	0	0	NR	NR	0
DOT OPS		0.500	0	0	0	NR	NR	0
US CDL		0.500	0	0	0	NR	NR	0
US BROWNFIELDS		1.000	0	0	0	0	NR	0
DOD		1.500	0	0	0	0	0	0
FUDS		1.500	0	0	0	0	0	0
LUCIS		1.000	0	0	0	0	NR	0
CONSENT		1.500	0	0	0	0	0	0
ROD		1.500	0	0	0	0	0	0
UMTRA		1.000	0	0	0	0	NR	0
ODI		1.000	0	0	0	0	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
TRIS		0.500	0	0	0	NR	NR	0
TSCA		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
HIST FTTS		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
ICIS		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
RADINFO		0.500	0	0	0	NR	NR	0
FINDS		0.500	0	0	0	NR	NR	0
RAATS		0.500	0	0	0	NR	NR	0
STATE AND LOCAL RECORDS								
SHWS		N/A	N/A	N/A	N/A	N/A	N/A	N/A
METHANE SITE		0.500	0	0	0	NR	NR	0
SWF/LF		1.000	0	0	0	0	NR	0
Methane Investigation		0.500	0	0	0	NR	NR	0
HIST LF		1.000	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST		1.000	0	0	0	0	NR	0
LUST TRUST		1.000	0	0	0	0	NR	0
UST		0.750	0	0	0	0	NR	0
LAST		TP	NR	NR	NR	NR	NR	0
AST		0.750	0	0	0	0	NR	0
CO ERNS		0.500	0	0	0	NR	NR	0
AUL		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0
DRYCLEANERS		0.750	0	0	0	0	NR	0
CDL		0.500	0	0	0	NR	NR	0
NPDES		0.500	0	0	0	NR	NR	0
AIRS		0.500	0	0	0	NR	NR	0
UMTRA		1.000	0	0	0	0	NR	0
ASBESTOS		0.500	0	0	0	NR	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.500	0	0	0	0	0	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
INDIAN LUST		1.000	0	0	0	0	NR	0
INDIAN UST		0.750	0	0	0	0	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.500	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

N/A = This State does not maintain a SHWS list. See the Federal CERCLIS list.

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 26

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/17/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/17/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/08/2008
Date Data Arrived at EDR: 03/07/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/26/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 34

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Transporters, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/06/2008
Date Data Arrived at EDR: 03/06/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 43

Source: Environmental Protection Agency
Telephone: 303-312-6149
Last EDR Contact: 05/21/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 04/22/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 04/16/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 29

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/16/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 02/14/2008
Date Data Arrived at EDR: 02/27/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 22

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/28/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/28/2008
Next Scheduled EDR Contact: 06/23/2008
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/30/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 04/30/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 05/09/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 08/31/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 41

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 04/03/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 06/09/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 02/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 35

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/22/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/14/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 06/23/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/07/2008
Date Data Arrived at EDR: 03/26/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 23

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/25/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/11/2008
Date Data Arrived at EDR: 04/24/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 27

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/11/2008
Date Data Arrived at EDR: 04/24/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 27

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/14/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 02/28/2008
Date Data Arrived at EDR: 03/18/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 49

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/14/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 06/20/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/22/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/29/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 05/01/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/08/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 28

Source: EPA
Telephone: (303) 312-6312
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/11/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

SHWS: This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: Department of Public Health & Environment
Telephone: 303-692-3300
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: N/A

METHANE SITE: Methane Site Investigations - Jefferson County 1980

The objectives of the study are to define as closely as possible the boundaries of methane producing solid waste landfills.

Date of Government Version: 12/31/1980
Date Data Arrived at EDR: 02/13/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 50

Source: Jefferson County Health Department
Telephone: 303-239-7175
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SWF/LF: Solid Waste Sites & Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/05/2008
Date Data Arrived at EDR: 03/18/2008
Date Made Active in Reports: 03/26/2008
Number of Days to Update: 8

Source: Department of Public Health & Environment
Telephone: 303-692-3300
Last EDR Contact: 06/04/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Annually

METHANE INVESTIGATION: Methane Gas & Swamp Findings

The primary objective of this study was to assess methane gas related hazards at selected landfill sites in Colorado. These sites were selected by the Colorado Department of Health following evaluation of responses received from County and Municipal agencies about completed and existing landfills within their jurisdiction.

Date of Government Version: 03/15/1979
Date Data Arrived at EDR: 02/13/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 50

Source: Department of Health
Telephone: 303-640-3335
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HISTORICAL LANDFILL: Historical Landfill List

Abandoned/Inactive Landfills.

Date of Government Version: 01/31/1993
Date Data Arrived at EDR: 04/24/1994
Date Made Active in Reports: 05/30/1994
Number of Days to Update: 36

Source: Department of Public Health & Environment
Telephone: 303-692-3300
Last EDR Contact: 09/05/1996
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LUST: Leaking Underground Storage Tank List

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 16

Source: Department of Labor and Employment, Oil Inspection Section
Telephone: 303-318-8521
Last EDR Contact: 04/02/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Quarterly

TRUST: Lust Trust Sites

Reimbursement application package. The 1989 Colorado General Assembly established Colorado's Petroleum Storage Tank Fund. The Fund reimburses eligible applicants for allowable costs incurred in cleaning up petroleum contamination from underground and aboveground petroleum storage tanks, as well as for third-party liability expenses. Remediation of contamination caused by railroad or aircraft fuel is not eligible for reimbursement. The Fund satisfies federal Environmental Protection Agency financial assurance requirements. Monies in the Fund come from various sources, predominantly the state environmental surcharge imposed on all petroleum products except railroad or aircraft fuel.

Date of Government Version: 02/27/2008
Date Data Arrived at EDR: 02/28/2008
Date Made Active in Reports: 03/26/2008
Number of Days to Update: 27

Source: Department of Labor and Employment, Oil Inspection Section
Telephone: 303-318-8521
Last EDR Contact: 05/27/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Varies

UST: Underground Storage Tank Database

Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 04/23/2008
Number of Days to Update: 21

Source: Department of Labor and Employment, Oil Inspection Section
Telephone: 303-318-8521
Last EDR Contact: 04/02/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Quarterly

LAST: Leaking Aboveground Storage Tank Listing
A listing of leaking aboveground storage tank sites.

Date of Government Version: 03/31/2008
Date Data Arrived at EDR: 04/01/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 17

Source: Department of Labor & Employment
Telephone: 303-318-8525
Last EDR Contact: 03/31/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Varies

AST: Aboveground Tank List
Aboveground storage tank locations.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 04/23/2008
Number of Days to Update: 21

Source: Department of Labor and Employment, Oil Inspection Section
Telephone: 303-318-8521
Last EDR Contact: 04/02/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Semi-Annually

CO ERNS: Spills Database
State reported spills.

Date of Government Version: 04/28/2008
Date Data Arrived at EDR: 04/30/2008
Date Made Active in Reports: 05/16/2008
Number of Days to Update: 16

Source: Department of Public Health and Environmental
Telephone: 303-692-2000
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

AUL: Environmental Real Covenants List
Activity and use limitations include both engineering controls and institutional controls. The Colorado Department of Public Health and Environment to approve requests to restrict the future use of a property using an enforceable agreement called an environmental real covenant. When a contaminated site is not cleaned up completely, land use restrictions may be used to ensure that the selected cleanup remedy is adequately protective of human health and the environment.

Date of Government Version: 03/27/2008
Date Data Arrived at EDR: 03/28/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 21

Source: Department of Public Health & Environment
Telephone: 303-692-3331
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

VCP: Voluntary Cleanup & Redevelopment Act Application Tracking Report
The Voluntary Cleanup and Redevelopment Act is intended to permit and encourage voluntary cleanups by providing a method to determine clean-up responsibilities in planning the reuse of property. The VCRA was intended for sites which were not covered by existing regulatory programs.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/23/2008
Date Made Active in Reports: 05/16/2008
Number of Days to Update: 23

Source: Department of Public Health and Environmental
Telephone: 303-692-3331
Last EDR Contact: 04/23/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Semi-Annually

DRYCLEANERS: Drycleaner Facilities
A listing of drycleaning facilities.

Date of Government Version: 04/16/2008
Date Data Arrived at EDR: 04/18/2008
Date Made Active in Reports: 05/16/2008
Number of Days to Update: 28

Source: Department of Public Health & Environment
Telephone: 303-692-3213
Last EDR Contact: 04/14/2008
Next Scheduled EDR Contact: 07/14/2008
Data Release Frequency: Varies

CDL: Meth Lab Locations

Meth lab locations that were reported to the Department of Public Health & Environment.

Date of Government Version: 08/20/2007
Date Data Arrived at EDR: 08/22/2007
Date Made Active in Reports: 09/18/2007
Number of Days to Update: 27

Source: Department of Public Health and Environment
Telephone: 303-692-3023
Last EDR Contact: 04/28/2008
Next Scheduled EDR Contact: 07/28/2008
Data Release Frequency: Quarterly

NPDES: Permitted Facility Listing

A listing of permitted facilities from the Water Quality Control Division.

Date of Government Version: 02/26/2008
Date Data Arrived at EDR: 02/27/2008
Date Made Active in Reports: 03/26/2008
Number of Days to Update: 28

Source: Department of Public Health & Environment
Telephone: 303-692-3611
Last EDR Contact: 05/27/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

AIRS: Permitted Facility & Emissions Listing

A listing of Air Pollution Control Division permits and emissions data.

Date of Government Version: 04/16/2008
Date Data Arrived at EDR: 04/18/2008
Date Made Active in Reports: 05/16/2008
Number of Days to Update: 28

Source: Department of Public Health & Environment
Telephone: 303-692-3213
Last EDR Contact: 04/14/2008
Next Scheduled EDR Contact: 06/30/2008
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

There were nine uranium mill tailings sites in Colorado designated for cleanup under the federal Uranium Mill Tailings Radiation Control Act. These nine sites, know commonly as UMTRA sites, were remediated jointly by the State of Colorado and the U.S. Department of Energy during the late 1980's and early 1990's. Mill tailings were removed from 8 of the mill sites and relocated in engineered disposal cells. A disposal cell is designed to encapsulate the material, reduce radon emanation, and prevent the movement of water through the material. At one site, Maybell, CO, the tailings were stabilized in-place at the mill site. After remediation of the tailings was completed, the State and DOE began to investigate the residual impacts to groundwater at the mill sites. The groundwater phase of the UMTRA program is on-going.

Date of Government Version: 11/23/2004
Date Data Arrived at EDR: 03/21/2007
Date Made Active in Reports: 05/02/2007
Number of Days to Update: 42

Source: Department of Public Health & Environment
Telephone: 970-248-7164
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

ASBESTOS: Asbestos Abatement & Demolition Projects

Asbestos abatement and demolition projects by the contractor.

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/17/2008
Date Made Active in Reports: 03/26/2008
Number of Days to Update: 9

Source: Department of Public Health & Environment
Telephone: 303-692-3100
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 05/09/2008
Next Scheduled EDR Contact: 08/04/2008
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/27/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 02/25/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 02/21/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 23

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 02/28/2008
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 17

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 02/20/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 13

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/25/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 23

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/21/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 23

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/28/2008
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 17

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 02/20/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 13
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/21/2007
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 34
Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6
Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 05/19/2008
Next Scheduled EDR Contact: 08/18/2008
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/07/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 03/07/2008
Next Scheduled EDR Contact: 07/21/2008
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COUNTY RECORDS

ADAMS COUNTY:

Summary Report on Methane Gas Hazards and Surveys Conducted on Domestic and Demolition Landfills in Adams County
As of May 8, 1978, all known landfills or dumping sites in the Adams County area have been surveyed.

Date of Government Version: 05/08/1978
Date Data Arrived at EDR: 02/16/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 47

Source: Tri-County Health Department
Telephone: 303-761-1340
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

ARAPAHOE COUNTY:

A Survey of Landfills in Arapahoe County
A survey of Arapahoe County was conducted from August through November, 1977, of all open and closed landfills and dumpsites in the county. Each of the sites found was classified as domestic or demolition.

Date of Government Version: 12/31/1978
Date Data Arrived at EDR: 02/16/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 47

Source: Tri-County Health Department
Telephone: 303-761-1340
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

BOULDER COUNTY:

Old Landfill Sites
Landfill sites in Boulder county.

Date of Government Version: 05/01/1986
Date Data Arrived at EDR: 11/14/1995
Date Made Active in Reports: 12/07/1995
Number of Days to Update: 23

Source: Boulder County Health Department
Telephone: 303-441-1182
Last EDR Contact: 01/30/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DENVER COUNTY:

Landfills in Denver County
Landfill sites in the city and county of Denver.

Date of Government Version: 12/01/1994
Date Data Arrived at EDR: 12/28/1994
Date Made Active in Reports: 01/31/1995
Number of Days to Update: 34

Source: City and County of Denver
Telephone: 303-436-7300
Last EDR Contact: 12/18/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DOUGLAS COUNTY:

Douglas County Landfill Key
Landfill sites in Douglas county.

Date of Government Version: 06/12/1991
Date Data Arrived at EDR: 02/16/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 47

Source: Tri-County Health Department
Telephone: 303-761-1340
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PUEBLO COUNTY:

Designated Disposal & Landfill Sites

Only inert materials. Asphalt, cement, dirt & rock unless otherwise specified. These sites are no longer active.

Date of Government Version: 04/30/1990
Date Data Arrived at EDR: 11/16/1995
Date Made Active in Reports: 12/07/1995
Number of Days to Update: 21

Source: Pueblo City-County Health Department
Telephone: 719-583-4300
Last EDR Contact: 11/13/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

TRI COUNTY:

Tri-County Area Solid Waste Facilities List (Adams, Arapahoe and Douglas Counties)

Closed Domestic Landfills in Adams County, Closed Domestic Landfills in Arapahoe County, Closed Demolition Landfills in Arapahoe County, Closed Domestic Landfills in Douglas County.

Date of Government Version: 10/15/1983
Date Data Arrived at EDR: 02/16/1995
Date Made Active in Reports: 04/04/1995
Number of Days to Update: 47

Source: Tri-County Health Department
Telephone: 303-761-1340
Last EDR Contact: 01/27/1995
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WELD COUNTY:

Solid Waste Facilities in Weld County

Solid Waste Facilities in Weld County.

Date of Government Version: 03/01/2008
Date Data Arrived at EDR: 03/18/2008
Date Made Active in Reports: 03/26/2008
Number of Days to Update: 8

Source: Weld County Department of Public Health
Telephone: 970-304-6415
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 06/15/2007
Date Made Active in Reports: 08/20/2007
Number of Days to Update: 66

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 06/13/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 02/15/2008
Date Data Arrived at EDR: 02/28/2008
Date Made Active in Reports: 04/09/2008
Number of Days to Update: 41

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/29/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/10/2008
Number of Days to Update: 20

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 06/09/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 04/27/2007
Date Made Active in Reports: 06/08/2007
Number of Days to Update: 42

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 04/07/2008
Next Scheduled EDR Contact: 07/07/2008
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Daycare Listing
Source: Department of Human Services
Telephone: 303-866-5958

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Riparian Vegetation Data
Source: Division of Wildlife
Telephone: 970-416-3360

STREET AND ADDRESS INFORMATION

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APPENDIX E

Site Photographs

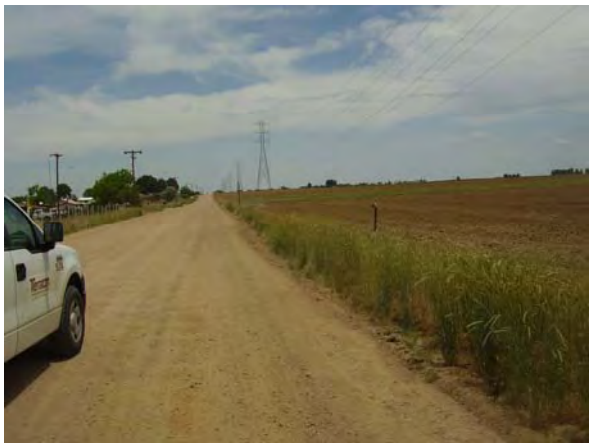

Photo #1 – View along the northern border of the site, shared Weld County Road 10. View to the east.



Photo #2 – View of the northerly adjoining residential properties. View to the northeast.



Photo #3 – View along the eastern border of the site, shared with Weld County Road 7. View to the north.



Photo #4 –View of the easterly adjoining residential properties. View to the northeast.



Photo #5 – View along the northeasterly adjoining residential properties. View to the northeast.



Photo #6 – View along the southern border of the site, shared with Weld County Road 8. View to the west.



Photo #7 – View of the southerly adjoining undeveloped property. View to the southwest.



Photo #8 View of the southwesterly adjoining high school and athletic field. View to the northwest.



Photo #9 – View along the western border of the site, shared with Weld County Road 5. View to the south.



Photo #10 – View of the westerly adjoining property. View to the northwest.



Photo #11 – Typical view of the site from the northwest corner. View to the southeast.



Photo #12 – Typical view of the site from the southeast corner. View to the northwest.



Photo #13 – View of the natural gas pipeline marker in the southeast corner of the site.



Photo #14 – View of the southern most NOAA compound. View to the northwest.



Photo #15 – View of the northern most NOAA compound. View to the north.



Photo #16 – View of the leaking pad-mounted transformer in the northern most NOAA lease compound.



Photo #17 – View of the entrance to the eastern most oil and/or natural gas well. View to the southwest.



Photo #18 – View of the eastern most oil and/or natural gas AST. View to the northwest.



Photo #19 – View of the stained soil beneath the eastern most oil and/or natural gas AST.



Photo #20 View of oil and gas operations equipment at the eastern most oil and/or natural gas well. View to the north.



Photo #21 – View of the entrance and well head of the western most oil and/or natural gas well. View to the southwest.



Photo #22 – View of the western most oil and/or natural gas AST. View to the southwest.



Photo #23 – View of oil and gas operations equipment at the western most oil and/or natural gas well. View to the east.



Photo #24 – View of oil and gas operations equipment at the western most oil and/or natural gas well. View to the west.



Photo #25– View of oil and gas operations equipment at the western most oil and/or natural gas well. View to the west.

APPENDIX F

Credentials

F. RUSSELL PICKERING, MS
ENVIRONMENTAL DEPARTMENT MANAGER

PROFESSIONAL EXPERIENCE

Mr. Pickering is the Environmental Department Manager of Terracon's Denver, Colorado office and has more than 15 years of experience in managing and providing a range of environmental services to a variety of clients. Mr. Pickering's principal work is focused in the oil and gas industry providing project management and field services for Due Diligence, Limited Site Investigations, and NEPA investigations. Mr. Pickering also conducts Phase I and Phase II ESAs and provides assistance in remedial system design and business development. Russell has extensive experience in wetland delineation, wetland mitigation planning, and is certified by the U.S. Fish and Wildlife service to conduct threatened and endangered species surveys in support of a variety of Terracon projects.

PROJECT EXPERIENCE

- **Phase I Environmental Site Assessments – Various Locations**
  Prepared Phase I Environmental Site Assessments (ESAs) for clients throughout Colorado, Wyoming, and Utah. The Phase I ESAs have been conducted on wide variety of properties including military installations, airports, gas stations, commercial properties, office and residential buildings, industrial facilities, and proposed communication tower sites. The Phase I ESAs have been performed in accordance with the current industry-recognized ASTM ESA guidelines and specific client requirements.

- **Limited Site Investigations, Oil and Gas Clients – Larimer and Weld Counties, CO**
  Conducted investigations to determine the vertical and lateral extent of condensate and other petroleum related contamination plumes at numerous production facilities located along the Front Range of Colorado. Projects included soil and groundwater sampling, monitoring well installations, plume modelling, remediation planning and oversight, and agency coordination.

- **Environmental Due Diligence Audit, Cannon AFB, Former Roswell Industrial Air Field – Roswell, NM**
  Conducted an Environmental Due Diligence Audit of a World War II air field in New Mexico. The study focused on the identification of recognized environmental conditions including unexploded ordinance, fuel storage, poly-chlorinated biphenyl containing equipment, lead paint, and asbestos containing materials.

- **Environmental Impact Statement, Jonah II Gas Field – Southwest Wyoming**
  Examined the effects of gas field development under the proposed action and several alternatives on the environment for a third-party EIS produced for the Bureau of Land Management. Principle issues evaluated included critical wildlife habitat and migration routes, noise, traffic, air quality, surface water, wetlands, and visual impacts.

EDUCATION

Masters of Science, Environmental Engineering, 2006, University of Wyoming

Masters of Science, Environmental Toxicology, 1995, Colorado State University

Bachelor of Science, Zoology/ Physiology, 1992, University of Wyoming

CERTIFICATIONS

USFWS Certification for Threatened & Endangered Species Surveys

Certified Wetland Delineator

40-Hour OSHA Hazwoper Certification

8-Hour OSHA refresher courses

WORK HISTORY

Terracon Consultants, Inc., Environmental Depat. Manager, 2007– Present

Terracon Consultants, Inc., Sr. Project Manager, 2006 – 2007

Aspen Environmental Services, Principal, 1997-2006

TRC Mariah Associates, Environmental Scientist, 1994-1997

PROJECT EXPERIENCE (continued)

- **Environmental Protection Planning, South Platte River Restoration – Denver, CO**
  Prepared guidance documents including Spill Prevention, Control, and Countermeasure Plan, Stormwater Pollution Prevention Plan, Erosion Control Plan, Section 404 of the Clean Water Act Permit, Traffic Control Plan, Environmental Protection Training, Contaminant Prevention Plan, and Natural and Cultural Resource Management Plan.

- **EIS Windpower Project – Arlington, WY**
  Worked as part of an integrated team to evaluate potential impacts to the environment resulting from the construction and operation of a large windpower project. Critical issues focused on cultural resources and impacts to wildlife, particularly raptor species.

- **NEPA Environmental Assessment, U.S. Army Corps of Engineers and U.S. Border Patrol – El Paso, TX**
  Managed a NEPA EA for the improvement and replacement of fence and road structures along a 15 mile stretch of the United States/Mexico border. The project included assessments of wildlife, threatened and endangered species, cultural resources, noise and visual impacts, air quality, socioeconomics, traffic, and environmental justice.

- **NEPA Environmental Assessment, Ft. Bliss, Gunnery Range – El Paso, TX**
  Conducted an EA to assess the effects of decommissioning an existing tank training area and the installation of a new training grounds. Critical issues included unexploded ordinance clearance at the site to be closed and air quality, noise, and visual impacts along with environmental justice at the proposed new site.

- **Surfactant Enhanced Electrokinetic Remediation of Petroleum Contaminated Fine Grained Soils – Laramie, WY**
  Designed and implemented a system to remove residual petroleum contamination from clay soils which had proven resistant to traditional remediation methods. The system involved the application of a direct current to the subsurface through an electrode array and the introduction of anionic surfactants to enhance contaminant mobilization.

ADDITIONAL COURSES

Engineering Applications of GIS and GPS, Colorado State University, Ft. Collins, CO

Ecological Risk Assessment and Management, Colorado State University, Ft. Collins, CO

Wetland Delineation and Mitigation Planning, Wetlands Training Institute, Kalispell, MT

Technical Writing and Peer Reviewing, Laramie, WY

PUBLICATIONS/PRESENTATIONS

Pickering, R., "Surfactant enhanced electrokinetic remediation of petroleum contaminated fine-grained soils" MS Thesis, Department of Civil and Architectural Engineering, University of Wyoming, 2006.

Pickering, R., "Relative importance of dietary versus aqueous exposures to copper, cadmium, lead, and zinc in Rainbow Trout (*Oncorhynchus mykiss*)". MS Thesis, Department of Fisheries and Wildlife Biology, Colorado State University, 1995.

Seville, R.S., D. Thomas, R. Pickering, and N. Stanton. "Species of *Eimeria* from the thirteen-lined ground squirrel, *Spermophilus tridecemlineatus*, from Wyoming". Great Basin Naturalist 52:309-312, 1992.

DARREN BRUNS, MBA
ENVIRONMENTAL SCIENTIST

PROFESSIONAL EXPERIENCE

Mr. Bruns is an environmental scientist in Terracon's Wheat Ridge, Colorado office supporting the Phase I Environmental Site Assessment (ESA) Group. He is responsible for site reconnaissance, site research, regulatory research, soil, and groundwater sampling, regulatory interpretation, and report preparation. He has experience performing National Environmental Protection Act (NEPA) screens, FCC Environmental Assessments (EAs), and Phase I and Phase II ESAs. In addition, Mr. Bruns coordinates and manages environmental and geotechnical projects for New Mexico, Arizona, Colorado, Montana, and Wyoming.

PROJECT EXPERIENCE

- **Phase I Environmental Assessments – Denver/Colorado**
  Mr. Bruns has conducted over 150 Phase I ESAs for undeveloped properties, commercial properties, industrial properties, and telecommunication installations.
- **Phase II Environmental Assessments – Denver/Colorado**
  On-site responsibilities include quarterly groundwater monitoring, soil sampling, and well installation. Mr. Bruns has collected soil samples via hand auger, geoprobe, and hollow/solid stem auger methods. Office responsibilities include investigation and report writing.
- **Asbestos, Radon, and Lead-Based Paint Sampling**
  Mr. Bruns has conducted radon testing, lead-based paint screens, and asbestos sampling in the Denver metropolitan area.

EDUCATION

Masters Degree, Business Administration, University of Phoenix

Bachelor of General Studies, Environmental Science, University of Kansas

Associate Degree, Biology, Kansas City Kansas Community College

CERTIFICATIONS

24-Hour OSHA Hazwoper Course

AHERA Asbestos Accredited Building Inspector

Colorado Asbestos Accredited: Building Inspector

Petroleum Geology

WORK HISTORY

Terracon Consultants, Environmental Scientist, 2005 – Present

Crest Oil & Gas, Ltd., Houston, Texas, Geological Technician, 2001-2005

Phase I ESA Project Experience

Phase I ESAs of the Former RTD Administration and Maintainence / Denver Tramway Facility

Conducted the Phase I ESAs of Denver's historic Denver Tramway facility located at the intersection of Santa Fe Drive and West Alameda Avenue. Fees: $4,800

Phase I ESAs of Gravel Mining Operations

Conducted the Phase I ESAs of 23 gravel mining operation facilities on the western slope of Colorado and the Colorado front range. Fees: $80,796

Phase II Environmental Assessment Experience

U-Pump-It Gasoline Station

Responisble for quarterly groundwater monitoring, soil vapor monitoring, and report writing for submittal to the Colorado Division of Oil and Public Safety. Fees: $30,500

Asbestos Surveying Experience

Buckingham Mall Demolition Survey

Collaborated with Terracon's Denver Asbestos Group and assissted in collection and assesment of suspected asbestos containing materials at the former Buckingham Mall in Aurora, Colorado. Fees: $40,000

Weld County PROPERTY PORTAL

Property Information (970) 400-3650
Technical Support (970) 400-4357

Account: R5728486

November 15, 2022

Account	Parcel	Space	Account Type	Tax Year	Buildings	Actual Value	Assessed Value
R5728486	146716000070		Agricultural	2022	0	2,770,725	803,510

Legal
24861-A SE4 16 1 68 (1D 4R)

Subdivision	Block	Lot	Land Economic Area
			ERIE RURAL

Property Address	Property City	Zip	Section	Township	Range
			16	01	68

Account	Owner Name	Address
R5728486	COLORADO STATE OF	1127 N SHERMAN ST STE 300 DENVER, CO 802032398

Reception	Rec Date	Type	Grantor	Grantee	Doc Fee	Sale Date	Sale Price
1879795	01-13-1982	COZ	WELD COUNTY ZONING	CASE: Z-355 ZONING A	0.00		0

*If the hyperlink for the reception number does not work, try a manual search in the Clerk and Recorder records. Use the Grantor or Grantee in your search.

No buildings found.

Type	Code	Description	Actual Value	Assessed Value	Acres	Land SqFt
Land	9129	EXEMPT-STATE NON RESIDENTIAL LAND	2,770,725	803,510	155.000	6,751,800
Totals	-	-	**2,770,725**	**803,510**	**155.000**	**6,751,800**

Comparable sales for your Residential or Commercial property may be found using our SALES SEARCH TOOL

Tax Area	District ID	District Name	Current Mill Levy
2390	1204	BOULDER VALLEY CONSERVATION	0.000
2390	1050	HIGH PLAINS LIBRARY	3.197
2390	0311	LEFT HAND WATER	0.000
2390	0512	MOUNTAIN VIEW FIRE PROTECTION DISTRICT	16.247
2390	0301	NORTHERN COLORADO WATER (NCW)	1.000
2390	0213	SCHOOL DIST RE1J-LONGMONT	57.358
2390	0100	WELD COUNTY	15.038
Total	-	-	**92.84**



NO PHOTO





Powered by Esri

Get additional detail with the Map Search.

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Weld County PROPERTY PORTAL

Property Information (970) 400-3650
Technical Support (970) 400-4357

Account: R8947358

November 15, 2022

Account	Parcel	Space	Account Type	Tax Year	Buildings	Actual Value	Assessed Value
R8947358	146716200076		Exempt	2022	0	40,240	11,670

Legal
W2 16-1-68 EXC BEG SW COR SEC TH N0D08'E 30' TO POB N0D08'E 1950' E1320' S0D08'W 1950' W1320' TO POB ALSO EXC BEG W4 COR SEC TH N0D12'E 243.22' N89D31'E 1062' S03D21'W 545' S44D31'E 339.83' S89D38'E 48' S04D46'E 110' S89D38'W 1322' TO PT ON W LN SEC TH N0D13'W 651.78 TO POB

Subdivision	Block	Lot	Land Economic Area
			ERIE RURAL

Property Address	Property City	Zip	Section	Township	Range
			16	01	68

Account	Owner Name	Address
R8947358	COLORADO STATE OF	1127 N SHERMAN ST STE 300 DENVER, CO 802032398

Reception	Rec Date	Type	Grantor	Grantee	Doc Fee	Sale Date	Sale Price
1879795	01-13-1982	COZ	WELD COUNTY ZONING	CASE: Z-355 ZONING A	0.00		0
4157549	11-12-2015	SURV	SURVEY	SURVEY	0.00	05-15-2015	0

*If the hyperlink for the reception number does not work, try a manual search in the Clerk and Recorder records. Use the Grantor or Grantee in your search.

No buildings found.

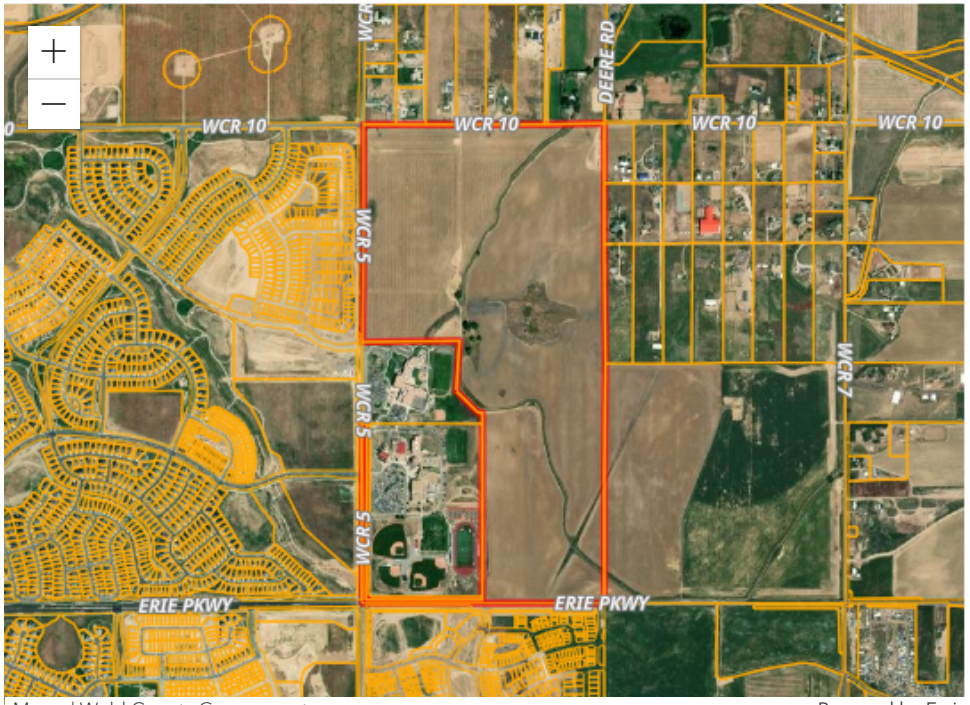
Type	Code	Description	Actual Value	Assessed Value	Acres	Land SqFt
Land	9149	EXEMPT-POLITICAL NON RESIDENTIAL LAND	40,240	11,670	238.160	10,374,250
Totals	**-**	**-**	**40,240**	**11,670**	**238.160**	**10,374,250**

Comparable sales for your Residential or Commercial property may be found using our SALES SEARCH TOOL

Tax Area	District ID	District Name	Current Mill Levy
2391	1204	BOULDER VALLEY CONSERVATION	0.000
2391	1050	HIGH PLAINS LIBRARY	3.197
2391	0512	MOUNTAIN VIEW FIRE PROTECTION DISTRICT	16.247
2391	0213	SCHOOL DIST RE1J-LONGMONT	57.358
2391	0100	WELD COUNTY	15.038
Total	**-**	**-**	**91.84**



NO SKETCH



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Get additional detail with the Map Search.

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National Flood Hazard Layer FIRMette

105°0'33"W 40°3'2"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°59'56"W 40°2'34"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

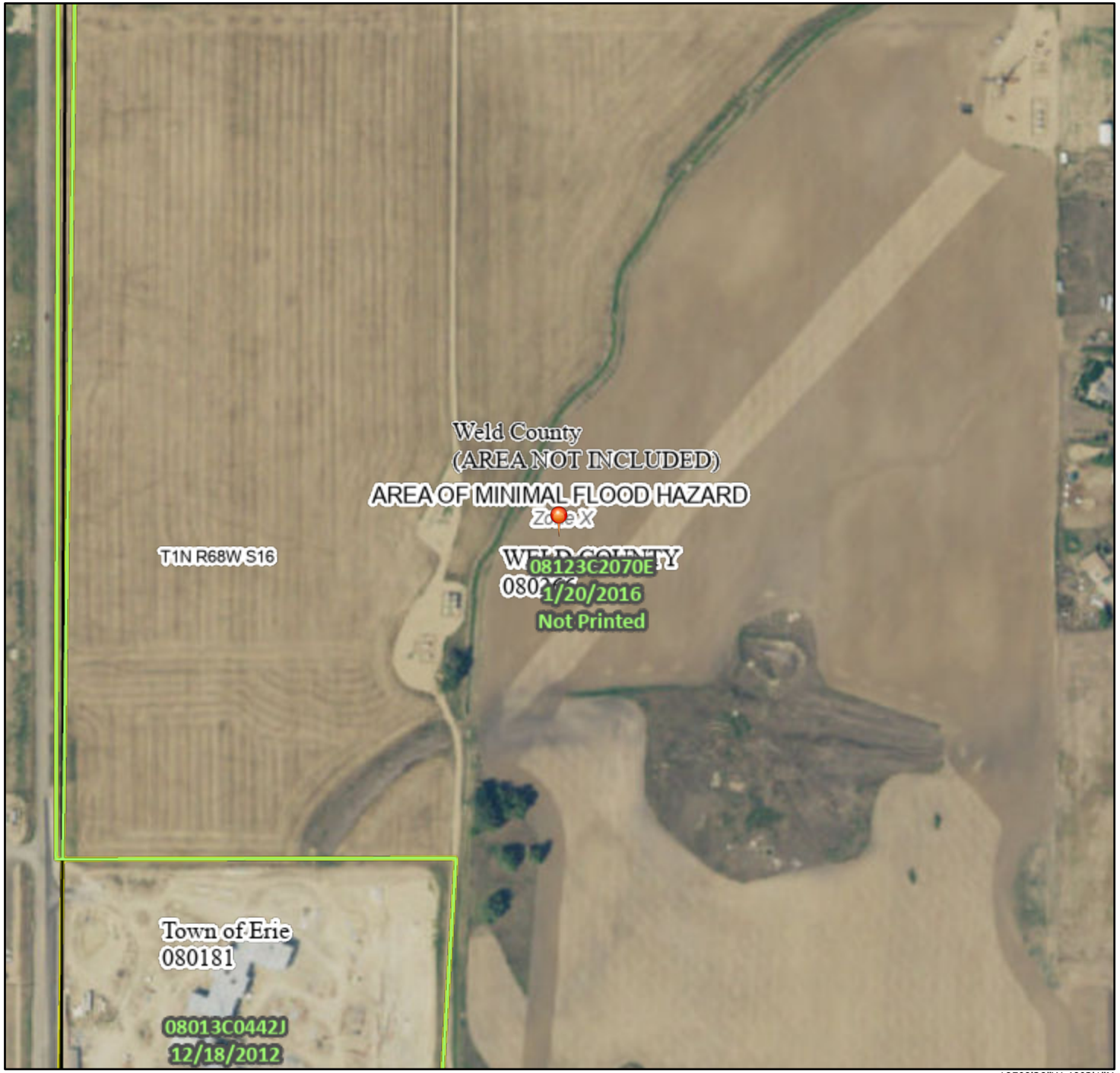
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/15/2022 at 3:57 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

105°1'7"W 40°3'29"N



105°0'29"W 40°3'1"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/15/2022 at 3:58 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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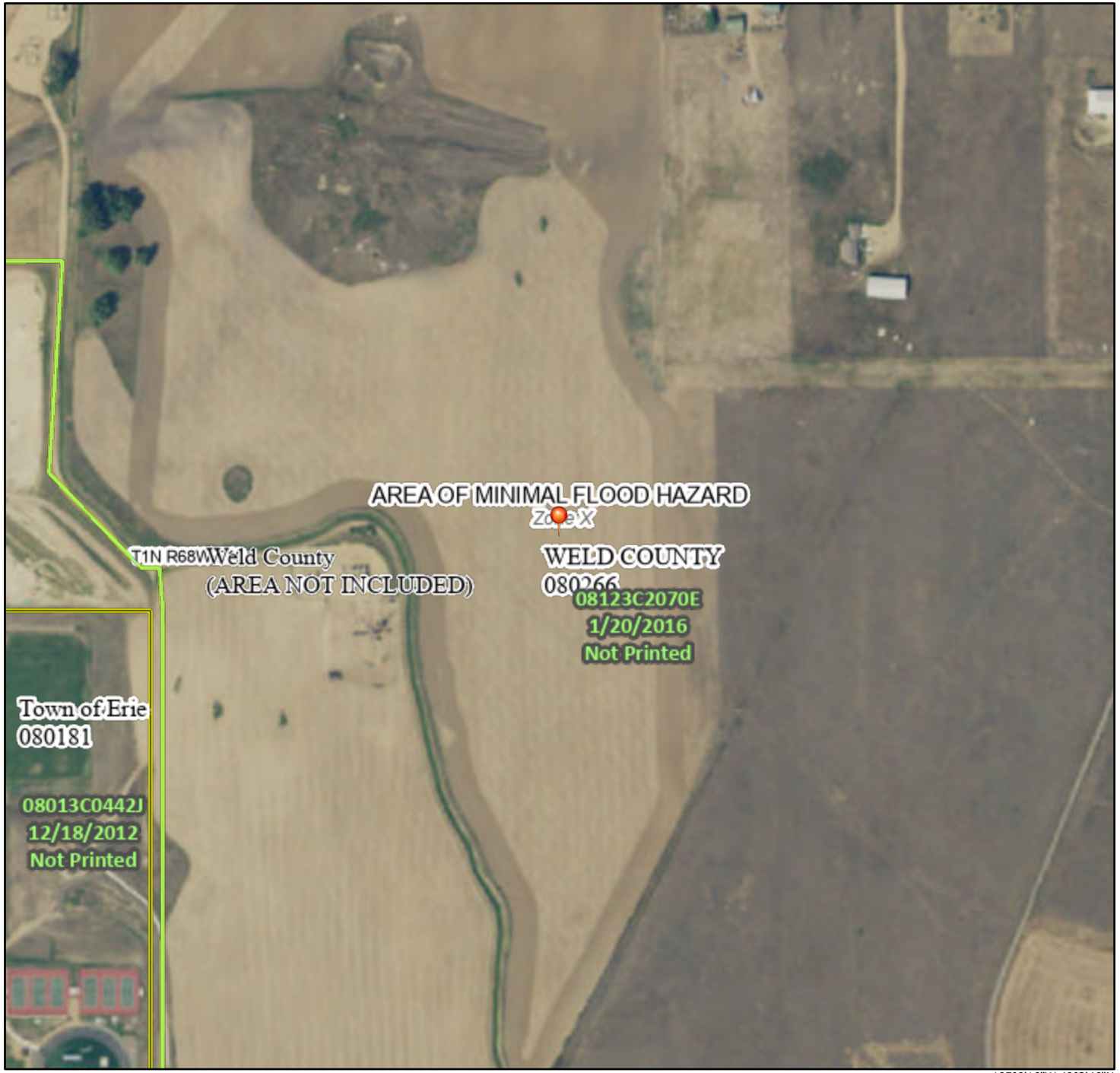
National Flood Hazard Layer FIRMette

FEMA

105°0'54"W 40°3'13"N



105°0'16"W 40°2'46"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/15/2022 at 3:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use Only

RECEIVED

MAR 04 1999

WATER RESOURCES STATE ENGINEER COLO.

1. **WELL PERMIT NUMBER:** MH-35111

2. **OWNER NAME(S)** TOWN OF ERIE, COLORADO
   Mailing Address 645 HOLBROOK
   City, St., Zip ERIE, COLORADO 80516
   Phone (303) 926-2870

3. **WELL LOCATION AS DRILLED:** SW 1/4 SE 1/4, Sec. 16 Twp. 1 N Range 68 W
   DISTANCES FROM SEC. LINES:
   60 ft. from S Sec. line. and 2600 ft. from E Sec. line. OR
   SUBDIVISION LOT BLOCK FILING(UNIT)
   STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION: ft. DRILLING METHOD 4" CFA
   DATE COMPLETED December 17, 1998 TOTAL DEPTH 20 ft. DEPTH COMPLETED 20 ft.

5. **GEOLOGIC LOG**

Depth	Description of Material (Type, Size, Color, Water Location)
0'-7'	CLAY: Generally medium stiff to very stiff, locally soft, sandy to very sandy, silty, moist to wet, brown, tan, red-brown.
7'-20'	CLAYSTONE: Very stiff to hard, locally stiff, silty, commonly lignitic, locally sandy, locally weathered to residual soil, moist to very moist, grey, brown, grey-brown, orange-grey.
	No water

6. **HOLE DIAM (In.)**

HOLE DIAM (In.)	From (ft)	To (ft)
5"	0	20

7. **PLAIN CASING**

OD (in)	Kind	Wall Size	From (ft.)	To (ft.)
2	PVC	SCH 40	0	15

PERF. CASING: Screen Slot Size: 0.02 inches

2	PVC	SCH 40	15	20

8. **FILTER PACK**
   Material: SAND
   Size: 10-20
   Interval: 11'-20'

9. **PACKER PLACEMENT:**
   Type: N/A
   Depth:

10. **GROUTING RECORD:**

Material	Amount	Density	Interval	Placement
Bentonite Chips			2'-7'	Poured & Hydrated

REMARKS: MW- 2

11. **DISINFECTION:** Type N/A Amt. Used

12. **WELL TEST DATA:** ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
    TESTING METHOD N/A
    Static Level Date/Time measured . Production Rate gpm.
    Pumping Level Date/Time measured . Test Length hrs.
    Remarks

13. I have read the statements mad herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104(13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Rocky Mountain Consultants Inc. Phone (303) 665-6283 Lic. No. N/A
Mailing Address 625 Deleware Ave., Ste. 500, Longmont, CO, 80501

Name/Title (Please Type or print)	Signature	Date
C.J. Greenlee/Geologist	C.J. Greenlee	01-25-99

1/98 Please type or print legibly in black ink Rcvd 11/19/98

Landowner's Name TOWN OF ERIE Well Owner's Name TOWN OF ERIE

Location: SW ¼, SE ¼, Section 16 Township 1 (N)S, Range 68 E(W) 6 PM, County WELD

Hole(s) to be Constructed: Number 1 Estimated Depth 20 Ft. Type 2" SCH 40 PVC

Purpose of Monitoring Hole(s) GROUNDWATER LEVELS MONITORING

Approximate Date of Construction DEC 1ST 1998 Driller Lic. No. (if applicable) _____

Consultant or Driller TERRA DRILLING Phone (303) 665-6283

Contact CHRISTOPHER GREENLEE ROCKY MOUNTAIN CONSULTANTS, INC Fax No (303) 665-6957

Address 825 DELAWARE AVE, STE 500

City, State, Zip LONGMONT, CO 80501 C J Greenlee
Signature

ACKNOWLEDGEMENT FROM STATE ENGINEER'S OFFICE

FOR OFFICE USE ONLY

MH- 35111 PROCESSED BY KMG

DATE NOTICE RECEIVED 11/19/98 DATE ACKNOWLEDGED 11/23/98

DIV. 1 COUNTY 02 WD 06 GROUND ELEV _____ USGS MAP NO. _____

CONDITIONS OF MONITORING HOLE ACKNOWLEDGEMENT

A COPY OF THE WRITTEN NOTICE OR ACKNOWLEDGEMENT SHALL BE AVAILABLE AT THE DRILLING SITE.

Notice was provided to the State Engineer at least 3 days prior to construction of monitoring & observation hole(s).

Construction of the hole(s) must be completed within 90 days of the date notice was given to the State Engineer.

Testing and/or pumping shall not exceed a total of 200 hours unless prior written approval is obtained from the State Engineer.

Water diverted during testing shall not be used for beneficial purposes. The owner of the hole(s) is responsible for obtaining permit(s) and complying with all rules and regulations pertaining to the discharge of fluids produced during testing.

All work must comply with the Water Well Construction Rules, 2 CCR 402-2. Minimum construction standards must be met or a variance obtained.

Well Construction and Test Reports (GWS-31) must be submitted to this office by the licensed contractor or authorized individual within 60 days of the completion of the work. Application to permit existing monitoring and observation holes should reference the MH number under which the report was filed or be accompanied by a copy of the report.

Unless a well permit is obtained, the hole(s) must be plugged and sealed within one (1) year after construction. An Abandonment Report (form GWS-9) must be submitted within 60 days of plugging & sealing.

The owner of the hole(s) should maintain records of water quality testing and submit this data to the State Engineer upon request.

The monitoring hole number, owner's structure name, and hole owner's name and address must be provided on all well permit application(s), well construction and abandonment reports.

A monitoring hole can not be converted to a production water well (other than a recovery well) unless the hole or well was originally constructed by a licensed well construction contractor.

THIS ACKNOWLEDGEMENT OF NOTICE DOES NOT INDICATE THAT WELL PERMIT(S) CAN BE APPROVED.

Additional Conditions Variance 98-4

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use Only

1. **WELL PERMIT NUMBER:** MH-

2. **OWNER NAME(S)** City of Longmont; Attn: Ken Huson
Mailing Address 1100 S. Sherman
City, St., Zip Longmont, CO 80501
Phone 303-651-8340

3. **WELL LOCATION AS DRILLED:** NE 1/4 SW 1/4, Sec. 18 Twp. 3 N Range 70 W
DISTANCES FROM SEC. LINES:
2500 ft. from West Sec. line. and 2600 ft. from South Sec. line. OR
SUBDIVISION LOT BLOCK FILING(UNIT)
STREET ADDRESS AT WELL LOCATION: Highway 36 - west side

4. GROUND SURFACE ELEVATION: 5345 ft. DRILLING METHOD Hollow Stem Auger
DATE COMPLETED 10/15/98 TOTAL DEPTH 15 ft. DEPTH COMPLETED 15 ft.

5. **GEOLOGIC LOG**

Depth	Description of Material (Type, Size, Color, Water Location)
0-2'	Clay: silty, sandy, gravels, reddish brown
2'-8'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey
8'-11'	Sand: very fine sand to fine sand, silty, clayey, locally gravels, red-brown to brown
11'-15'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey

REMARKS: MW- BP-1
Water at 11'

6. **HOLE DIAM (in.)**

HOLE DIAM (in.)	From (ft)	To (ft)
6	0	15

7. **PLAIN CASING**

OD (in)	Kind	Wall Size	From (ft.)	To (ft.)
2	PVC	SCH 40	0	10

PERF. CASING: Screen Slot Size: 0.02 inches

2	PVC	SCH 40	10	15

8. **FILTER PACK**
Material: SAND
Size: 10-20
Interval: 7'-15'

9. **PACKER PLACEMENT:**
Type: N/A
Depth:

10. **GROUTING RECORD:**

Material	Amount	Density	Interval	Placement
Bentonite	100 lbs.		1'-	Poured &
Chips			7'	Hydrated

11. **DISINFECTION:** Type N/A Amt. Used

12. **WELL TEST DATA:** ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
TESTING METHOD N/A
Static Level Date/Time measured Production Rate gpm.
Pumping Level Date/Time measured Test Length hrs.
Remarks

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104(13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Rocky Mountain Consultants Inc. Phone (303) 665-6283 Lic. No. N/A
Mailing Address 825 Delaware Ave., Ste. 500, Longmont, CO, 80501

Name/Title (Please Type or print)	Signature	Date
C.J. Greenlee/Geologist	C.J. Greenlee	11-19-98

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use Only

1. **WELL PERMIT NUMBER:** MH-

2. **OWNER NAME(S)** City of Longmont; Attn: Ken Huson
Mailing Address 1100 S. Sherman
City, St., Zip Longmont, CO 80501
Phone 303-651-8340

3. **WELL LOCATION AS DRILLED:** NW 1/4 SE 1/4, Sec. 18 Twp. 3 N Range 70 W
DISTANCES FROM SEC. LINES:
2000 ft. from East Sec. line. and 1750 ft. from South Sec. line. OR
SUBDIVISION LOT BLOCK FILING(UNIT)
STREET ADDRESS AT WELL LOCATION: South of Broadway & 4th Ave.

4. GROUND SURFACE ELEVATION: 5347 ft. DRILLING METHOD Hollow Stem Auger
DATE COMPLETED 10/15/98 TOTAL DEPTH 20 ft. DEPTH COMPLETED 20 ft.

5. **GEOLOGIC LOG**

Depth	Description of Material (Type, Size, Color, Water Location)
0'-1'	Fill: clay, silty, sandy, gravels, reddish-rusty brown
1'-6'	Sand: very fine sand to fine sand, silty, clayey, locally gravels, red-brown to brown
6'-10'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey
10'-15'	Sand: very fine sand to fine sand, silty, clayey, locally gravels, red-brown to brown
15'-20'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey

REMARKS: MW- BP-2
No Water

6. **HOLE DIAM (In.)**

HOLE DIAM (In.)	From (ft)	To (ft)
6	0	20

7. **PLAIN CASING**

OD (In)	Kind	Wall Size	From (ft.)	To (ft.)
2	PVC	SCH 40	0	15

PERF. CASING: Screen Slot Size: 0.02 inches

2	PVC	SCH 40	15	20

8. **FILTER PACK**
Material: SAND
Size: 10-20
Interval: 10-20'

9. **PACKER PLACEMENT:**
Type: N/A
Depth:

10. **GROUTING RECORD:**

Material	Amount	Density	Interval	Placement
Bentonite Chips	100 lbs.		1'-10'	Poured & Hydrated

11. **DISINFECTION:** Type N/A Amt. Used

12. **WELL TEST DATA:** ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
TESTING METHOD N/A
Static Level Date/Time measured . Production Rate gpm.
Pumping Level Date/Time measured . Test Length hrs.
Remarks

13. I have read the statements med herein and know the contents thereof, and that they are true to my knowledge. (Pursuant to Section 24-4-104(13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.)

CONTRACTOR Rocky Mountain Consultants Inc. Phone (303) 665-6283 Lic. No. N/A
Mailing Address 825 Delaware Ave., Ste. 500, Longmont, CO, 80501

Name/Title (Please Type or print)	Signature	Date
C.J. Greenlee/Geologist	C.J. Greenlee	11.19.98

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use Only

1. **WELL PERMIT NUMBER:** MH-

2. **OWNER NAME(S)** City of Longmont; Attn: Ken Huson
Mailing Address 1100 S. Sherman
City, St., Zip Longmont, CO 80501
Phone 303-651-8340

3. **WELL LOCATION AS DRILLED:** NW 1/4 SE 1/4, Sec. 18 Twp. 3 N Range 70 W
DISTANCES FROM SEC. LINES:
1350 ft. from East Sec. line. and 1650 ft. from South Sec. line. OR
SUBDIVISION LOT BLOCK FILING(UNIT)
STREET ADDRESS AT WELL LOCATION: South side of City Park, west of 3rd avenue.

4. GROUND SURFACE ELEVATION: 5343 ft. DRILLING METHOD Hollow Stem Auger
DATE COMPLETED 10/15/98 TOTAL DEPTH 34 ft. DEPTH COMPLETED 34 ft.

5. **GEOLOGIC LOG**

Depth	Description of Material (Type, Size, Color, Water Location)
0'-1'	Fill: clay, silty, sandy, gravels, reddish-rusty brown
1'-5'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey
5'-16'	Sand: very fine sand to fine sand, silty, clayey, locally gravels, red-brown to brown
16'-34'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey

REMARKS: MW- BP-3
Water at 23'

6. **HOLE DIAM (in.)**

HOLE DIAM (in.)	From (ft)	To (ft)
8	0	34

7. **PLAIN CASING**

OD (in)	Kind	Wall Size	From (ft.)	To (ft.)
2	PVC	SCH 40	0	24

PERF. CASING: Screen Slot Size: 0.02 inches

2	PVC	SCH 40	24	34

8. **FILTER PACK**
Material: SAND
Size: 10-20
Interval: 20'-34'

9. **PACKER PLACEMENT:**
Type: N/A
Depth:

10. **GROUTING RECORD:**

Material	Amount	Density	Interval	Placement
Bentonite Chips	200 lbs.		5'-20'	Poured & Hydrated

11. **DISINFECTION:** Type N/A Amt. Used

12. **WELL TEST DATA:** ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
TESTING METHOD N/A
Static Level Date/Time measured . Production Rate gpm.
Pumping Level Date/Time measured . Test Length hrs.
Remarks

13. I have read the statements mad herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104(13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Rocky Mountain Consultants Inc. Phone (303) 665-6283 Lic. No. N/A
Mailing Address 825 Delaware Ave., Ste. 500, Longmont, CO, 80501

Name/Title (Please Type or print)	Signature	Date
C.J. Greenlee/Geologist	C.J. Greenlee	11.19.98

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use Only

1. **WELL PERMIT NUMBER:** MH-

2. **OWNER NAME(S)** City of Longmont; Attn: Ken Huson
Mailing Address 1100 S. Sherman
City, St., Zip Longmont, CO 80501
Phone 303-651-8340

3. **WELL LOCATION AS DRILLED:** NE 1/4 SE 1/4, Sec. 18 Twp. 3 N Range 70 W
DISTANCES FROM SEC. LINES:
500 ft. from East Sec. line. and 1150 ft. from South Sec. line. OR
SUBDIVISION LOT BLOCK FILING(UNIT)
STREET ADDRESS AT WELL LOCATION: South of Broadway & 4th Ave.

4. GROUND SURFACE ELEVATION: 5321 ft. DRILLING METHOD Hollow Stem Auger
DATE COMPLETED 10/15/98 TOTAL DEPTH 15 ft. DEPTH COMPLETED 15 ft.

5. **GEOLOGIC LOG**

Depth	Description of Material (Type, Size, Color, Water Location)
0'-1'	Fill: clay, silty, sandy, gravels, reddish-rusty brown
1'-11'	Sand: very fine sand to fine sand, silty, clayey, locally gravels, red-brown to brown
11'-12'	Sand: silty, clayey, grey-brown
12'-15'	Sand: silty, clay-silt mix, fine to medium grains, poorly graded sand & gravel, grades to coarse grained sands, gravels and cobbles generally coarsening with depth, brown-pink-grey

REMARKS: MW- BP-4

Water at 9'

6. **HOLE DIAM (in.)**

HOLE DIAM (in.)	From (ft)	To (ft)
6	0	15

7. **PLAIN CASING**

OD (in)	Kind	Wall Size	From (ft.)	To (ft.)
2	PVC	SCH 40	0	10

PERF. CASING: Screen Slot Size: 0.02 inches

2	PVC	SCH 40	10	15

8. **FILTER PACK**
Material: SAND
Size: 10-20
Interval: 7'-15'

9. **PACKER PLACEMENT:**
Type: N/A
Depth:

10. **GROUTING RECORD:**

Material	Amount	Density	Interval	Placement
Bentonite Chips	100 lbs.		1'-7'	Poured & Hydrated

11. **DISINFECTION:** Type N/A Amt. Used

12. **WELL TEST DATA:** ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
TESTING METHOD N/A
Static Level Date/Time measured Production Rate gpm.
Pumping Level Date/Time measured Test Length hrs.
Remarks

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104(13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Rocky Mountain Consultants Inc. Phone (303) 665-6283 Lic. No. N/A
Mailing Address 825 Delaware Ave., Ste. 500, Longmont, CO, 80501

Name/Title (Please Type or print)	Signature	Date
C.J. Greenlee/Geologist	C J Greenlee	11-19-98

ROCKY MOUNTAIN CONSULTANTS, INC.

Premiere Building
825 Delaware Ave., Suite 500
Longmont, CO 80501
(303) 772-5282
Metro (303) 665-6283
FAX (303) 665-6959
E-mail rmclong@rmii.com

- Via Faxmittal -

October 15, 1998

Mr. Jack Byers
Colorado Department of Water Resources
Office of the State Engineer
1313 Sherman Street
Denver, Colorado 80203

Re: Installation of Monitoring Wells, County of Boulder, State of Colorado

Dear Mr. Byers:

Enclosed is the Notice of Intent to Construct Monitoring Wells for the City of Longmont, Water and Waste Water Department. Please review the location of interest as soon as possible and notify us with your authorization if applicable.

Please call with any questions or comments.

Sincerely,

ROCKY MOUNTAIN CONSULTANTS, INC.

Christopher J. Greenlee
Geologist

CG:sp

Enclosures

C:\MyFiles\Dept19\Well_Intent.ltr.wpd

ROCKY MOUNTAIN CONSULTANTS, INC.

Premiere Building
825 Delaware Ave., Suite 500
Longmont, CO 80501
(303) 772-5282
Metro (303) 665-6283
FAX (303) 665-6959
E-mail rmclong@rmii.com

November 19, 1998

Mr. Jack Byers
Colorado Department of Water Resources
Office of the State Engineer
1313 Sherman Street
Denver, Colorado 80203

Re: Notice of Intent to Construct Monitoring Wells

Dear Mr. Byers:

Included with this letter are forms describing the notice of intent to construct four monitoring wells for the Town of Erie, Colorado. These wells will be utilized to gather seasonal groundwater level data for the installation of a proposed treated water transmission pipeline. Attached is the blanket variance from Rules 10.4.3, 10.4.4, 10.5.2.1 and 12.3 granted by your office to construct monitoring wells.

Also included are the completed well construction reports with respect to the four monitoring wells installed October 15, 1998 located in the Town of Lyons, CO, Boulder County.

If you have any questions, please call.

Sincerely,

ROCKY MOUNTAIN CONSULTANTS, INC.

Christopher J. Greenlee
Geologist

CJG:cjg

Enclosures

ROCKY MOUNTAIN CONSULTANTS, INC.

825 Delaware Ave., Suite 500 · Longmont, CO 80501
(303) 772-5282 · Metro (303) 665-6283
Fax (303)665-6959

TRANSMITTAL

RECEIVED
NOV 19 1998
WATER RESOURCES STATE ENGINEER COLO.

TO: SEO
Colorado Dept of Water Res.

ATTN: Mr. Jack Byers

FROM: Christopher Greenlee

DATE: 11.19.98

PROJECT:

JOB NO.:

VIA:

☑ **FAX: Number of pages sent including this transmittal** 12 **. If you do not receive all pages or if transmission is not clear please call RMC at 772-5282.**

☐ **Messenger** ☐ **Mail** ☐

WE ARE SENDING YOU:

Copies	Description
Enclosed	i) NOTICE OF INTENT TO CONSTRUCT MONITORING WELLS
	ii) VARIANCE REGARDING MONITORING holes
	iii) well CONSTRUCTION REPORTS
	iv) AUTHORIZATION IN REFERENCE to item (iii)

If enclosures are not as noted, please notify us promptly.

THESE ARE TRANSMITTED:

☐ **For Approval** ☐ **As Requested**

☐ **For Your Use** ☐ **For Review and Comment**

☐

REMARKS any questions? please call Christopher Greenlee

COPY TO:

STATE OF COLORADO

BOARD OF EXAMINERS OF WATER WELL CONSTRUCTION AND PUMP INSTALLATION CONTRACTORS
Division of Water Resources
Department of Natural Resources

1313 Sherman Street, Room 818
Denver, Colorado 80203
Phone (303) 866-3581
FAX (303) 866-3589

January 8, 1998

Roy Romer
Governor

James S. Lochhead
Executive Director, DNR

Hal D. Simpson
Secretary

Mr. Christopher J. Greenlee
Rocky Mountain Consultants, Inc.
825 Delaware Ave, Suite 500
Longmont, CO 80501

RE: Request for Variance, Monitoring Holes

Request No: 98-4

Dear Mr. Greenlee:

Thank you for the Request for Variance received regarding monitoring holes. Your request has been reviewed for the Board of Examiners of Water Well Construction and Pump installation Contractors. The request is specifically for a blanket variance from Rules 10.4.3, 10.4.4, 10.5.2.1 and 12.3.

Pursuant to Rule 18 and the authority granted by the Board, the required blanket variance to Rules 10.4.3, 10.4.4, 10.5.2.1 and 12.3 is granted subject to the following conditions:

1) The well construction will be in accordance with the Water Well Construction Rules except those Rules for which a variance was granted.
2) The Monitoring holes shall be constructed in a similar manner to the diagrams provided.
3) Please provide a copy of this variance approval with the Notice of Intent to Construct Monitoring Holes and Permit Applications submitted to this office.

Granting the request for variance to minimum water well construction standards does not relieve the owner of potential responsibility or liability in the event contamination of the water source results from such construction, nor does the grantor assume any responsibility or liability should contamination occur.

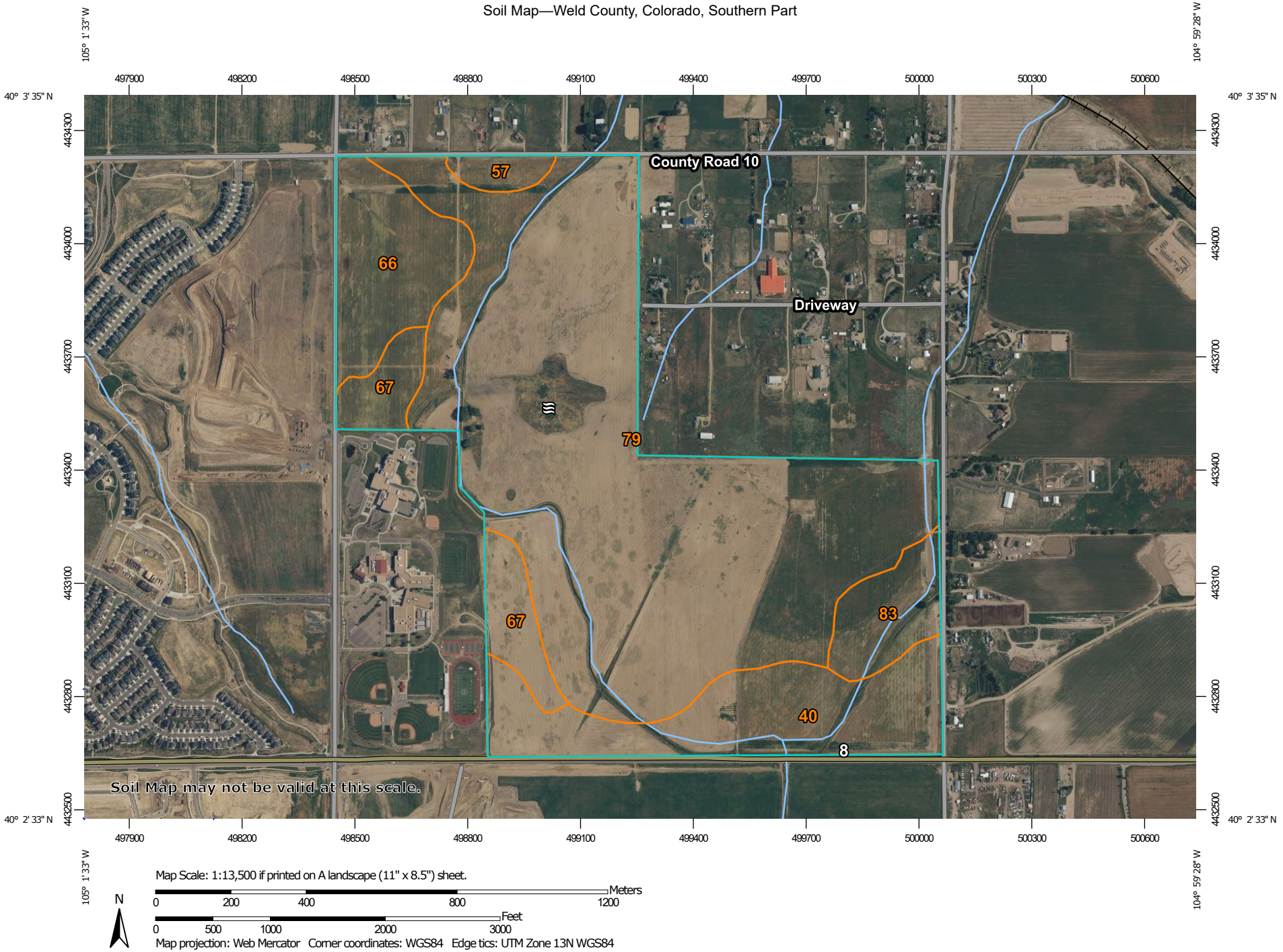
If you have any questions regarding this matter please contact Mr. George VanSlyke of this office.

Sincerely,

Jack G. Byers
Assistant State Engineer

JGB/GDV/gla:s:\bordexam\variance\98-4.doc

R. LYNN TWISS, CHAIRMAN, Wray; GLENN A. BODNAR, Denver; JANET BELLIS, Boulder



Map Scale: 1:13,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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 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: Weld County, Colorado, Southern Part
Survey Area Data: Version 21, Sep 1, 2022

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

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
40	Nunn loam, 1 to 3 percent slopes	56.9	14.5%
57	Renohill clay loam, 3 to 9 percent slopes	5.5	1.4%
66	Ulm clay loam, 0 to 3 percent slopes	35.1	8.9%
67	Ulm clay loam, 3 to 5 percent slopes	23.2	5.9%
79	Weld loam, 1 to 3 percent slopes	253.3	64.6%
83	Wiley-Colby complex, 3 to 5 percent slopes	18.3	4.7%
Totals for Area of Interest		**392.2**	**100.0%**

Form No. GWS-31
02/2017

WELL CONSTRUCTION AND YIELD ESTIMATE REPORT

State of Colorado, Office of the State Engineer
1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581
dwr.colorado.gov and dwrpermitsonline@state.co.us

For Office Use Only

1. Well Permit Number: ~~N/A~~ 324885 **Receipt Number:** ~~N/A~~ 10017320

2. Owner's Well Designation: MW03

3. Well Owner Name: COLORADO STATE OF

4. Well Location Street Address: WCR 5 X WCR 10, East 0.2 miles, South 0.25 miles into

5. As Built GPS Well Location (required): ☐ Zone 12 ☒ Zone 13 Easting: 498751.7 Northing: 4433792.37531713

6. Legal Well Location: SW 1/4, NW 1/4, Sec., 16 Twp. 1 ☒ N or S ☐, Range 68 ☐ E or W ☒, 6 P.M.
County: WELD
Subdivision: N/A, Lot N/A, Block N/A, Filing (Unit) N/A

7. Ground Surface Elevation: 5,168 feet **Date Completed:** 09/30/2021 **Drilling Method:** Geoprobe/Direct Push/Solid S

8. Completed Aquifer Name : Unnamed Quaternary Allu **Total Depth:** 23 feet **Depth Completed:** 23 feet

9. Advance Notification: Was Notification Required Prior to Construction? ☐ Yes ☒ No, Date Notification Given: _____

10. Aquifer Type: (Check one) ☐ Type I (One Confining Layer) ☐ Type I (Multiple Confining Layers) ☐ Laramie-Fox Hills ☐ Type II (Not overlain by Type III) ☐ Type II (Overlain by Type III) ☒ Type III (alluvial/colluvial)

11. Geologic Log:

Depth	Type	Grain Size	Color	Water Loc.
0-15'	Clay	N/A	Brown	10'
15-16.5'	Sandstone	FG	Light brown	-
16.5-23'	Clay	N/A	-	-

12. Hole Diameter (in.)

	From (ft)	To (ft)
3"	0	23

13. Plain Casing

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	0	8

Perforated Casing Screen Slot Size (in): .010

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	8	23

14. Filter Pack:
Material: Washed Silica Sand
Size: N/A
Interval: 6-23'

15. Packer Placement:
Type: Bentonite
Depth: 0-6'

16. Grouting Record

Material	Amount	Density	Interval	Method
N/A				

Remarks: Logged cuttings from surface

17. Disinfection: Type N/A Amt. Used N/A

18. Well Yield Estimate Data: ☐ Check box if Test Data is submitted on Form Number GWS-39, Well Yield Test Report
Well Yield Estimate Method: N/A
Static Level: N/A
Date/Time measured: N/A
Estimated Yield (gpm) N/A
Estimate Length (hrs) N/A

Remarks:

19. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402 2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to $1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be compliance with Rule 17.4.

Company Name:	Email:	Phone w/area code:	License Number:
WSP, USA	david.stainback@wsp.com	(970) 403-4108	PG-4077

Mailing Address: 4600 W 60th Ave Arvada, Colorado 80003

Sign (or enter name if filing online)	Print Name and Title	Date:
David Stainback	David Stainback, P.G., Consultant Geologist	12/06/2021

COLORADO
Division of Water Resources
Department of Natural Resources

WELL PERMIT NUMBER 324885-
RECEIPT NUMBER 10017320

ORIGINAL PERMIT APPLICANT(S)

KERR MCGEE OIL & GAS ONSHORE LP (MICKELSON, ERIK)

AUTHORIZED AGENT

WSP USA (STAINBACK, DAVID)

APPROVED WELL LOCATION

Water Division: 1 Water District: 5
Designated Basin: N/A
Management District: N/A
County: WELD
Parcel Name: N/A
Physical Address: N/A

SW 1/4 NW 1/4 Section 16 Township 1.0 N Range 68.0 W Sixth P.M.

UTM COORDINATES (Meters, Zone:13, NAD83)

Easting: 498751.7 Northing: 4433792.3

PERMIT TO USE AN EXISTING WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(f). Use of this well is limited to monitoring water levels and/or water quality sampling.
4) Approved for the use of an existing well known as MW03.
5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.
6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.
7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.
8) The owner shall mark the well in a conspicuous location with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.
9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.
10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE - Construction of this well may have occurred without proper notice or permit, as required by the Water Well Construction Rules (2 CCR 402-2). Issuance of this permit does not relieve the well owner and/or their well construction contractor of responsibility or liability for any violations that may have occurred. The well owner and/or their well construction contractor may be contacted by the Chief Well Inspector regarding alleged violations.

NOTICE: This permit has been approved subject to the following change: The UTM coordinate values provided with the permit application were not used and the UTMs were taken from the Well Construction Report provided. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 106, C.R.S.)

WELL PERMIT NUMBER 324885- **RECEIPT NUMBER 10017320**

Issued By ANITIA ARCHULETA

Date Issued: 12/20/2021

Expiration Date: N/A

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., Ste 821, DENVER CO 80203
Phone: (303) 866-3581 dwrpermitsonline@state.co.us

Office Use Only

Form GWS-46 (01/2020)

RCVD DWR
12/10/2021

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be typed, completed online or in black or blue ink.

1. Well Owner Information

Name of well owner: KERR MCGEE OIL & GAS ONSHORE LP

Mailing address: P O BOX 173779

City	State	Zip code
Denver	Colorado	80217-3779

Telephone #	E-Mail (If filing online it is required)
(720)929-4306	Erik_Mickelson@oxy.com

2. Type Of Application (check applicable boxes)

- ■ Use existing well
- ☐ Construct new well
- ☐ Other:
- ☐ Replacement for existing monitoring well: Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment	Well name or #
MH-	MW03

4. Location Of Proposed Well (Important! See Instructions)

County: WELD

SW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
16	1	☒ N ☐ S	68	☐ E ☒ W	6

Distance of well from section lines (section lines are typically not property lines)

Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well

feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ■ YES

Easting 498751
Northing 4433792
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: COLORADO STATE OF

Mailing address: 1127 N SHERMAN ST STE 300

City	State	Zip Code
Denver	Colorado	80203-2398

Telephone #: N/A

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth	Aquifer
23 feet	Unnamed Quaternary Alluvium

8. Consultant Information (if applicable)

Name of contact person: David Stainback, P.G.

Company name: WSP, USA

Mailing address: 4600 W 60th Ave

City	State	Zip Code
Arvada	Colorado	80003

Telephone #: (970)403-4108

9. Proposed Well Driller License #(optional):

10. Name of Well Owner or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign or enter full name here	Date (mm/dd/yyyy)
Erik Mickelson	12/07/2021

If signing print name. Print title if other than land owner.

Erik Mickelson, Senior HSE Advisor

Office Use Only

USGS map name	DWR map no.	Surface elev.

Receipt area only

10017320

DIV 1 WD 5 BA ____ MD ____

Form No. GWS-31
02/2017

WELL CONSTRUCTION AND YIELD ESTIMATE REPORT

State of Colorado, Office of the State Engineer
1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581
dwr.colorado.gov and dwrpermitsonline@state.co.us

For Office Use Only

1. Well Permit Number: ~~N/A~~ 324884 **Receipt Number:** ~~N/A~~ 10017319

2. Owner's Well Designation: MW02

3. Well Owner Name: COLORADO STATE OF

4. Well Location Street Address: WCR 5 X WCR 10, East 0.2 miles, South 0.25 miles into

5. As Built GPS Well Location (required): ☐ Zone 12 ☒ Zone 13 Easting: 498781.5 Northing: 4433828.21208316

6. Legal Well Location: SW 1/4, NW 1/4, Sec., 16 Twp. 1 ☒ N or S ☐, Range 68 ☐ E or W ☒, 6 P.M.
County: WELD
Subdivision: N/A, Lot N/A, Block N/A, Filing (Unit) N/A

7. Ground Surface Elevation: 5,168 feet **Date Completed:** 09/30/2021 **Drilling Method:** Geoprobe/Solid Stem augers

8. Completed Aquifer Name : Unnamed Quaternary Allu **Total Depth:** 30 feet **Depth Completed:** 30 feet

9. Advance Notification: Was Notification Required Prior to Construction? ☐ Yes ☒ No, Date Notification Given:

10. Aquifer Type: (Check one) ☐ Type I (One Confining Layer) ☐ Type I (Multiple Confining Layers) ☐ Laramie-Fox Hills ☐ Type II (Not overlain by Type III) ☐ Type II (Overlain by Type III) ☒ Type III (alluvial/colluvial)

11. Geologic Log:

Depth	Type	Grain Size	Color	Water Loc.
0-10	Clay	N/A	brown	-
10-18'	Claystone	N/A	grey	-
18-22'	Sandstone	FG	tan	-
22-30'	Clayey Sands	VFG	brown	-

12. Hole Diameter (in.)

	From (ft)	To (ft)
3"	0	30

13. Plain Casing

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	0	10

Perforated Casing Screen Slot Size (in): .010

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	10	30

14. Filter Pack:
Material: Washed Silica Sand
Size: N/A
Interval: 8-30'

15. Packer Placement:
Type: Bentonite
Depth: 0-8'

16. Grouting Record

Material	Amount	Density	Interval	Method
N/A				

Remarks: Surface cuttings logged

17. Disinfection: Type N/A Amt. Used N/A

18. Well Yield Estimate Data: ☐ Check box if Test Data is submitted on Form Number GWS-39, Well Yield Test Report
Well Yield Estimate Method: N/A
Static Level: N/A
Date/Time measured: N/A
Estimated Yield (gpm) N/A
Estimate Length (hrs) N/A

Remarks:

19. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402 2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to $1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be compliance with Rule 17.4.

Company Name:	Email:	Phone w/area code:	License Number:
WSP, USA	david.stainback@wsp.com	(970) 403-4108	PG-4077

Mailing Address: 4600 W 60th Ave Arvada, Colorado 80003

Sign (or enter name if filing online)	Print Name and Title	Date:
David Stainback	David Stainback, P.G., Consultant Geologist	12/06/2021

COLORADO
Division of Water Resources
Department of Natural Resources

WELL PERMIT NUMBER 324884-
RECEIPT NUMBER 10017319

ORIGINAL PERMIT APPLICANT(S)

KERR MCGEE OIL & GAS ONSHORE LP (MICKELSON, ERIK)

AUTHORIZED AGENT

WSP USA (STAINBACK, DAVID)

APPROVED WELL LOCATION

Water Division: 1 Water District: 5
Designated Basin: N/A
Management District: N/A
County: WELD
Parcel Name: N/A
Physical Address: N/A

SW 1/4 NW 1/4 Section 16 Township 1.0 N Range 68.0 W Sixth P.M.

UTM COORDINATES (Meters, Zone:13, NAD83)

Easting: 498781.5 Northing: 4433828.2

PERMIT TO USE AN EXISTING WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.

2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.

3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(f). Use of this well is limited to monitoring water levels and/or water quality sampling.

4) Approved for the use of an existing well known as MW02.

5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.

6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.

7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.

8) The owner shall mark the well in a conspicuous location with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.

9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.

10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE - Construction of this well may have occurred without proper notice or permit, as required by the Water Well Construction Rules (2 CCR 402-2). Issuance of this permit does not relieve the well owner and/or their well construction contractor of responsibility or liability for any violations that may have occurred. The well owner and/or their well construction contractor may be contacted by the Chief Well Inspector regarding alleged violations.

NOTICE: This permit has been approved subject to the following change: The UTM coordinate values provided with the permit application were not used and the UTMs were taken from the Well Construction Report provided. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 106, C.R.S.)

WELL PERMIT NUMBER 324884- **RECEIPT NUMBER 10017319**

Issued By ANITIA ARCHULETA

Date Issued: 12/20/2021

Expiration Date: N/A

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., Ste 821, DENVER CO 80203
Phone: (303) 866-3581 dwrpermitsonline@state.co.us

Office Use Only

Form GWS-46 (01/2020)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be typed, completed online or in black or blue ink.

RCVD DWR
12/10/2021

1. Well Owner Information

Name of well owner: KERR MCGEE OIL & GAS ONSHORE LP

Mailing address: P O BOX 173779

City	State	Zip code
Denver	Colorado	80217-3779

Telephone #	E-Mail (If filing online it is required)
(720)929-4306	Erik_Mickelson@oxy.com

2. Type Of Application (check applicable boxes)

- ■ Use existing well
- ☐ Construct new well
- ☐ Other:
- ☐ Replacement for existing monitoring well: Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment	Well name or #
MH-	MW02

4. Location Of Proposed Well (Important! See Instructions)

County: WELD

SW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
16	1	☒ ☐	68	☐ ☒	6

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ■ YES

Easting 498781
Northing 4433828
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: COLORADO STATE OF

Mailing address: 1127 N SHERMAN ST STE 300

City	State	Zip Code
Denver	Colorado	80203-2398

Telephone #: N/A

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total **depth**	Aquifer
30 feet	Unnamed Quaternary Alluvium

8. Consultant Information (if applicable)

Name of contact person: David Stainback, P.G.

Company name: WSP, USA

Mailing address: 4600 W 60th Ave

City	State	Zip Code
Arvada	Colorado	80003

Telephone #: (970)403-4108

9. Proposed Well Driller License #(optional):

10. Name of Well Owner or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign or enter full name here	Date (mm/dd/yyyy)
Erik Mickelson	12/07/2021

If signing print name. Print title if other than land owner.
Erik Mickelson, Senior HSE Advisor

Office Use Only

USGS map name	DWR map no.	Surface elev.

Receipt area only

10017319

DIV 1 WD 5 BA ____ MD ____

Form No. GWS-31
02/2017

WELL CONSTRUCTION AND YIELD ESTIMATE REPORT

State of Colorado, Office of the State Engineer
1313 Sherman St., Room 821, Denver, CO 80203 303.866.3581
dwr.colorado.gov and dwrpermitsonline@state.co.us

For Office Use Only

1. Well Permit Number: ~~N/A~~ 324883 **Receipt Number:** ~~N/A~~ 10017318

2. Owner's Well Designation: MW01

3. Well Owner Name: COLORADO STATE OF

4. Well Location Street Address: WCR 5 X WCR 10, East 0.2 miles, South 0.25 miles into

5. As Built GPS Well Location (required): ☐ Zone 12 ☒ Zone 13 Easting: 498765.1 Northing: 4433753.93599951

6. Legal Well Location: SW 1/4, NW 1/4, Sec., 16 Twp. 1 ☒ N or S ☐, Range 68 ☐ E or W ☒, 6 P.M.
County: WELD
Subdivision: N/A, Lot N/A, Block N/A, Filing (Unit) N/A

7. Ground Surface Elevation: 5,168 feet **Date Completed:** 09/30/2021 **Drilling Method:** Geoprobe/Direct Push/Solid S

8. Completed Aquifer Name : Unnamed Quaternary Allu **Total Depth:** 27 feet **Depth Completed:** 27 feet

9. Advance Notification: Was Notification Required Prior to Construction? ☐ Yes ☒ No, Date Notification Given: _____

10. Aquifer Type: (Check one) ☐ Type I (One Confining Layer) ☐ Type I (Multiple Confining Layers) ☐ Laramie-Fox Hills ☐ Type II (Not overlain by Type III) ☐ Type II (Overlain by Type III) ☒ Type III (alluvial/colluvial)

11. Geologic Log:

Depth	Type	Grain Size	Color	Water Loc.
0-7'	Clay	N/A	brown	-
7-13'	Claystone	N/A	brown	-
13-20'	Silty sandstone	VFG	brown	-
20-27'	Clay	N/A	brown	21'

12. Hole Diameter (in.)

	From (ft)	To (ft)
3"	0	27

13. Plain Casing

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	0	7

Perforated Casing Screen Slot Size (in): .010

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
1"	PVC	N/A	7	27

14. Filter Pack:
Material: Washed Silica Sand
Size: N/A
Interval: 6-27'

15. Packer Placement:
Type: Bentonite
Depth: 0-6'

16. Grouting Record

Material	Amount	Density	Interval	Method
N/A				

Remarks: 0-6' hand augered to clear potential utilities

17. Disinfection: Type N/A Amt. Used N/A

18. Well Yield Estimate Data: ☐ Check box if Test Data is submitted on Form Number GWS-39, Well Yield Test Report
Well Yield Estimate Method: N/A
Static Level: N/A
Date/Time measured: N/A
Estimated Yield (gpm) N/A
Estimate Length (hrs) N/A

Remarks:

19. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed (or name entered if filing online) and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402 2. The filing of a document that contains false statements is a violation of section 37 91 108(1)(e), C.R.S., and is punishable by fines up to $1,000 and/or revocation of the contracting license. If filing online the State Engineer considers the entry of the licensed contractor's name to be compliance with Rule 17.4.

Company Name:	Email:	Phone w/area code:	License Number:
WSP, USA	david.stainback@wsp.com	(970) 403-4108	PG-4077

Mailing Address: 4600 W 60th Ave Arvada, Colorado 80003

Sign (or enter name if filing online)	Print Name and Title	Date:
David Stainback	David Stainback, P.G., Consultant Geologist	12/06/2021

COLORADO
Division of Water Resources
Department of Natural Resources

WELL PERMIT NUMBER 324883-
RECEIPT NUMBER 10017318

ORIGINAL PERMIT APPLICANT(S)

KERR MCGEE OIL & GAS ONSHORE LP (MICKELSON, ERIK)

AUTHORIZED AGENT

WSP USA (STAINBACK, DAVID)

APPROVED WELL LOCATION

Water Division: 1 Water District: 5
Designated Basin: N/A
Management District: N/A
County: WELD
Parcel Name: N/A
Physical Address: N/A

SW 1/4 NW 1/4 Section 16 Township 1.0 N Range 68.0 W Sixth P.M.

UTM COORDINATES (Meters, Zone:13, NAD83)

Easting: 498765.1 Northing: 4433753.9

PERMIT TO USE AN EXISTING WELL

ISSUANCE OF THIS PERMIT DOES NOT CONFER A WATER RIGHT

CONDITIONS OF APPROVAL

1) This well shall be used in such a way as to cause no material injury to existing water rights. The issuance of this permit does not ensure that no injury will occur to another vested water right or preclude another owner of a vested water right from seeking relief in a civil court action.
2) The construction of this well shall be in compliance with the Water Well Construction Rules 2 CCR 402-2, unless approval of a variance has been granted by the State Board of Examiners of Water Well Construction and Pump Installation Contractors in accordance with Rule 18.
3) Approved pursuant to CRS 37-92-602(3)(b)(I) for uses as described in CRS 37-92-602(1)(f). Use of this well is limited to monitoring water levels and/or water quality sampling.
4) Approved for the use of an existing well known as MW01.
5) This well must be equipped with a locking cap or seal to prevent well contamination or possible hazards as an open well. The well must be kept capped and locked at all times except during sampling or measuring.
6) Records of water level measurements and water quality analyses shall be maintained by the well owner and submitted to the Division of Water Resources upon request.
7) Upon conclusion of the monitoring program the well owner shall plug this well in accordance with Rule 16 of the Water Well Construction Rules. A Well Abandonment Report must be completed and submitted to the Division of Water Resources within 60 days of plugging.
8) The owner shall mark the well in a conspicuous location with the well permit number and name of aquifer as appropriate, and shall take necessary means and precautions to preserve these markings.
9) This well must have been constructed by or under the supervision of a licensed well driller or other authorized individual according to the Water Well Construction Rules.
10) This well must be located not more than 200 feet from the location specified on this permit.

NOTE: Issuance of this permit does not guarantee that this well can be converted to a production well under a future permit. Additionally, pursuant to Rule 14.2 of the Water Well Construction Rules (2 CCR 402-2), monitoring holes constructed pursuant to a monitoring hole notice shall not be converted to a production well. (Upon obtaining a permit from the State Engineer, a monitoring hole may be converted to a monitoring well, recovery well for remediation of the aquifer, or a dewatering system for dewatering the aquifer.)

NOTICE - Construction of this well may have occurred without proper notice or permit, as required by the Water Well Construction Rules (2 CCR 402-2). Issuance of this permit does not relieve the well owner and/or their well construction contractor of responsibility or liability for any violations that may have occurred. The well owner and/or their well construction contractor may be contacted by the Chief Well Inspector regarding alleged violations.

NOTICE: This permit has been approved subject to the following change: The UTM coordinate values provided with the permit application were not used and the UTMs were taken from the Well Construction Report provided. You are hereby notified that you have the right to appeal the issuance of this permit, by filing a written request with this office within sixty (60) days of the date of issuance, pursuant to the State Administrative Procedures Act. (See Section 24-4-104 through 106, C.R.S.)

WELL PERMIT NUMBER 324883- **RECEIPT NUMBER 10017318**

Issued By ANITIA ARCHULETA

Date Issued: 12/20/2021

Expiration Date: N/A

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., Ste 821, DENVER CO 80203
Phone: (303) 866-3581 dwrpermitsonline@state.co.us

Office Use Only

Form GWS-46 (01/2020)

RCVD DWR
12/10/2021

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be typed, completed online or in black or blue ink.

1. Well Owner Information

Name of well owner: KERR MCGEE OIL & GAS ONSHORE LP

Mailing address: P O BOX 173779

City	State	Zip code
Denver	Colorado	80217-3779

Telephone #	E-Mail (If filing online it is required)
(720)929-4306	Erik_Mickelson@oxy.com

2. Type Of Application (check applicable boxes)

- ■ Use existing well
- ☐ Construct new well
- ☐ Other:
- ☐ Replacement for existing monitoring well: Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment	Well name or #
MH-	MW01

4. Location Of Proposed Well (Important! See Instructions)

County: WELD

SW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
16	1	☒ N ☐ S	68	☐ E ☒ W	6

Distance of well from section lines (section lines are typically not property lines)

Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well

feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ■ YES

Easting 498765
Northing 4433753
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: COLORADO STATE OF

Mailing address: 1127 N SHERMAN ST STE 300

City	State	Zip Code
Denver	Colorado	80203-2398

Telephone #: N/A

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total **depth**	Aquifer
27 feet	Unnamed Quaternary Alluvium

8. Consultant Information (if applicable)

Name of contact person: David Stainback, P.G.

Company name: WSP, USA

Mailing address: 4600 W 60th Ave

City	State	Zip Code
Arvada	Colorado	80003

Telephone #: (970)403-4108

9. Proposed Well Driller License # (optional):

10. Name of Well Owner or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign or enter full name here	Date (mm/dd/yyyy)
Erik Mickelson	12/07/2021

If signing print name. Print title if other than land owner.

Erik Mickelson, Senior HSE Advisor

Office Use Only

USGS map name	DWR map no.	Surface elev.

Receipt area only

10017318

DIV 1 WD 5 BA ____ MD ____

FORM 19 Rev 03/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Document Number: 402792735
Date Received: 08/26/2021

Spill report taken by: CANFIELD, CHRIS
Spill/Release Point ID: 480594

SPILL/RELEASE REPORT (INITIAL /w SUPPLEMENTAL)

This form is to be submitted by the party responsible for the oil and gas spill or release. Refer to COGCC Rule 912.b. for reporting requirements of spills or releases of E&P Waste, produced Fluids, or unauthorized Releases of natural gas. Submit a Site Investigation and Remediation Workplan (Form 27) if Rule 913.c. applies.

OPERATOR INFORMATON

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Operator No: 47120
Address: P O BOX 173779
City: DENVER State: CO Zip: 80217-3779
Contact Person: Erik Mickelson

Phone Numbers
Phone: (720) 929-4306
Mobile: ( )
Email: Erik_Mickelson@oxy.com

☐ Transfer of Operatorship: Pursuant to Rule 912.f, this Supplemental Form 19 is being submitted to designate the Buying Operator as the responsible Operator for this Spill and Release.

INITIAL SPILL/RELEASE REPORT

Initial Spill/Release Report Doc# 402792735

Initial Report Date: 08/26/2021 Date of Discovery: 08/26/2021 Spill Type: Historical Release

Spill/Release Point Location:

QTRQTR SWNW SEC 16 TWP 1N RNG 68W MERIDIAN 6
Latitude: 40.054299 Longitude: -105.014555
`Municipality (if within municipal boundaries): County: WELD

Enter Lat./long measurement of the actual Spill/Release Point. Lat./Long. Data shall meet standards of Rule 216.

Reference Location:

Facility Type: WELL SITE ☐ Facility/Location ID No
Spill/Release Point Name: State 30-16 ☒ Well API No. (Only if the reference facility is well) 05-123-29115
☐ No Existing Facility or Location ID No.

Estimated Total Spill Volume: use same ranges as others for values

Estimated Oil Spill Volume(bbl): 0 Estimated Condensate Spill Volume(bbl): 0
Estimated Flow Back Fluid Spill Volume(bbl): 0 Estimated Produced Water Spill Volume(bbl): 0
Estimated Other E&P Waste Spill Volume(bbl): Unknown Estimated Drilling Fluid Spill Volume(bbl): 0
Specify: Thermogenic gas

Has the subject Spill/Release been controlled at the time of reporting? No

Land Use:

Current Land Use: CROP LAND Other(Specify):
Weather Condition: Sunny 90°F
Surface Owner: FEE Other(Specify):

Describe what is known about the spill/release event (what happened -- including how it was stopped, contained, and recovered):

During plugging and abandonment activities at the State 30-16 wellhead, five shallow soil vapor points were installed in the vicinity of the wellhead. On August 20, 2021, methane was detected at SVP03 (2.7%). The volume of the methane release is unknown. WSP collected samples from SVP03 using IsoTubes™ and an IsoTube™ sampling manifold in conjunction with the pump on a GEM 5000. The samples were submitted to Dolan Integration Group (DIG) for gas composition analysis. Results from the gas composition analysis were received from DIG on August 25, 2021 and are attached. The analytical results indicate the detected soil gas is thermogenic in origin. An investigation into the source of the soil gas in on-going. The assessment details will be summarized in a supplemental Form 27 report (Remediation No. 18298; Form 27 Initial Document No. 402697754). The topographic Site Location Map showing the geographic setting of the release is provided as Figure 1.

List of Agencies and Other Parties Notified Pursuant to Rule 912.b.(7)-(11):

OTHER NOTIFICATIONS

Date	Agency/Party	Contact	Phone	Response
8/26/2021	Weld County	Weld County	-	Notified via email
8/26/2021	Surface Owner	Surface Owner	-	Notified via telephone

REPORT CRITERIA

Rule 912.b.(1) Report to the Director (select all criteria that apply):

No — Rule 912.b.(1).A: A Spill or Release of any size that impacts or threatens to impact any Waters of the State, Public Water System, residence or occupied structure, livestock, wildlife, or publicly-maintained road.

Waters of the State: _____ Public Water System: _____

Residence or Occupied Structure: _____ Livestock: _____

Wildlife: _____ Publicly-Maintained Road: _____

No — Rule 912.b.(1).B: A Spill or Release in which 1 barrel or more of E&P Waste or produced fluids is spilled or released outside of berms or other secondary containment.

No — Rule 912.b.(1).C: A Spill or Release of 5 barrels or more of E&P Waste or produced Fluids regardless of whether the Spill or Release is completely contained within berms or other secondary containment.

No — Rule 912.b.(1).D: Within 6 hours of discovery, a Grade 1 Gas Leak. For a Grade 1 Gas Leak from a Flowline, the Operator also must submit the Form 19 – Initial, document number on a Form 44, Flowline Report, for the Grade 1 Gas Leak

Enter the approximate time of discovery _____ (HH:MM)

Enter the Document Number of the Grade 1 Gas Leak Report, Form 44 _____

Was there a reportable accident associated with either a Grade 1 Gas Leak or an E&P waste spill or release? _____

Enter the Document Number of the Initial Accident Report, Form 22 _____

Was there damage during excavation? _____

Was CO 811 notified prior to excavation? _____

No — Rule 912.b.(1).E: The discovery of 10 cubic yards or more of impacted material resulting from a current or historic Spill or Release. Discovery and reporting will not be contingent upon confirmation samples demonstrating exceedance of Table 915-1 standards.

Estimated Volume of Impacted Solids (cu. yd.): _____

No — Rule 912.b.(1).F: The discovery of impacted Waters of the State, including Groundwater. Discovery and reporting will not be contingent upon confirmation samples demonstrating exceedance of Table 915-1 standards. The presence of free product or hydrocarbon sheen on Groundwater or surface water is reportable. The presence of contaminated soil in contact with Groundwater or surface water is reportable. Check all that apply:

- ☐ The presence of free product or hydrocarbon sheen Surface Water
- ☐ The presence of free product or hydrocarbon sheen on Groundwater
- ☐ The presence of contaminated soil in contact with Groundwater
- ☐ The presence of contaminated soil in contact with Surface water

No — Rule 912.b.(1).G: A suspected or actual Spill or Release of any volume where the volume cannot be immediately determined, including a spill or release of any volume that daylights from the subsurface.

No — Rule 912.b.(1).H: Spill or Release resulting in vaporized hydrocarbon mists that leave the Oil and Gas Location or Off-Location Flowline right of way from an Oil and Gas Location and impacts or threatens to impact off-location property.

☐ Areas offsite of Oil & Gas Location ☐ Off-Location Flowline right of way

Yes — Rule 912.b.(1).I: A Release of natural gas that results in an accumulation of soil gas or gas seeps.

No — Rule 912.b.(1).J: A Release that results in natural gas in Groundwater.

SPILL/RELEASE DETAIL REPORTS

#1 Supplemental Report Date: 08/26/2021

FLUIDS	BBL's SPILLED	BBL's RECOVERED	Unknown
OIL	0	0	☐
CONDENSATE	0	0	☐
PRODUCED WATER	0	0	☐
DRILLING FLUID	0	0	☐
FLOW BACK FLUID	0	0	☐
OTHER E&P WASTE			☒

specify: Thermogenic gas

Was spill/release completely contained within berms or secondary containment? NO Was an Emergency Pit constructed? NO

*Secondary containment, **including walls & floor regardless of construction material**, must be sufficiently impervious to contain any discharge from primary containment until cleanup occurs.*

A Form 15 Pit Report shall be submitted within 30 calendar days after the construction of an emergency pit

Impacted Media (Check all that apply) ☒ Soil ☐ Groundwater ☐ Surface Water ☐ Dry Drainage Feature

Surface Area Impacted: Length of Impact (feet): Width of Impact (feet):

Depth of Impact (feet BGS): Depth of Impact (inches BGS):

How was extent determined?

Assessment and remediation activities are ongoing. The analytical results and assessment details will be provided in a supplemental Form 27 report (Remediation No. 18298; Form 27 Initial Document No. 402697754).

Soil/Geology Description:

Clayey Sand (SC)

Depth to Groundwater (feet BGS) 20 Number Water Wells within 1/2 mile radius: 11

If less than 1 mile, distance in feet to nearest

Water Well	1850	None ☐	Surface Water	160	None ☐
Wetlands		None ☒	Springs		None ☒
Livestock	1700	None ☐	Occupied Building	1200	None ☐

Additional Spill Details Not Provided Above:

CORRECTIVE ACTIONS

#1 Supplemental Report Date: 08/26/2021

Root Cause of Spill/Release: Unknown (Historical)

Other (specify):

Type of Equipment at Point of Spill/Release: Other

If "Other" selected above, specify or describe here:

Wellhead

Describe Incident & Root Cause (include specific equipment and point of failure)

During plugging and abandonment activities at the State 30-16 wellhead, five shallow soil vapor points were installed in the vicinity of the wellhead. On August 20, 2021, methane was detected at SVP03 (2.7%). The volume of the methane release is unknown.

Describe measures taken to prevent the problem(s) from reoccurring:

An investigation to determine the source of the soil gas is ongoing.

Volume of Soil Excavated (cubic yards):

Disposition of Excavated Soil (attach documentation) ☐ Offsite Disposal ☐ Onsite Treatment

☐ Other (specify)

Volume of Impacted Ground Water Removed (bbls):

Volume of Impacted Surface Water Removed (bbls):

REQUEST FOR CLOSURE

Spill/Release Reports should be closed when impacts have been remediated or when further investigation and corrective actions will take place under an approved Form 27.

Basis for Closure:

☐ Corrective Actions Completed (documentation attached, check all that apply)

☐ Horizontal and Vertical extents of impacts have been delineated.

☐ Documentation of compliance with Table 915-1 is attached.

☐ All E&P Waste has been properly treated or disposed.

☒ Work proceeding under an approved Form 27 (Rule 912.c).

Form 27 Remediation Project No: 18298

☐ SUSPECTED Spill/Release did not occur or was below Rule 912.a.(5) reporting thresholds.

OPERATOR COMMENTS:

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: Print Name: Erik Mickelson

Title: Sr. HSE Advisor Date: 08/26/2021 Email: Erik_Mickelson@oxy.com

Condition of Approval

COA Type	Description

0 COA

Attachment List

Att Doc Num	Name
402792735	SPILL/RELEASE REPORT(I/S)
402792763	SITE MAP
402793106	CORRESPONDENCE
402793107	ANALYTICAL RESULTS
402794116	FORM 19 SUBMITTED

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

Interactive Map Selected Items Report

Selection Result Filters

Oil & Gas Formations

Include

JSND
NB-CD
CODL
J-CDL
JNBCD
NBRR
SUSX
DKTA
DKJCD

Water Well Depth

Greater than

Hold down the **CTRL** key to select multiple formations

Filter Results Reset Export Results to Excel

Oil & Gas Wells - 80 Records

API County	API Sequence	Location ID	Status	Status Date	Well	Operator	Qtr Qtr	Section	Township	Range	Meridian	Sidetrack	Formation	Top	Bottom	TD	Formation Status
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	JSND	8342	8357	8490	AB
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	NB-CD	7526	7910	8490	AB
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	CODL	7892	7910	8490	CM
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	J-CDL	7892	8357	8490	CM
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	JNBCD			8490	CM
123	09634	318659	PA	7/2/2018	STATE OF COLORADO AL *1	KERR MCGEE OIL & GAS ONSHORE LP	NWNE	16	1N	68W	6	00	NBRR	7526	7690	8490	CM
123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	JSND	8347	8367	8500	AB
123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	NB-CD	7513	7914	8500	AB

123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	SUSX	4850	4876	8500	AB
123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	CODL	7904	7914	8500	CM
123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	JNBCD	7513	8367	8500	CM
123	12626	323150	PA	1/26/2018	STATE OF COLORADO AL *2	KERR MCGEE OIL & GAS ONSHORE LP	CSW	16	1N	68W	6	00	NBRR	7513	7669	8500	CM
123	15592	335609	PA	8/30/2018	STATE OF COLORADO AZ *1	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	7822	7904	8748	AB
123	15592	335609	PA	8/30/2018	STATE OF COLORADO AZ *1	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	DKTA	8504	8526	8748	AB
123	15592	335609	PA	8/30/2018	STATE OF COLORADO AZ *1	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	JSND	8348	8476	8748	AB
123	15592	335609	PA	8/30/2018	STATE OF COLORADO AZ *1	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	DKJCD	7904	8526	8748	CM
123	15597	408698	AL	6/13/1992	STATE OF COLORADO /AY/ *1	AMOCO PRODUCTION COMPANY	SESE	16	1N	68W	6						
123	16105	328532	PA	8/28/2015	STATE *16-9V	KERR MCGEE OIL & GAS ONSHORE LP	NESE	16	1N	68W	6	00	CODL	7928	7950	8717	AB
123	16105	328532	PA	8/28/2015	STATE *16-9V	KERR MCGEE OIL & GAS ONSHORE LP	NESE	16	1N	68W	6	00	JSND	8370	8384	8717	AB
123	16105	328532	PA	8/28/2015	STATE *16-9V	KERR MCGEE OIL & GAS ONSHORE LP	NESE	16	1N	68W	6	00	J-CDL	7928	8384	8717	CM
123	24399	409917	AL	7/24/2008	STATE *4-16	KERR MCGEE OIL & GAS ONSHORE LP	NWNW	16	1N	68W	6						
123	24398	409916	AL	7/24/2008	STATE *6-16	KERR MCGEE OIL & GAS ONSHORE LP	SENW	16	1N	68W	6						
123	24397	335885	PA	12/17/2018	STATE *11-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7564	7964	8110	AB
123	24397	335885	PA	12/17/2018	STATE *11-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	7948	7964	8110	CM
123	24397	335885	PA	12/17/2018	STATE *11-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7564	7721	8110	CM

123	24396	409915	AL	7/24/2008	STATE *3-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6						
123	24481	306343	PA	8/30/2018	STATE *5-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7614	8004	8165	AB
123	24481	306343	PA	8/30/2018	STATE *5-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	7989	8004	8165	CM
123	24481	306343	PA	8/30/2018	STATE *5-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7614	7859	8165	CM
123	24511	409946	AL	7/15/2008	STATE *14-16	KERR MCGEE OIL & GAS ONSHORE LP	SESW	16	1N	68W	6						
123	29021	335885	PA	2/13/2018	STATE *14-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7856	8122	8320	AB
123	29021	335885	PA	2/13/2018	STATE *14-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8104	8122	8320	CM
123	29021	335885	PA	2/13/2018	STATE *14-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7856	7981	8320	CM
123	29022	335885	PA	3/7/2018	STATE *13-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7862	8282	8445	AB
123	29022	335885	PA	3/7/2018	STATE *13-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8266	8282	8445	CM
123	29022	335885	PA	3/7/2018	STATE *13-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7832	8141	8445	CM
123	29023	335885	PA	2/13/2018	STATE *12-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7721	8129	8282	AB
123	29023	335885	PA	2/13/2018	STATE *12-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8113	8129	8282	CM
123	29023	335885	PA	2/13/2018	STATE *12-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7721	7994	8282	CM
123	29024	335885	PA	12/14/2018	STATE *25-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7698	8104	8665	AB
123	29024	335885	PA	12/14/2018	STATE *25-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8087	8104	8665	CM
123	29024	335885	PA	12/14/2018	STATE *25-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7698	7967	8665	CM

123	29025	335885	PA	12/14/2018	STATE *22-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7629	8024	8210	AB
123	29025	335885	PA	12/14/2018	STATE *22-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8010	8024	8210	CM
123	29025	335885	PA	12/14/2018	STATE *22-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7629	7891	8210	CM
123	29026	335885	PA	2/14/2018	STATE *33-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7889	8295	8458	AB
123	29026	335885	PA	2/14/2018	STATE *33-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8280	8295	8458	CM
123	29026	335885	PA	2/14/2018	STATE *33-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7889	8161	8458	CM
123	29027	335885	PA	2/13/2018	STATE *35-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NB-CD	7935	8306	8489	AB
123	29027	335885	PA	2/13/2018	STATE *35-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	CODL	8284	8306	8489	CM
123	29027	335885	PA	2/13/2018	STATE *35-16	KERR MCGEE OIL & GAS ONSHORE LP	NESW	16	1N	68W	6	00	NBRR	7935	8156	8489	CM
123	29112	335609	PA	11/13/2019	STATE *35-9	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7783	8172	8341	AB
123	29112	335609	PA	11/13/2019	STATE *35-9	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8154	8172	8341	CM
123	29112	335609	PA	11/13/2019	STATE *35-9	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7783	8031	8341	CM
123	29113	335609	PA	2/15/2018	STATE *21-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7826	8208	8368	AB
123	29113	335609	PA	2/15/2018	STATE *21-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8193	8208	8368	CM
123	29113	335609	PA	2/15/2018	STATE *21-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7826	8062	8368	CM
123	29114	335609	PA	8/31/2018	STATE *6-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7657	8054	8228	AB
123	29114	335609	PA	8/31/2018	STATE *6-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8038	8054	8228	CM

123	29114	335609	PA	8/31/2018	STATE *6-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7657	7908	8228	CM
123	29115	335609	PA	8/17/2021	STATE *30-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7846	8240	8390	AB
123	29115	335609	PA	8/17/2021	STATE *30-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8220	8240	8390	CM
123	29115	335609	PA	8/17/2021	STATE *30-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7846	8100	8390	CM
123	29116	335609	PA	8/30/2018	STATE *32-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7796	8193	8350	AB
123	29116	335609	PA	8/30/2018	STATE *32-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8178	8193	8350	CM
123	29116	335609	PA	8/30/2018	STATE *32-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7796	8048	8350	CM
123	29117	335609	PA	8/31/2018	STATE *3-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	8089	76096	8245	AB
123	29117	335609	PA	8/31/2018	STATE *3-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8069	8089	8245	CM
123	29117	335609	PA	8/31/2018	STATE *3-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7696	7953	8245	CM
123	29118	335609	PA	6/19/2018	STATE *4-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7619	8004	8160	AB
123	29118	335609	PA	6/19/2018	STATE *4-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	7990	8004	8160	CM
123	29118	335609	PA	6/19/2018	STATE *4-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7619	7870	8160	CM
123	29119	335609	PA	11/13/2019	STATE *28-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NB-CD	7972	8366	8561	AB
123	29119	335609	PA	11/13/2019	STATE *28-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	CODL	8347	8366	8561	CM
123	29119	335609	PA	11/13/2019	STATE *28-16	KERR MCGEE OIL & GAS ONSHORE LP	SWNW	16	1N	68W	6	00	NBRR	7972	8216	8561	CM
123	30936	414828	PA	7/23/2019	STATE *7-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6	00	NB-CD	7848	8252	8930	AB

123	30937	414828	SI	8/1/2020	STATE *8-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6	00	NB-CD	8130	8522	9075	SI
123	30942	414828	SI	12/1/2020	STATE *2-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6	00	NB-CD	7596	7992	8148	SI
123	30943	414828	PA	11/29/2017	STATE *1-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6	00	NB-CD	7988	8390	8540	AB
123	30946	414828	PA	11/10/2020	STATE *26-16	KERR MCGEE OIL & GAS ONSHORE LP	NENW	16	1N	68W	6	00	NB-CD	8098	8496	9035	AB

Water Wells - 0 Records

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401778507

Date Received: 09/28/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: CRYSTAL MCCLAIN

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-4398

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: CRYSTAL.MCCLAIN@ANADARKO.COM

For "Intent" 24 hour notice required, Name: Tel:

COGCC contact: Email:

API Number 05-123-15592-00

Well Name: STATE OF COLORADO AZ Well Number: 1

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054103 Longitude: -105.014489

GPS Data:

Date of Measurement: 08/06/2008 PDOP Reading: 5.5 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	7904	7922	06/22/2018	B PLUG CEMENT TOP	7850
J SAND	8348	8376	06/22/2018	B PLUG CEMENT TOP	8290
DAKOTA	8504	8526	06/22/2018	B PLUG CEMENT TOP	8450

Total: 3 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	1,232	880	1,232	0	VISU
1ST	7+7/8	5+1/2	17	8,743	920	8,743	3,532	CBL
S.C. 1.1				1,600	150	1,678	852	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 8450 with 2 sacks cmt on top. CIPB #2: Depth 8290 with 2 sacks cmt on top.

CIBP #3: Depth 7850 with 60 sacks cmt on top. CIPB #4: Depth 4480 with 2 sacks cmt on top.

CIBP #5: Depth 80 with 41 sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 60 sks cmt from 7850 ft. to 7147 ft. Plug Type: CASING Plug Tagged: ☐

Set 15 sks cmt from 3160 ft. to 2956 ft. Plug Type: CASING Plug Tagged: ☒

Set 9 sks cmt from 2575 ft. to 2446 ft. Plug Type: CASING Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 3500 ft. with 100 sacks. Leave at least 100 ft. in casing 3160 CICR Depth

Perforate and squeeze at 2930 ft. with 106 sacks. Leave at least 100 ft. in casing 2575 CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

(Cast Iron Cement Retainer Depth)

Set 140 sacks half in. half out surface casing from 1335 ft. to 340 ft. Plug Tagged: ☒

Set 41 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 550 ft. of 5+1/2 inch casing Plugging Date: 08/30/2018

*Wireline Contractor: PIONEER *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☒ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

THE CEMENT SUMMARY DATED 06/28/18 ONLY LISTS THE WELL NAME AS "STATE OF COLORADO" HOWEVER WE HAVE CONFRIMED THAT IT IS INDEED FOR THE "STATE OF COLORADO AZ 1" (THIS WELL).

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: CRYSTAL MCCLAIN

Title: REGULATORY ANALYST Date: 9/28/2018 Email: CRYSTAL.MCCLAIN@ANADARKO.COM

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Strathman, Elliot Date: 6/18/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401778507	FORM 6 SUBSEQUENT SUBMITTED
401778565	OPERATIONS SUMMARY
401778566	CEMENT JOB SUMMARY
401778568	WIRELINE JOB SUMMARY
401778570	CEMENT BOND LOG
401778571	CEMENT BOND LOG
401778574	WELLBORE DIAGRAM

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401554176

Date Received: 02/23/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-12626-00

Well Name: STATE OF COLORADO AL Well Number: 2

Location: QtrQtr: CSW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.047540 Longitude: -105.013540

GPS Data:

Date of Measurement: 08/06/2008 PDOP Reading: 3.6 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
SUSSEX	4850	4876	12/19/2017	B PLUG CEMENT TOP	4790
NIOBRARA	7513	7669	12/18/2017	B PLUG CEMENT TOP	7440
CODELL	7904	7914	12/18/2017	B PLUG CEMENT TOP	7440
J SAND	8347	8367	12/18/2017	B PLUG CEMENT TOP	8275

Total: 4 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	852	600	852	0	VISU
1ST	7+7/8	5+1/2	15.5	8,524	1,250	8,524	3,550	CBL
S.C. 1.1				8,524	400	1,010	0	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 8275 with 2 sacks cmt on top. CIPB #2: Depth 7440 with 40 sacks cmt on top.

CIBP #3: Depth 4790 with 2 sacks cmt on top. CIPB #4: Depth 4480 with 2 sacks cmt on top.

CIBP #5: Depth 80 with 21 sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7440 ft. to 6982 ft. Plug Type: CASING Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set 15 sks cmt from 1100 ft. to 915 ft. Plug Type: CASING Plug Tagged: ☒

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 1500 ft. with 135 sacks. Leave at least 100 ft. in casing 1230 CICR Depth

Perforate and squeeze at 650 ft. with 100 sacks. Leave at least 100 ft. in casing CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

(Cast Iron Cement Retainer Depth)

Set sacks half in. half out surface casing from ft. to ft. Plug Tagged: ☐

Set 21 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: ft. of inch casing Plugging Date: 01/26/2018

*Wireline Contractor: PIONEER *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 2/23/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 8/17/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401554176	FORM 6 SUBSEQUENT SUBMITTED
401554198	GYRO SURVEY
401554200	OPERATIONS SUMMARY
401554203	WELLBORE DIAGRAM
401554205	WIRELINE JOB SUMMARY
401554207	CEMENT BOND LOG
401554208	CEMENT BOND LOG
401554209	CEMENT BOND LOG
401554210	CEMENT JOB SUMMARY
401554211	OTHER

Total Attach: 10 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401572225

Date Received: 03/13/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29027-00

Well Name: STATE Well Number: 35-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049067 Longitude: -105.011433

GPS Data:

Date of Measurement: 03/24/2009 PDOP Reading: 2.4 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8284	8306	11/06/2017	B PLUG CEMENT TOP	7860
NIOBRARA	7935	8156	11/06/2017	B PLUG CEMENT TOP	7860

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	907	570	907	0	VISU
1ST	7+7/8	4+1/2	11.6	8,473	640	8,473	1,800	CBL
S.C. 1.1				1,432	183	1,420	592	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7860 with 40 sacks cmt on top. CIPB #2: Depth 4850 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 35 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7860 ft. to 7157 ft. Plug Type: CASING Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 3700 ft. with 120 sacks. Leave at least 100 ft. in casing 3410 CICR Depth

Perforate and squeeze at 3050 ft. with 145 sacks. Leave at least 100 ft. in casing 2780 CICR Depth

Perforate and squeeze at 2400 ft. with 135 sacks. Leave at least 100 ft. in casing 2120 CICR Depth

(Cast Iron Cement Retainer Depth)

Set 135 sacks half in. half out surface casing from 1345 ft. to 305 ft. Plug Tagged: ☒

Set 35 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 500 ft. of 4+1/2 inch casing Plugging Date: 02/13/2018

*Wireline Contractor: PIONEER *Cementing Contractor: OTEX, SCHLUMBERGER

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 3/13/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 5/24/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401572225	FORM 6 SUBSEQUENT SUBMITTED
401572250	WELLBORE DIAGRAM
401572251	OPERATIONS SUMMARY
401572252	CEMENT JOB SUMMARY
401572253	WIRELINE JOB SUMMARY
401572256	CEMENT BOND LOG

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 02/20

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 402253384

Date Received: 12/04/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer_thomas@oxy.com

For "Intent" 24 hour notice required, COGCC contact: Name: Silver, Randy Tel: (720) 827-6688 Email: randy.silver@state.co.us

Type of Well Abandonment Report: ☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

API Number 05-123-29112-00

Well Name: STATE Well Number: 35-9

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054527 Longitude: -105.014409

GPS Data: GPS Quality Value: 1.3 Type of GPS Quality Value: PDOP Date of Measurement: 11/13/2019

GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☒ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8154	8172	10/02/2019	B PLUG CEMENT TOP	7710
NIOBRARA	7783	8031	10/02/2019	B PLUG CEMENT TOP	7710

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	989	620	989	0	VISU
1ST	7+7/8	4+1/2	11.6	8,330	640	8,330	3,376	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7710 with 25 sacks cmt on top. CIPB #2: Depth 4660 with 2 sacks cmt on top.

CIBP #3: Depth _____ with _____ sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 25 sks cmt from 7710 ft. to 7265 ft. Plug Type: CASING Plug Tagged: ☐

Set 50 sks cmt from 1600 ft. to 1293 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set 60 sks cmt from 150 ft. to 0 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at 3350 ft. with 115 sacks. Leave at least 100 ft. in casing 2980 CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 230 sacks half in. half out surface casing from 1293 ft. to 542 ft. Plug Tagged: ☒

Set 60 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☒ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1500 ft. of 4+1/2 inch casing Cut and Cap Date: 11/13/2019

*Wireline Contractor: RMWS *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No

Technical Detail/Comments:

Form 6 NOIA approval was extended to 10/31/19. Thank you.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 12/4/2019 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 3/4/2020

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
402253384	FORM 6 SUBSEQUENT SUBMITTED
402253449	OTHER
402253450	OTHER
402253454	WELLBORE DIAGRAM
402253455	OPERATIONS SUMMARY
402253458	WIRELINE JOB SUMMARY
402253460	CEMENT JOB SUMMARY
402253461	CEMENT BOND LOG

Total Attach: 8 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401576523

Date Received: 03/15/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29026-00

Well Name: STATE Well Number: 33-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049158 Longitude: -105.011439

GPS Data:

Date of Measurement: 03/24/2009 PDOP Reading: 3.4 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8280	8295	08/28/2017	B PLUG CEMENT TOP	7830
NIOBRARA	7889	8161	08/28/2017	B PLUG CEMENT TOP	7830

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	908	610	908	0	VISU
1ST	7+7/8	4+1/2	11.6	8,435	640	8,435	3,890	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7830 with 40 sacks cmt on top. CIPB #2: Depth 4750 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 35 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7830 ft. to 7129 ft. Plug Type: CASING Plug Tagged: ☐

Set 96 sks cmt from 1450 ft. to 1199 ft. Plug Type: STUB PLUG Plug Tagged: ☐

Set 45 sks cmt from 1199 ft. to 1049 ft. Plug Type: OPEN HOLE Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

(Cast Iron Cement Retainer Depth)

Set 70 sacks half in. half out surface casing from 970 ft. to 710 ft. Plug Tagged: ☒

Set 35 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1350 ft. of 4+1/2 inch casing Plugging Date: 02/14/2018

*Wireline Contractor: PIONEER *Cementing Contractor: OTEX, SCHLUMBERGER, HALIBURTON

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 3/15/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 8/17/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401576523	FORM 6 SUBSEQUENT SUBMITTED
401576547	WELLBORE DIAGRAM
401576548	OPERATIONS SUMMARY
401576549	CEMENT JOB SUMMARY
401576550	WIRELINE JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401777504

Date Received: 09/29/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29116-00

Well Name: STATE Well Number: 32-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70.8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054258 Longitude: -105.014580

GPS Data:

Date of Measurement: 09/13/2017 PDOP Reading: 1.3 GPS Instrument Operator's Name: DANNY RASMUSSEN

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8178	8193	03/23/2018	B PLUG CEMENT TOP	7740
NIOBRARA	7796	8048	03/23/2018	B PLUG CEMENT TOP	7740

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	997	770	997	0	VISU
1ST	7+7/8	4+1/2	11.6	8,329	160	8,329	7,200	CBL
S.C. 1.1				1,400	184	1,476	726	CBL
			Stage Tool	5,932	290	5,974	3,680	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7740 with 40 sacks cmt on top. CIPB #2: Depth 4725 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 40 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7740 ft. to 7039 ft. Plug Type: CASING Plug Tagged: ☐

Set 156 sks cmt from 1804 ft. to 1357 ft. Plug Type: CASING Plug Tagged: ☐

Set 3 sks cmt from 1080 ft. to 1025 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set 136 sks cmt from 1025 ft. to 380 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 3360 ft. with 115 sacks. Leave at least 100 ft. in casing 2990 CICR Depth

Perforate and squeeze at 2750 ft. with 115 sacks. Leave at least 100 ft. in casing 2380 CICR Depth

Perforate and squeeze at 2200 ft. with 86 sacks. Leave at least 100 ft. in casing 1830 CICR Depth

(Cast Iron Cement Retainer Depth)

Set sacks half in. half out surface casing from ft. to ft. Plug Tagged: ☐

Set 40 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 650 ft. of 4+1/2 inch casing Plugging Date: 08/30/2018

*Wireline Contractor: RELIANCE, PIONEER *Cementing Contractor: SCHLUMBERGER, HALLIBURTON

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

Resin was pumped at 1080 feet. The unit of measure for the quantity reported is barrels.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 9/29/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 12/3/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401777504	FORM 6 SUBSEQUENT SUBMITTED
401777505	WELLBORE DIAGRAM
401777506	OPERATIONS SUMMARY
401777507	WIRELINE JOB SUMMARY
401777508	CEMENT JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 11/20

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 402805573

Date Received: 09/09/2021

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: CANDICE BARBER

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (307) 233-4513

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: CANDICE_BARBER@OXY.COM

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

Type of Well Abandonment Report: ☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

API Number 05-123-29115-00

Well Name: STATE Well Number: 30-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054298 Longitude: -105.014555

GPS Data: GPS Quality Value: 1.8 Type of GPS Quality Value: PDOP Date of Measurement: 08/24/2021

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8220	8240	02/12/2021	B PLUG CEMENT TOP	7790
NIOBRARA	7846	8100	02/12/2021	B PLUG CEMENT TOP	7790

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Grade	Wt/Ft	Csg/Liner Top	Setting Depth	Sacks Cmt	Cmt Btm	Cmt Top	Status
SURF	12+1/4	8+5/8	J-55	24	0	1003	705	1003	0	VISU
1ST	7+7/8	4+1/2	I-80	11.6	0	8373	635	8373	3673	CBL
S.C. 1.1	7+7/8	4+1/2		11.6	0	1410	135	1410	740	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7790 with 2 sacks cmt on top. CIBP #2: Depth 4733 with 2 sacks cmt on top.

CIBP #3: Depth _____ with _____ sacks cmt on top. CIBP #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 30 sks cmt from 1105 ft. to 723 ft. Plug Type: CASING Plug Tagged: ☒

Set 218 sks cmt from 723 ft. to 0 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at 2500 ft. with 230 sacks. Leave at least 100 ft. in casing 2057 CICR Depth

Perforate and squeeze at 1800 ft. with 100 sacks. Leave at least 100 ft. in casing 1485 CICR Depth

Perforate and squeeze at 1430 ft. with 150 sacks. Leave at least 100 ft. in casing 1340 CICR Depth

(Cast Iron Cement Retainer Depth)

Set _____ sacks half in. half out surface casing from _____ ft. to _____ ft. Plug Tagged: ☐

Set _____ sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☒ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: _____ ft. of _____ inch casing

Surface Plug Setting Date: 06/17/2021 Cut and Cap Date: 08/17/2021 Number of Days from Setting Surface Plug to Capping or Sealing the Well: 61

*Wireline Contractor: CUTTERS & PATRIOT *Cementing Contractor: SCHLUMBERGER & NEXTIER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No

Technical Detail/Comments:

CONT'D PLUGGING PROCEDURE:

PERF and SQUEEZE AT 1204' WITH 105 SX CEMENT, CICR SET AT1170' IN CASING
CASING PUNCHES AT 700'

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: CANDICE BARBER

Title: REGULATORY ANALYST Date: 9/9/2021 Email: DJPOSTDRILL@ANADARKO.COM

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 11/12/2021

CONDITIONS OF APPROVAL, IF ANY:

Condition of Approval

COA Type	Description

0 COA

Attachment List

Att Doc Num	Name
402805573	FORM 6 SUBSEQUENT SUBMITTED
402805629	OPERATIONS SUMMARY
402805631	CEMENT BOND LOG
402805635	OTHER
402805637	CEMENT JOB SUMMARY
402805639	OTHER
402805650	WELLBORE DIAGRAM
402805652	WIRELINE JOB SUMMARY

Total Attach: 8 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 02/20

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 402253686

Date Received: 12/04/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer_thomas@oxy.com

For "Intent" 24 hour notice required, COGCC contact: Name: Silver, Randy Tel: (720) 827-6688 Email: randy.silver@state.co.us

Type of Well Abandonment Report: ☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

API Number 05-123-29119-00

Well Name: STATE Well Number: 28-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054488 Longitude: -105.014433

GPS Data: GPS Quality Value: 1.5 Type of GPS Quality Value: Date of Measurement: 11/13/2019

GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☒ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8347	8366	10/10/2019	B PLUG CEMENT TOP	7890
NIOBRARA	7972	8216	10/10/2019	B PLUG CEMENT TOP	7890

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	993	620	993	0	VISU
1ST	7+7/8	4+1/2	11.6	8,548	625	8,548	3,704	CBL
S.C. 1.1				1,504	150	1,504	690	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7890 with 25 sacks cmt on top. CIPB #2: Depth _____ with _____ sacks cmt on top.

CIBP #3: Depth _____ with _____ sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 25 sks cmt from 7890 ft. to 7445 ft. Plug Type: CASING Plug Tagged: ☐

Set 15 sks cmt from 4840 ft. to 4582 ft. Plug Type: CASING Plug Tagged: ☐

Set 19 sks cmt from 2410 ft. to 2079 ft. Plug Type: CASING Plug Tagged: ☒

Set 21 sks cmt from 1590 ft. to 1307 ft. Plug Type: CASING Plug Tagged: ☒

Set 80 sks cmt from 1095 ft. to 457 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Perforate and squeeze at 2500 ft. with 46 sacks. Leave at least 100 ft. in casing 2410 CICR Depth

Perforate and squeeze at 1900 ft. with 125 sacks. Leave at least 100 ft. in casing 1590 CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set _____ sacks half in. half out surface casing from _____ ft. to _____ ft. Plug Tagged: ☐

Set _____ sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☒ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 650 ft. of 4+1/2 inch casing Cut and Cap Date: 11/13/2019

*Wireline Contractor: RMWS *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No

Technical Detail/Comments:

Additional perfs at 2350', 1530'

60 SX set from 150' to surface

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 12/4/2019 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: McFarland, Nick Date: 3/12/2020

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
402253686	FORM 6 SUBSEQUENT SUBMITTED
402253785	OTHER
402253787	OTHER
402253789	WELLBORE DIAGRAM
402253801	OPERATIONS SUMMARY
402253804	WIRELINE JOB SUMMARY
402253805	CEMENT JOB SUMMARY

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
Engineer	GPS location appears accurate on maps. Pre-PA bradenhead test performed. Ops notice given. Form 7 reporting PA status. 42 filed for flowline abandonment. Zones and casing history are consistent with approved intent. Procedure, WBD and tickets are consistent.	03/12/2020

Total: 1 comment(s)

FORM 6 Rev 11/20

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 402533556

Date Received: 11/17/2020

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: CANDICE BARBER

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (307) 233-4513

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: CANDICE_BARBER@OXY.COM

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

Type of Well Abandonment Report: ☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

API Number 05-123-30946-00

Well Name: STATE Well Number: 26-16

Location: QtrQtr: NENW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number:

Field Name: WATTENBERG Field Number: 90750

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.057469 Longitude: -105.009239

GPS Data: GPS Quality Value: 4.0 Type of GPS Quality Value: PDOP Date of Measurement: 11/03/2020

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8476	8496	09/25/2020	B PLUG CEMENT TOP	8020
NIOBRARA	8098	8346	09/25/2020	B PLUG CEMENT TOP	8020

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Grade	Wt/Ft	Csg/Liner Top	Setting Depth	Sacks Cmt	Cmt Btm	Cmt Top	Status
SURF	12+1/4	8+5/8	J55	24		1017	711	1017	0	VISU
1ST	7+7/8	4+1/2	M80	11.6		9026	1090	9026	2710	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 8020 with 2 sacks cmt on top. CIPB #2: Depth 4790 with 2 sacks cmt on top.

CIBP #3: Depth _____ with _____ sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 60 sks cmt from 2560 ft. to 2220 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 120 sacks half in. half out surface casing from 1120 ft. to 824 ft. Plug Tagged: ☒

Set 36 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☒ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 2510 ft. of 4+1/2 inch casing

Surface Plug Setting Date: 11/03/2020 Cut and Cap Date: 11/03/2020 Number of Days from Setting Surface Plug to Capping or Sealing the Well: 0

*Wireline Contractor: RELIANCE *Cementing Contractor: SCHULUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: CANDICE BARBER

Title: REGULATORY ANALYST Date: 11/17/2020 Email: DJPOSTDRILL@ANADARKO.COM

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 2/2/2021

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment List

Att Doc Num	Name
402533556	FORM 6 SUBSEQUENT SUBMITTED
402533571	CEMENT BOND LOG
402533575	OPERATIONS SUMMARY
402533576	CEMENT JOB SUMMARY
402533578	WELLBORE DIAGRAM
402533579	WIRELINE JOB SUMMARY
402534122	OTHER

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401901358

Date Received: 01/10/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: CRYSTAL MCCLAIN

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-4398

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: CRYSTAL.MCCLAIN@ANADARKO.COM

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29024-00

Well Name: STATE Well Number: 25-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049262 Longitude: -105.011450

GPS Data:

Date of Measurement: 12/14/2018 PDOP Reading: 1.7 GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8087	8104	09/21/2017	B PLUG CEMENT TOP	7640
NIOBRARA	7698	7967	09/21/2017	B PLUG CEMENT TOP	7640

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	900	570	900	0	VISU
1ST	7+7/8	4+1/2	11.6	8,664	230	8,664	6,400	CBL
S.C. 1.1				1,439	160	1,438	460	CBL
			Stage Tool	5,762	290	5,784	3,524	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7640 with 25 sacks cmt on top. CIPB #2: Depth 4650 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 45 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 25 sks cmt from 7640 ft. to 7198 ft. Plug Type: CASING Plug Tagged: ☐

Set 15 sks cmt from 1670 ft. to 1578 ft. Plug Type: CASING Plug Tagged: ☒

Set 25 sks cmt from 852 ft. to 591 ft. Plug Type: CASING Plug Tagged: ☒

Set 40 sks cmt from 591 ft. to 310 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 3165 ft. with 40 sacks. Leave at least 100 ft. in casing 3140 CICR Depth

Perforate and squeeze at 1780 ft. with 25 sacks. Leave at least 100 ft. in casing 1670 CICR Depth

Perforate and squeeze at 1560 ft. with 35 sacks. Leave at least 100 ft. in casing 1490 CICR Depth

(Cast Iron Cement Retainer Depth)

Set 25 sacks half in. half out surface casing from 1110 ft. to 852 ft. Plug Tagged: ☒

Set 45 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 470 ft. of 4+1/2 inch casing Plugging Date: 12/14/2018

*Wireline Contractor: PIONEER, KLX, RELIANCE,CUTTERS *Cementing Contractor: O-TEX, SCHLUMBERGER, C&J

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

1. CICR at 1740' was the result of an unsuccessful squeeze.

2. Casedhole solutions was also a wireline contractor, but there wasn't enough room to list them in the "Plugging Procedure" tab.

3. Received approval from Diane McCoy to pump a stub plug from 582' (TOC from previous work on the well) rather than attempting to latch back on to the top of the casing stub. Document has been attached as "Other."

Additional PERFS at 950 & 1010

Additional PERFS at 830 & 730

Additional tubing punch holes at 780

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: CRYSTAL MCCLAIN

Title: REGULATORY ANALYST Date: 1/10/2019 Email: CRYSTAL.MCCLAIN@ANADARKO.COM

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Strathman, Elliot Date: 4/1/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401901358	FORM 6 SUBSEQUENT SUBMITTED
401901377	CEMENT BOND LOG
401901380	CEMENT BOND LOG
401901382	CEMENT BOND LOG
401901385	OPERATIONS SUMMARY
401901387	OTHER
401901393	CEMENT JOB SUMMARY
401901394	WIRELINE JOB SUMMARY
401901396	WELLBORE DIAGRAM

Total Attach: 9 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401901325

Date Received: 01/10/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29025-00

Well Name: STATE Well Number: 22-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049346 Longitude: -105.011460

GPS Data:

Date of Measurement: 12/14/2018 PDOP Reading: 1.7 GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8010	8024	10/26/2017	B PLUG CEMENT TOP	7570
NIOBRARA	7629	7891	10/26/2017	B PLUG CEMENT TOP	7570

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	894	560	894	0	VISU
1ST	7+7/8	4+1/2	11.6	8,193	620	8,193	4,060	CBL
S.C. 1.1				1,500	165	1,500	540	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7570 with 40 sacks cmt on top. CIPB #2: Depth 4560 with 2 sacks cmt on top.

CIBP #3: Depth _____ with _____ sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7570 ft. to 6867 ft. Plug Type: CASING Plug Tagged: ☐

Set 24 sks cmt from 2147 ft. to 1900 ft. Plug Type: CASING Plug Tagged: ☒

Set 20 sks cmt from 1898 ft. to 1820 ft. Plug Type: CASING Plug Tagged: ☒

Set 80 sks cmt from 1770 ft. to 1165 ft. Plug Type: CASING Plug Tagged: ☒

Set 2 sks cmt from 1150 ft. to 1144 ft. Plug Type: CASING Plug Tagged: ☒

Perforate and squeeze at 4000 ft. with 105 sacks. Leave at least 100 ft. in casing 3732 CICR Depth

Perforate and squeeze at 3465 ft. with 148 sacks. Leave at least 100 ft. in casing 3190 CICR Depth

Perforate and squeeze at 2830 ft. with 155 sacks. Leave at least 100 ft. in casing 2520 CICR Depth

(Cast Iron Cement Retainer Depth)

Set 115 sacks half in. half out surface casing from 903 ft. to 211 ft. Plug Tagged: ☒

Set 5 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 400 ft. of 4+1/2 inch casing Plugging Date: 12/14/2018

*Wireline Contractor: CHS, PIONEER *Cementing Contractor: SCHLUMBERGER, C&J

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

Please note:
Cement plug listed at 2147' was a cement sqeeze, with CICR set at 2117'
Cement plug listed at 1898' was a cement squeeze, with CICR set at 1868'
Cement plug listed at 1770' was a cement squeeze, with CICR set at 1740'

17 sacks of cement was set in casing at 1144', TOC tagged at 967'
3.5 barrels of nano-sealant was also pumped at 1144'
40 sacks of cement was set in open hole at 965', TOC tagged at 903'
115 sacks of cement was set in casing (stub plug) at 903', TOC tagged at 211'
66 sacks of cement was set in casing at 211', circulated to surface

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 1/10/2019 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: McFarland, Nick Date: 4/4/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401901325	FORM 6 SUBSEQUENT SUBMITTED
401901428	CEMENT BOND LOG
401901431	CEMENT BOND LOG
401901432	OTHER
401901438	OTHER
401901439	WELLBORE DIAGRAM
401901441	OPERATIONS SUMMARY
401901442	CEMENT JOB SUMMARY
401901445	CEMENT BOND LOG
401901455	WIRELINE JOB SUMMARY

Total Attach: 10 Files

General Comments

User Group	Comment	Comment Date
Engineer	GPS location accurate per mapping. Zones consistent with approved intent and plugging procedure. Casing history consistent with approved intent. Bradenhead test performed, form 17 submitted, and sample on file with COGCC per COA. Form 42, 48 hr notice for P&A ops, and form 42 for abandoned flowlines submitted per COA. Modifications to plugging procedure approved by COGCC engineer via email. Condition of tagging plug below casing shoe was met. Plugs and cement verified by service tickets. WBD and procedure consistent with ops summary.	04/04/2019

Total: 1 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401576693

Date Received: 03/15/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29113-00

Well Name: STATE Well Number: 21-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054376 Longitude: -105.014505

GPS Data:

Date of Measurement: 12/07/2017 PDOP Reading: 1.5 GPS Instrument Operator's Name: PRESTON KNUTSON

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8193	8208	09/28/2017	B PLUG CEMENT TOP	7775
NIOBRARA	7826	8062	09/28/2017	B PLUG CEMENT TOP	7775

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	997	770	997	0	VISU
1ST	7+7/8	4+1/2	11.6	8,355	720	8,355	3,030	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7775 with 40 sacks cmt on top. CIPB #2: Depth 4725 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 33 sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set	40	sks cmt from	7775	ft. to	7072	ft.	Plug Type: CASING	Plug Tagged: ☐
Set	79	sks cmt from	1400	ft. to	1200	ft.	Plug Type: STUB PLUG	Plug Tagged: ☒
Set	70	sks cmt from	1200	ft. to	1020	ft.	Plug Type: OPEN HOLE	Plug Tagged: ☒
Set	130	sks cmt from	1020	ft. to	619	ft.	Plug Type: STUB PLUG	Plug Tagged: ☒
Set		sks cmt from		ft. to		ft.	Plug Type:	Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set _____ sacks half in. half out surface casing from _____ ft. to _____ ft. Plug Tagged: ☐

Set 33 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1300 ft. of 4+1/2 inch casing Plugging Date: 02/15/2018

*Wireline Contractor: RELIANCE *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 3/15/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 5/24/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401576693	FORM 6 SUBSEQUENT SUBMITTED
401576694	WELLBORE DIAGRAM
401576695	OPERATIONS SUMMARY
401576696	WIRELINE JOB SUMMARY
401576697	CEMENT JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 12/05

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 400892874

Date Received: 09/02/2015

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: REBECCA HEIM

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6361

Address: P O BOX 173779 Fax: (720) 929-7361

City: DENVER State: CO Zip: 80217- Email: REBECCA.HEIM@ANADARKO.COM

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-16105-00

Well Name: STATE Well Number: 16-9V

Location: QtrQtr: NESE Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number:

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.047892 Longitude: -105.002757

GPS Data:

Date of Measurement: 04/01/2010 PDOP Reading: 2.2 GPS Instrument Operator's Name: Paul Tappy

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	7928	7950	08/18/2015	B PLUG CEMENT TOP	7860
J SAND	8370	8384	08/18/2015	B PLUG CEMENT TOP	8320

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	715	500	715	0	VISU
1ST	7+7/8	4+1/2	11.6	8,700	325	8,717	7,200	CBL
S.C. 1.1	7+7/8	4+1/2	11.6	8,700	370	5,140	4,492	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 8320 with 2 sacks cmt on top. CIPB #2: Depth 7860 with 45 sacks cmt on top.

CIBP #3: Depth 75 with sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 50 sks cmt from 5090 ft. to 4545 ft. Plug Type: CASING Plug Tagged: ☒

Set 600 sks cmt from 1468 ft. to 211 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

(Cast Iron Cement Retainer Depth)

Set sacks half in. half out surface casing from ft. to ft. Plug Tagged: ☐

Set 34 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1360 ft. of 4+1/2 inch casing Plugging Date: 08/28/2015

*Wireline Contractor: CUTTERS/WARRIOR *Cementing Contractor: SANJEL 45

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1103 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: REBECCA HEIM

Title: SR. REGULATORY ANALYST Date: 9/2/2015 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 1/25/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description
	COA: Operator is to file Form 7 for 09/2015 showing J Sand and Codell to be AB with no production for 09/2015 and no oil in tank. Sent email request for same. Operator reports filing requested Form 7. Form 7 still wrong.

Attachment Check List

Att Doc Num	Name
400892874	FORM 6 SUBSEQUENT SUBMITTED
400892888	OPERATIONS SUMMARY
400892889	CEMENT JOB SUMMARY
400892890	GYRO SURVEY
400892891	CEMENT BOND LOG
400892892	WIRELINE JOB SUMMARY
400894161	WELLBORE DIAGRAM

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401572846

Date Received: 03/13/2018

WELL ABANDONMENT REPORT

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A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29021-00

Well Name: STATE Well Number: 14-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049048 Longitude: -105.011427

GPS Data:

Date of Measurement: 06/09/2009 PDOP Reading: 2.8 GPS Instrument Operator's Name: CHRIS PEARSON

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8104	8122	08/21/2017	B PLUG CEMENT TOP	7800
NIOBRARA	7856	7981	08/21/2017	B PLUG CEMENT TOP	7800

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	907	690	907	0	VISU
1ST	7+7/8	4+1/2	11.6	8,260	652	8,260	4,032	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7800 with 40 sacks cmt on top. CIPB #2: Depth 4700 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 69 sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7800 ft. to 7097 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 335 sacks half in. half out surface casing from 1443 ft. to 280 ft. Plug Tagged: ☒

Set 69 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1345 ft. of 4+1/2 inch casing Plugging Date: 02/13/2018

*Wireline Contractor: PIONEER *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 3/13/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 5/24/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401572846	FORM 6 SUBSEQUENT SUBMITTED
401572870	WELLBORE DIAGRAM
401572873	OPERATIONS SUMMARY
401572874	WIRELINE JOB SUMMARY
401572875	CEMENT JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401596297

Date Received: 04/04/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29022-00

Well Name: STATE Well Number: 13-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049136 Longitude: -105.011450

GPS Data:

Date of Measurement: 03/24/2009 PDOP Reading: 3.5 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8266	8282	08/24/2017	B PLUG CEMENT TOP	7790
NIOBRARA	7862	8141	08/24/2017	B PLUG CEMENT TOP	7790

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	907	570	907	0	VISU
1ST	7+7/8	4+1/2	11.6	8,428	640	8,428	3,480	CBL
S.C. 1.1				1,432	183	1,430	420	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7790 with 40 sacks cmt on top. CIPB #2: Depth 4750 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 8 sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7790 ft. to 7089 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 145 sacks half in. half out surface casing from 1337 ft. to 115 ft. Plug Tagged: ☒

Set 8 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 350 ft. of 4+1/2 inch casing Plugging Date: 03/07/2018

*Wireline Contractor: PIONEER *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

Casing stub was filled to surface with 8 sacks cement.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 4/4/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 8/15/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401596297	FORM 6 SUBSEQUENT SUBMITTED
401596493	WELLBORE DIAGRAM
401596504	OPERATIONS SUMMARY
401596505	WIRELINE JOB SUMMARY
401596510	CEMENT JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401572097

Date Received: 03/13/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29023-00

Well Name: STATE Well Number: 12-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049244 Longitude: -105.011408

GPS Data:

Date of Measurement: 03/24/2009 PDOP Reading: 3.5 GPS Instrument Operator's Name: Cody Mattson

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8113	8129	12/12/2017	B PLUG CEMENT TOP	7650
NIOBRARA	7721	7994	12/12/2017	B PLUG CEMENT TOP	7650

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	906	610	906	0	VISU
1ST	7+7/8	4+1/2	11.6	8,270	640	8,270	4,174	CBL
S.C. 1.1				1,500	165	1,514	610	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7650 with 25 sacks cmt on top. CIPB #2: Depth 4700 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 35 sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 25 sks cmt from 7650 ft. to 7218 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 135 sacks half in. half out surface casing from 1440 ft. to 364 ft. Plug Tagged: ☒

Set 35 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 550 ft. of 4+1/2 inch casing Plugging Date: 02/13/2018

*Wireline Contractor: CASEDHOLE, PIONEER *Cementing Contractor: OTEX, SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 3/13/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 5/24/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401572097	FORM 6 SUBSEQUENT SUBMITTED
401572108	WELLBORE DIAGRAM
401572109	OPERATIONS SUMMARY
401572110	CEMENT JOB SUMMARY
401572111	WIRELINE JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401905021

Date Received: 01/15/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-24397-00

Well Name: STATE Well Number: 11-16

Location: QtrQtr: NESW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.049306 Longitude: -105.011456

GPS Data:

Date of Measurement: 12/17/2018 PDOP Reading: 1.2 GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	7948	7964	10/13/2017	B PLUG CEMENT TOP	7510
NIOBRARA	7564	7721	10/13/2017	B PLUG CEMENT TOP	7510

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	905	630	905	0	VISU
1ST	7+7/8	4+1/2	11.6	8,097	620	8,097	4,220	CBL
S.C. 1.1				1,500	165	1,520	628	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7510 with 40 sacks cmt on top. CIPB #2: Depth 6216 with 2 sacks cmt on top.

CIBP #3: Depth 4510 with 2 sacks cmt on top. CIPB #4: Depth 995 with 5 sacks cmt on top.

CIBP #5: Depth 80 with 35 sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7510 ft. to 6809 ft. Plug Type: CASING Plug Tagged: ☐

Set 105 sks cmt from 1340 ft. to 1000 ft. Plug Type: CASING Plug Tagged: ☒

Set 5 sks cmt from 995 ft. to 965 ft. Plug Type: CASING Plug Tagged: ☒

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 4045 ft. with 80 sacks. Leave at least 100 ft. in casing 3850 CICR Depth

Perforate and squeeze at 2970 ft. with 115 sacks. Leave at least 100 ft. in casing 2680 CICR Depth

Perforate and squeeze at 2310 ft. with 135 sacks. Leave at least 100 ft. in casing 2040 CICR Depth

(Cast Iron Cement Retainer Depth)

Set 70 sacks half in. half out surface casing from 965 ft. to 368 ft. Plug Tagged: ☒

Set 35 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 545 ft. of 4+1/2 inch casing Plugging Date: 12/17/2018

*Wireline Contractor: CHS, KLX, PIONEER *Cementing Contractor: SCHLUMBERGER, OTEX

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 1/15/2019 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: McFarland, Nick Date: 4/10/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
1801768	WELLBORE DIAGRAM- CURRENT
401905021	FORM 6 SUBSEQUENT SUBMITTED
401905160	CEMENT BOND LOG
401905168	CEMENT BOND LOG
401905169	CEMENT BOND LOG
401905170	OPERATIONS SUMMARY
401905172	CEMENT JOB SUMMARY
401905174	WIRELINE JOB SUMMARY

Total Attach: 8 Files

General Comments

User Group	Comment	Comment Date
Engineer	Form 7 status set to PA. GPS accurate per mapping. Zones match approved intent. Casing history matches approved intent. Forms 42s for 48 hour ops notice and flowline abandonment submitted per COA. Bradenhead test performed and form 17 submitted. Sample taken per COA. Ops summary, tickets, plugging procedure are all consistent with WBD.	04/05/2019

Total: 1 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 402142810

Date Received: 08/13/2019

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Doreen Green

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (970) 336-3555

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: doreen.green@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-30936-00

Well Name: STATE Well Number: 7-16

Location: QtrQtr: NENW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number:

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.057292 Longitude: -105.009241

GPS Data:

Date of Measurement: 07/23/2019 PDOP Reading: 1.5 GPS Instrument Operator's Name: PAT MCCLURE

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8232	8252	06/28/2019	B PLUG CEMENT TOP	7653
NIOBRARA	7848	8100	06/28/2019	B PLUG CEMENT TOP	7653

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	1,058	760	1,058	0	VISU
1ST	7+7/8	4+1/2	11.6	8,801	1,080	8,801	2,400	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 8600 with 2 sacks cmt on top. CIPB #2: Depth 7653 with 25 sacks cmt on top.

CIBP #3: Depth 4730 with 2 sacks cmt on top. CIPB #4: Depth 80 with 40 sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 25 sks cmt from 7653 ft. to 7220 ft. Plug Type: CASING Plug Tagged: ☐

Set 170 sks cmt from 1375 ft. to 1070 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 84 sacks half in. half out surface casing from 1070 ft. to 760 ft. Plug Tagged: ☒

Set 40 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1275 ft. of 4+1/2 inch casing Cut and Cap Date: 07/23/2019

*Wireline Contractor: CASEDHOLE/CUTTERS *Cementing Contractor: C&J

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

NOTE, FORM 17 DOC #402098990 NOTES NO BRADENHEAD SAMPLE WAS TAKEN.
SAMPLE WAS ACQUIRED 06/24/2019 BY ABSAROKA.

07/01/2019-170 SACKS PUMPED FROM 1375-1000 TAGGED
07/03/2019-DRILLED OUT CEMENT FROM 1000-1070

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Doreen Green

Title: Analyst Date: 8/13/2019 Email: doreen.green@oxy.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: McFarland, Nick Date: 10/16/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
402142810	FORM 6 SUBSEQUENT SUBMITTED
402143065	CEMENT JOB SUMMARY
402143067	OTHER
402143069	OPERATIONS SUMMARY
402143071	WELLBORE DIAGRAM
402143073	WIRELINE JOB SUMMARY

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
Engineer	Form 17 filed; 285 psi on bradenhead flowing gas down to 115 psi. 42 filed for flowline abandonment. 48 hour ops notice given. Form 7 reporting PA status. GPS location appears accurate on maps. Zones and casing history are consistent with approved intent. Procedure, WBD and tickets are consistent.	10/16/2019
Engineer	jacobsoe06/28/201947120123-3093606/28/2019Edit Good afternoon Eric, We are currently rigged up on the State 7-16 and we were able to set the JSand plug at 8600' with 2 sx cement. On the way down for the Nio plug we got hung up, and to avoid getting stuck, set the plug at 7653' instead of 7760'. I was wondering if we were okay to pump the 25 sx on top of the plug. Please let me know your thoughts on this. Approved as outlined. E	10/16/2019

Total: 2 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401779039

Date Received: 09/29/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29114-00

Well Name: STATE Well Number: 6-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8750-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054338 Longitude: -105.014532

GPS Data:

Date of Measurement: 09/13/2017 PDOP Reading: 1.4 GPS Instrument Operator's Name: DANNY RASMUSSEN

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8038	8054	01/27/2018	B PLUG CEMENT TOP	7600
NIOBRARA	7657	7908	01/27/2018	B PLUG CEMENT TOP	7600

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	999	630	999	0	VISU
1ST	7+7/8	4+1/2	11.6	8,218	635	8,218	3,496	CBL
S.C. 1.1				3,420	300	3,420	2,870	CBL
S.C. 1.2				1,700	200	1,700	840	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7600 with 40 sacks cmt on top. CIPB #2: Depth 4570 with 2 sacks cmt on top.

CIBP #3: Depth 1568 with 0 sacks cmt on top. CIPB #4: Depth 80 with 41 sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7600 ft. to 6899 ft. Plug Type: CASING Plug Tagged: ☐

Set 3 sks cmt from 1558 ft. to 1475 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set 20 sks cmt from 1475 ft. to 1172 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set 105 sks cmt from 1170 ft. to 270 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at 3240 ft. with 130 sacks. Leave at least 100 ft. in casing 2960 CICR Depth

Perforate and squeeze at 2700 ft. with 170 sacks. Leave at least 100 ft. in casing 2330 CICR Depth

Perforate and squeeze at 2100 ft. with 140 sacks. Leave at least 100 ft. in casing 1830 CICR Depth

(Cast Iron Cement Retainer Depth)

Set _____ sacks half in. half out surface casing from _____ ft. to _____ ft. Plug Tagged: ☐

Set 41 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 600 ft. of 4+1/2 inch casing Plugging Date: 08/31/2018

*Wireline Contractor: CUTTERS, RELIANCE, PIONEER *Cementing Contractor: HALLIBURTON, OTEX, SLB

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

Please note that resin was pumped at 1558 feet, and the quantity reported is in barrels.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 9/29/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 12/3/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401779039	FORM 6 SUBSEQUENT SUBMITTED
401779048	WIRELINE JOB SUMMARY
401779049	WELLBORE DIAGRAM
401779050	OPERATIONS SUMMARY
401779051	CEMENT JOB SUMMARY
401779052	CEMENT BOND LOG
401779053	OTHER
401779054	OTHER

Total Attach: 8 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401776220

Date Received: 09/27/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-24481-00

Well Name: STATE Well Number: 5-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054221 Longitude: -105.014602

GPS Data:

Date of Measurement: 09/13/2017 PDOP Reading: 1.4 GPS Instrument Operator's Name: DANNY RASMUSSEN

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	7989	8004	06/13/2018	B PLUG CEMENT TOP	7550
NIOBRARA	7614	7859	06/13/2018	B PLUG CEMENT TOP	7550

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	998	930	998	0	VISU
1ST	7+7/8	4+1/2	11.6	8,156	655	8,156	3,306	CBL
S.C. 1.1				1,490	200	1,490	574	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7550 with 40 sacks cmt on top. CIPB #2: Depth 4595 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 47 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7550 ft. to 6848 ft. Plug Type: CASING Plug Tagged: ☐

Set 9 sks cmt from 2770 ft. to 2577 ft. Plug Type: CASING Plug Tagged: ☐

Set 14 sks cmt from 2250 ft. to 1968 ft. Plug Type: CASING Plug Tagged: ☒

Set 9 sks cmt from 1600 ft. to 1407 ft. Plug Type: CASING Plug Tagged: ☐

Set sks cmt from ft. to ft. Plug Type: Plug Tagged: ☐

Perforate and squeeze at 3110 ft. with 106 sacks. Leave at least 100 ft. in casing 2770 CICR Depth

Perforate and squeeze at 2400 ft. with 44 sacks. Leave at least 100 ft. in casing 2250 CICR Depth

Perforate and squeeze at 1950 ft. with 106 sacks. Leave at least 100 ft. in casing 1600 CICR Depth

(Cast Iron Cement Retainer Depth)

Set 130 sacks half in. half out surface casing from 1295 ft. to 340 ft. Plug Tagged: ☒

Set 47 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 540 ft. of 4+1/2 inch casing Plugging Date: 08/30/2018

*Wireline Contractor: PIONEER *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☒ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 9/27/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Strathman, Elliot Date: 1/11/2019

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401776220	FORM 6 SUBSEQUENT SUBMITTED
401776526	WELLBORE DIAGRAM
401776527	OPERATIONS SUMMARY
401776554	WIRELINE JOB SUMMARY
401776555	CEMENT BOND LOG
401776558	CEMENT JOB SUMMARY

Total Attach: 6 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401706308

Date Received: 07/18/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29118-00

Well Name: STATE Well Number: 4-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70-8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054452 Longitude: -105.014457

GPS Data:

Date of Measurement: 12/07/2017 PDOP Reading: 1.3 GPS Instrument Operator's Name: PRESTON KNUTSON

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	7990	8004	04/19/2018	B PLUG CEMENT TOP	7560
NIOBRARA	7619	7870	04/19/2018	B PLUG CEMENT TOP	7560

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	995	730	995	0	VISU
1ST	7+7/8	4+1/2	11.6	8,148	630	8,148	3,090	CBL
S.C. 1.1				1,490	155	1,490	998	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7560 with 40 sacks cmt on top. CIPB #2: Depth 4530 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 48 sacks cmt on top. CIPB #4: Depth with sacks cmt on top.

CIBP #5: Depth with sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7560 ft. to 6818 ft. Plug Type: CASING Plug Tagged: ☐

Set 9 sks cmt from 2750 ft. to 2557 ft. Plug Type: CASING Plug Tagged: ☐

Set 15 sks cmt from 1620 ft. to 1390 ft. Plug Type: CASING Plug Tagged: ☒

Set 25 sks cmt from 1390 ft. to 1076 ft. Plug Type: CASING Plug Tagged: ☒

Set 50 sks cmt from 1045 ft. to 1000 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Perforate and squeeze at 3020 ft. with 85 sacks. Leave at least 100 ft. in casing 2750 CICR Depth

Perforate and squeeze at 1920 ft. with 96 sacks. Leave at least 100 ft. in casing 1620 CICR Depth

Perforate and squeeze at ft. with sacks. Leave at least 100 ft. in casing CICR Depth

(Cast Iron Cement Retainer Depth)

Set 80 sacks half in. half out surface casing from 1000 ft. to 725 ft. Plug Tagged: ☒

Set 48 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set sacks in rat hole Set sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 1045 ft. of 4+1/2 inch casing Plugging Date: 06/19/2018

*Wireline Contractor: PIONEER, RELIANCE *Cementing Contractor: OTEX, SLB, HALLIBURTON

Type of Cement and Additives Used:

Flowline/Pipeline has been abandoned per Rule 1105 ☒ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 7/18/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Strathman, Elliot Date: 11/17/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401706308	FORM 6 SUBSEQUENT SUBMITTED
401706367	CEMENT JOB SUMMARY
401706370	OTHER
401706371	WELLBORE DIAGRAM
401706372	OPERATIONS SUMMARY
401706374	CEMENT BOND LOG
401706378	WIRELINE JOB SUMMARY

Total Attach: 7 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401777101

Date Received: 09/27/2018

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-29117-00

Well Name: STATE Well Number: 3-16

Location: QtrQtr: SWNW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number: 70/8570-S

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.054413 Longitude: -105.014483

GPS Data:

Date of Measurement: 09/13/2017 PDOP Reading: 1.3 GPS Instrument Operator's Name: DANNY RASMUSSEN

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8069	8089	09/25/2017	B PLUG CEMENT TOP	7640
NIOBRARA	7696	7953	09/25/2017	B PLUG CEMENT TOP	7640

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	1,000	730	1,000	0	VISU
1ST	7+7/8	4+1/2	11.6	8,225	660	8,225	2,890	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7640 with 40 sacks cmt on top. CIPB #2: Depth 4650 with 2 sacks cmt on top.

CIBP #3: Depth 1325 with 3 sacks cmt on top. CIPB #4: Depth 85 with 45 sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7640 ft. to 6939 ft. Plug Type: CASING Plug Tagged: ☐

Set 3 sks cmt from 1325 ft. to 1230 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set 15 sks cmt from 1230 ft. to 1120 ft. Plug Type: OPEN HOLE Plug Tagged: ☒

Set 95 sks cmt from 1060 ft. to 450 ft. Plug Type: STUB PLUG Plug Tagged: ☒

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at 2360 ft. with 110 sacks. Leave at least 100 ft. in casing 2130 CICR Depth

Perforate and squeeze at 1875 ft. with 105 sacks. Leave at least 100 ft. in casing 1650 CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set _____ sacks half in. half out surface casing from _____ ft. to _____ ft. Plug Tagged: ☐

Set 45 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 775 ft. of 4+1/2 inch casing Plugging Date: 08/31/2018

*Wireline Contractor: CHS, CUTTERS, RELIANCE *Cementing Contractor: SLB, HALLIBURTON, OTEX

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

Please note that resin was pumped at 1325'. The quantity reported is in barrels.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 9/27/2018 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Jacobson, Eric Date: 12/3/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401777101	FORM 6 SUBSEQUENT SUBMITTED
401777173	OTHER
401777174	OTHER
401777175	OTHER
401777177	WELLBORE DIAGRAM
401777179	OPERATIONS SUMMARY
401777180	WIRELINE JOB SUMMARY
401777193	CEMENT JOB SUMMARY
401777195	CEMENT BOND LOG

Total Attach: 9 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

FORM 6 Rev 05/18

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES

Document Number: 401489509

Date Received: 12/18/2017

WELL ABANDONMENT REPORT

This form is to be submitted as an Intent to Abandon whenever an abandonment is planned on a borehole. After the abandonment is complete, this form shall again be submitted as a Subsequent Report of the actual work completed. The approved intent shall be valid for six months after the approval date, after that period, a new intent will be required. Attachments required with the Intent to Abandon are wellbore diagrams of the current configuration and the proposed configuration with plugs set.
A Subsequent Report of Abandonment shall indicate the actual work completed. Attachments required with a Subsequent Report are a wellbore diagram showing plugs that were set and casing remaining in the hole, the job summaries from all plugging contractors used, including wireline and cementing (third party verification) and any logs that may have been run during abandonment.

OGCC Operator Number: 47120 Contact Name: Jennifer Thomas

Name of Operator: KERR MCGEE OIL & GAS ONSHORE LP Phone: (720) 929-6808

Address: P O BOX 173779 Fax:

City: DENVER State: CO Zip: 80217- Email: jennifer.thomas@anadarko.com

For "Intent" 24 hour notice required, COGCC contact: Name: Tel: Email:

API Number 05-123-30943-00

Well Name: STATE Well Number: 1-16

Location: QtrQtr: NENW Section: 16 Township: 1N Range: 68W Meridian: 6

County: WELD Federal, Indian or State Lease Number:

Field Name: WATTENBERG Field Number: 90750

☐ Notice of Intent to Abandon ☒ Subsequent Report of Abandonment

Only Complete the Following Background Information for Intent to Abandon

Latitude: 40.057428 Longitude: -105.009253

GPS Data:

Date of Measurement: 06/22/2010 PDOP Reading: 3.2 GPS Instrument Operator's Name: Renee Doiron

Reason for Abandonment: ☐ Dry ☐ Production Sub-economic ☐ Mechanical Problems

☐ Other

Casing to be pulled: ☐ Yes ☐ No Estimated Depth:

Fish in Hole: ☐ Yes ☐ No If yes, explain details below

Wellbore has Uncemented Casing leaks: ☐ Yes ☐ No If yes, explain details below

Details:

Current and Previously Abandoned Zones

Formation	Perf. Top	Perf. Btm	Abandoned Date	Method of Isolation	Plug Depth
CODELL	8370	8390	08/30/2017	B PLUG CEMENT TOP	7920
NIOBRARA	7988	8240	08/30/2017	B PLUG CEMENT TOP	7920

Total: 2 zone(s)

Casing History

Casing Type	Size of Hole	Size of Casing	Weight Per Foot	Setting Depth	Sacks Cement	Cement Bot	Cement Top	Status
SURF	12+1/4	8+5/8	24	1,061	670	1,061	0	VISU
1ST	7+7/8	4+1/2	11.6	8,522	970	8,522	1,400	CBL
S.C. 1.1				1,400	95	1,400	520	CBL

Plugging Procedure for Intent and Subsequent Report

CIBP #1: Depth 7920 with 40 sacks cmt on top. CIPB #2: Depth 4820 with 2 sacks cmt on top.

CIBP #3: Depth 80 with 39 sacks cmt on top. CIPB #4: Depth _____ with _____ sacks cmt on top.

CIBP #5: Depth _____ with _____ sacks cmt on top.

NOTE: Two(2) sacks cement required on all CIBPs.

Set 40 sks cmt from 7920 ft. to 7219 ft. Plug Type: CASING Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Set _____ sks cmt from _____ ft. to _____ ft. Plug Type: _____ Plug Tagged: ☐

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

Perforate and squeeze at _____ ft. with _____ sacks. Leave at least 100 ft. in casing _____ CICR Depth

(Cast Iron Cement Retainer Depth)

Set 140 sacks half in. half out surface casing from 1300 ft. to 159 ft. Plug Tagged: ☒

Set 39 sacks at surface

Cut four feet below ground level, weld on plate Above Ground Dry-Hole Marker: ☐ Yes ☐ No

Set _____ sacks in rat hole Set _____ sacks in mouse hole

Additional Plugging Information for Subsequent Report Only

Casing Recovered: 400 ft. of 4+1/2 inch casing Plugging Date: 11/29/2017

*Wireline Contractor: RELIANCE *Cementing Contractor: SCHLUMBERGER

Type of Cement and Additives Used: _____

Flowline/Pipeline has been abandoned per Rule 1105 ☐ Yes ☐ No *ATTACH JOB SUMMARY

Technical Detail/Comments:

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Jennifer Thomas

Title: Regulatory Analyst Date: 12/18/2017 Email: rscdjpostdrill@anadarko.com

Based on the information provided herein, this Well Abandonment Report (Form 6) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: Mangama, Christelle Date: 7/31/2018

CONDITIONS OF APPROVAL, IF ANY:

COA Type	Description

Attachment Check List

Att Doc Num	Name
401489509	FORM 6 SUBSEQUENT SUBMITTED
401489524	WELLBORE DIAGRAM
401489525	OPERATIONS SUMMARY
401489528	WIRELINE JOB SUMMARY
401489533	CEMENT JOB SUMMARY

Total Attach: 5 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

APPENDIX D
Western Environment and Ecology Inc.
Statement of Qualifications

"We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental professional as defined in 40 CFR 312 and we have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

REAL ESTATE TRANSFER ENVIRONMENTAL AUDITS

(RETA)

In response to provisions contained within the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), lending institutions, firms and individuals involved with property transfers have become painfully aware of the costs associated with environmental liabilities. In an attempt to make informed decisions and potentially avail themselves of the "innocent purchaser defense" as defined in CERCLA, lending institutions are requiring the completion of an environmental audit. Previously, the completeness and the thoroughness of these audits varied as greatly as the cost. However, in late 1992, the American Society of Testing and Materials (ASTM) adopted specific standards for completion of Phase I audits. The ASTM standards (E-1527 and E-1528) are quite specific as to the level of investigation necessary to complete the audit. **WESTERN ENVIRONMENT AND ECOLOGY, INC.** has performed Real Estate Transfer Environmental Audits to ASTM standards long before the standards were adopted. Additionally, **WESTERN ENVIRONMENT AND ECOLOGY, INC.** personnel have provided training to FDIC regional offices on environmental compliance and financial institution liabilities. This familiarity with lending institutions and more than fifteen years of experience in performing RETA's allows **WESTERN ENVIRONMENT AND ECOLOGY, INC.** to provide efficient and complete reports meeting short time frame requirements.

SERVICES

◗Historical Photo Records Search◗Lead-Based Paint Survey
◗Environmental Records Search◗Asbestos Survey
◗Interviews◗Radon Survey
◗On-site Inspection◗PCB Survey

SELECTED CLIENT LIST

Community Development Group Denver, Colorado
City of Aurora, Aurora, Colorado
City of Wheat Ridge, Colorado
Shively, Strommen & Holst, Longmont, Colorado
Town of Lyons, Colorado

GREG D. SHERMAN, P.G.
President

PROFESSIONAL CAPABILITIES:

Mr. Sherman has more than 42years of professional experience. He is currently President of **WESTERN ENVIRONMENT AND ECOLOGY, INC.** Prior to his current position, he was the Principal Geologist with SEACOR in its Lakewood, Colorado office and Project Director with Roy F. Weston also in Lakewood.

Duties performed in these capacities involved responsibility for CERCLA RI/FS studies and RCRA investigations. His professional assignments include project management and technical direction of the design and installation of the 2,000-foot long the 881 Hillside Groundwater Interception trench at the Rocky Flats Nuclear Weapons Plant in Jefferson County, Colorado. Mr. Sherman was Field Operations Manager for the installation of 75 groundwater extraction wells and vapor extraction and sparging points. This work was completed on the Stanford Research Park Superfund site in Palo Alto, California. Recently, he has concentrated on VOC remediation system design and installation utilizing on-site re-injection of treated groundwater and enhanced oxygenation systems. Mr. Sherman was lead investigator for the City of Wheat Ridge regarding the characterization of the Jay Street Park. This project, which was submitted to the Colorado Voluntary Clean-Up Program, received a grant from the Colorado Department of Public Health and Environment for innovative use of a Brownsfields site. Mr. Sherman and Western Environment and Ecology, Inc. was selected by the Cities of Aurora and Lakewood as their approved USEPA Brownsfields contractor.

Mr. Sherman is past Chairman of the Rocky Mountain Section of the Association of Engineering Geologists. He has served as Chairman of Executive Enterprises Seminars on Sampling and Data Analysis. He has extensive experience in geotechnical and geological investigations, groundwater studies, UST testing and evaluation, construction materials testing and mineral resource evaluation.

Mr. Sherman is recognized in the region as one of the leading experts in underground storage tank management and mine subsidence. He has placed special emphasis on the application of geophysical techniques to environmental and geotechnical investigations. Clients for these projects range from Federal, state and local governments to private industry and commercial developments. The project types included petroleum distribution facilities, nuclear power plants, highways and streets, dams and reservoirs, transmission lines, sewage treatment plants and sewage systems, hazardous and industrial waste disposal areas, and mining facilities, as well as residential and commercial developments. Mr. Sherman has performed geotechnical and geological investigations in Alaska, Arizona, California, Colorado, Idaho, Illinois, Montana, New Mexico, New York, Nevada, North Dakota, South Dakota, Texas, Utah and Wyoming. Additionally, he has international evaluation experience in the Middle East and Mexico.

REGISTRATION/CERTIFICATION

Wyoming Professional Geologist #2296
Indiana Certified Geologist #786
Certified Professional Geologist, CPG #6586
Petro Tite Training Course, 1986
40-Hour OSHA Training Course, 1987
8-Hour OSHA Supervisor Course, 1987
Nuclear Density Gauge Operation and Safety Training Course, 1984
NRC Quality Assurance Training, 1978
Asbestos Inspector, 1996

EXPERIENCE

Western Environment and Ecology, Inc., Littleton, Colorado; President, 1994.
SEACOR, Inc., Lakewood, Colorado; Principal Scientist, 1992-1993.
Roy F. Weston, Inc., Lakewood, Colorado; Principal Geologist, 1990-1992.
ATEC Associates, Inc., Denver, Colorado; Environmental Division Manager, 1985-1990.
Tierra Consultants, Inc., Denver, Colorado; President, 1982-1985.
Apache Energy and Minerals, Denver, Colorado; Senior Project Geologist, 1979-1982.
Dames and Moore, Denver, Colorado; Project Geologist, 1977-1979.
Resource Associates of Alaska, Fairbanks, Alaska; Staff Geologist, 1976.
Uranerez U.S.A., Inc., Casper, Wyoming; Staff Geologist, 1975-1976.
Amoco Production Company, Denver, Colorado; Lab Technician, 1974.
Cities Service Company, Durango, Colorado; Field Technician, 1973.

EDUCATION
B.S., Geology, University of Northern Colorado, 1975
Graduate Studies, New Mexico Institute of Mining and Technology, 1977

AWARDS

Rocky Mountain Associate of Geologists, Outstanding Senior, 1975
Who's Who in the West, 1988
Colorado Wildlife Federation, 1996 Conservationist of the Year (Owl Mountain Partnership)

PROFESSIONAL ASSOCIATIONS

Association of Engineering Geologists
American Institute of Professional Geologists
Senior Scientist Colca Canyon Scientific Expedition, 1990
Colorado School of Mines, Non-facility Senior Design Team Advisor

PUBLICATIONS/PRESENTATIONS

Sherman Greg D.,"Mine Subsidence Assessment, Boulder-Weld Coal Field, Using British National Coal Board Methods" The Mountain Geologist, Volume 46, Number 1 January 2009.

Sherman Greg D. and Brian R. Partington., "Abandoned Mine Subsidence Prediction Using

British National Coal Board Methods, Boulder/Weld Coal Field, Denver, Colorado" Proceedings for the International Association of Engineering Geologists, 2006 Meeting Nottingham, United Kingdom. September 2006.

Sherman, Greg D., "Sampling and Data Analysis"; Executive Enterprises Seminar, Chairman, May 1992.

Sherman, Greg D., "Statistical Design of Sampling Plans"; Executive Enterprises Seminar, June 1990.

Sherman, Greg D., "Impact of the EPA UST Regulations"; Tri-State Petroleum Marketer, December 1988.

Sherman, Greg D., "Variables Effecting Volumetric Leak Detection Methods for Underground Storage Tanks"; Paper given to the Colorado Section, American Society of Civil Engineers, 1988.

Sherman, Greg D., "The Impact of Underground Storage Tank Regulations on Industry"; Extended Abstracts, American Institute of Chemical Engineers, National Meeting, 1988.

Sherman, Greg D., "Assessment of Subsidence Damage to Existing Structures in Louisville, Lafayette, Colorado"; Proceedings of the Colorado Governor's Conference on Subsidence, 1985.

Sherman, Greg D., "Geology and Mining History of the Boulder/Weld Coal Field"; Paper given at Denver Coal Club Meeting, 1985.

Sherman, Greg D., "The New Mexico Gold Belt Regional Structural Implications"; Proceedings of the Western Mining Association, 1982 Convention.

Sherman, Greg D., "Colorado Front Range Uranium Deposits, A Possible Origin": in review.

Sherman, Greg D., "Origin of Monoclinal Folding Near Livermore, Colorado"; The Mountain Geologist, April 1976.

Geotechnical Site Development Study
Colorado State Land Board Parcel
Erie, Colorado

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Project Number 223122
December 20, 2022

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1.0 EXECUTIVE SUMMARY

A. G. Wassenaar, Inc. (AGW) completed the geotechnical site development study for the proposed residential development at the subject site. The data collected during our field exploration and laboratory work and our analysis, opinions, and conclusions are presented. The purpose of our study is to provide design recommendations for planning, site development, and preliminary design concepts for foundation systems, interior floor support, and streets.

The subsurface materials encountered in our test borings consist of fill, topsoil, clay, and sand, overlying sedimentary bedrock. Claystone, sandstone, or siltstone bedrock was encountered at depths ranging from 1 to 27 feet. Ground water was measured at depths ranging from 4½ to 43 feet.

Site development considerations should include provisions for the presence of existing structures, existing fill and underground utilities, high to very high expansive clays and claystone bedrock, isolated areas of shallow ground water and the associated soft/loose soils, ironstone, cemented sandstone, lignite, and coal mines.

If the site is overexcavated, the structures could be founded on spread or pad-type footings bearing on the moisture treated fill below frost depth. If the site is not overexcavated, straight-shaft drilled piers or helical piles are recommended. Preliminary foundation design concepts are presented.

Floors and flatwork being considered for construction on-grade will require a specific risk analysis by the Client because of the potential for movement of the soils and bedrock encountered. Where the structures are founded upon deep foundations, engineered structural floors or modification of the floor supporting soils or bedrock can be anticipated. Where footings are constructed, slabs-on-grade may be possible depending on the expansion potential of the supporting materials and the Client's analysis of risk. Slabs supported by soil will be subject to movement. Options for floor support are discussed.

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Foundation subsurface drainage systems will be necessary for all below grade areas. Extensive drain systems will be required when foundations are within 4 feet of ground water. Water soluble sulfate test results indicate that site and foundation concrete should be designed for very severe sulfate exposure. Preliminary pavement and other geotechnical-related recommendations are presented in the following report. We encourage the Client to read this report in its entirety and not to solely rely on the cursory information contained in this summary.

2.0 PURPOSE

This report presents the results of a geotechnical site development study for the proposed residential development to be located southeast of Weld County Road 10 and Weld County Road 5 in Erie, Colorado. The study was conducted by AGW to assist in determining geotechnical design criteria for planning, site evaluation, and development considerations. Preliminary geotechnical design concepts are also presented for foundations, interior floor support, foundation drainage, and street construction. Factual data gathered during the field and laboratory work are summarized on Figures

1 through 25 and in Appendix A. Our opinions and recommendations presented in this report are based on the data generated during our field exploration, laboratory testing, our understanding of the proposed project, and our experience with similar projects and geotechnical conditions.

This study was performed in general conformance with our Proposal Number 223122, dated May 31, 2022. This report is not intended to provide design criteria for individual foundations or street construction. Additional geotechnical studies will be required to provide final design criteria and construction recommendations.

3.0 PROPOSED CONSTRUCTION

We understand the proposed development will include single family lots and the associated utility and roadway infrastructure. Products with basements or crawl spaces are planned. Site and grading plans were not available at the time of this study. AGW should be contacted to review the contents of this study when grading plans are available.

4.0 SITE CONDITIONS

Oil and gas facilities are located in the center of the northwest portion of the site and in the east portion of the site. A ditch runs from northwest to south across the site, along the south property boundary, crosses the southeast corner, and along the east property boundary. The northwest and southeast portions of the site are being used for agriculture. The abandoned Clayton Coal Mine right-of-way is in the center of the site with remnants of the previous coal mine operation. An abandoned railroad embankment crosses the southern portion of the site. An abandoned homestead was observed in the center of the site. Construction debris, trash, and concrete pads were observed in the vicinity of the abandoned structures and in oil and gas facilities. Several utilities cross the site in various locations and are located along the north and east property boundaries. High tensioned powerlines are located along the north property boundary. Vegetation consists of grasses and weeds with occasional old growth cottonwood trees. The ground surface is rolling and slopes gently to the northwest. The site is bounded by Weld County Road 10 and rural residences to the north, Erie Parkway to the south, rural residences and Weld County Road 7 to the east, and residential subdivisions and Weld County Road 5 to the west. No bedrock outcrops were observed on the site.

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5.0 FIELD EXPLORATION

Subsurface conditions were explored by drilling 137 test borings at the approximate locations indicated on Figure 1. The test borings were advanced using a 4-inch diameter, continuous flight auger powered by a truck-mounted drill rig. At frequent intervals, samples of the subsurface materials were obtained using a Modified California sampler which was driven into the soil by dropping a 140-pound hammer through a free fall of 30 inches. The Modified California sampler is a 2.5-inch outside diameter by 2-inch inside diameter device. The number of blows required for the sampler to penetrate 12 inches and/or the number of inches that the sampler is driven by 50 blows gives an indication of the consistency or relative density of the soils and bedrock materials encountered. Results of the penetration tests and locations of sampling are presented on the "Test Boring Logs", Figures 2 through 25. Ground water measurements were made at the time of drilling and after drilling.

6.0 LABORATORY TESTING

The samples obtained during drilling were returned to the laboratory where they were visually classified by a geotechnical engineer. Laboratory testing was then assigned to specific samples to evaluate their engineering properties. The laboratory tests included swell-consolidation tests to evaluate the effect of wetting and loading on the selected samples. Gradation analysis, Atterberg limits, specific gravity, and hydrometer tests were conducted to evaluate grain size distribution and plasticity. Standard Proctor tests and remolded swell-consolidation tests were performed on blended bulk samples of the soils anticipated to be used as fill. In addition, representative samples were tested for water soluble sulfates, pH, resistivity, and chlorides. The test results are summarized on Figures 2 through 25 and presented in Appendix A.

7.0 SUBSURFACE CONDITIONS

The subsurface materials encountered in our test borings consist of fill, topsoil, clay, and sand, overlying sedimentary bedrock. Claystone, sandstone, or siltstone bedrock was encountered at depths ranging from 1 to 27 feet. Ground water was measured at depths ranging from 4½ to 43 feet. A more complete description of the subsurface conditions is shown on Figures 2 through 25.

7.1 Fill

Fill was encountered in one of the 137 test borings (Test Boring 15) and was approximately 1½ feet thick. The fill consisted of sand and gravel and was medium dense, clayey, moist, and mottled brown. The existing fill are more fully discussed under "Geotechnical Concerns".

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7.2 Natural Soil

Topsoil was encountered in 135 of the 137 test borings. The topsoil consisted of sandy clay up to 1-foot thick. It was organic, moist, and dark brown.

Clay was encountered in 135 of the 137 test borings. The clay was soft to very stiff, silty, slightly sandy to very sandy, with trace gravel to slightly gravelly, with sand and silt lenses, slightly moist to very moist, and brown. Soft to medium stiff clay was encountered in 33 of the 137 test borings at depths ranging from ½ to 9 feet and was between 1 and 26½ feet thick. The stiff to very stiff clay has high to very high expansion potential and low consolidation potential. The soft to medium stiff clay has low expansion potential and moderate to high consolidation potential.

Sand was encountered in 12 of the 137 test borings. The sand was loose to dense, silty to very silty, slightly clayey to very clayey, slightly gravelly, with clay and silt lenses, slightly moist to wet, and brown to light brown. Loose sand was encountered in one of the 137 test borings and was 2½ feet thick. The sand has low expansion potential. The medium dense to dense sand has low settlement potential. The loose sand has moderate settlement potential.

7.3 Bedrock

Claystone bedrock was encountered in all 137 test borings at depths ranging from 2½ to 39 feet. The claystone was weathered to very hard, silty to very silty, with trace sand to very sandy, with sandstone and siltstone lenses, iron stained, with lignite and ironstone lenses, slightly moist to very

moist, and brown to gray to olive to rust. Lignite lenses were encountered in the claystone bedrock in 26 of the 137 test borings at depths ranging from 10½ to 41 feet and were between 1 and 11 feet thick. Lignite layers were encountered in nine of the 137 test borings at depths ranging from 11 to 31½ feet. These layers ranged from 1 to 8 feet thick. Ironstone lenses were encountered in 17 of the 137 test borings at depths ranging from 8½ to 34 feet and were between ½ and 5 feet thick. The claystone has very high expansion potential.

Sandstone bedrock was encountered in 50 of the 137 test borings at depths ranging from 2 to 40 feet. The sandstone was firm to very hard, poorly cemented, with moderately to well cemented lenses, silty to very silty, clean to very clayey, with claystone and siltstone lenses, iron stained, moist to wet, and brown to light brown to gray to olive to rust. Well cemented sandstone lenses were encountered in 6 of the 137 test borings at depths ranging from 11½ to 32½ feet and were between 1 and 5 feet thick. The sandstone has low expansion potential.

Siltstone bedrock was encountered in 37 of the 137 test borings at depths ranging from 1 to 41½ feet. The siltstone was weathered to very hard, clayey to very clayey, with trace sand to very sandy, with sandstone and claystone lenses, iron stained, slightly moist to very moist, and brown to gray to olive to rust. The siltstone has low expansion potential. Estimated depth and elevation of bedrock are shown on Figures 26 and 27.

7.4 Ground Water

Ground water was measured at depths ranging from 6 to 40 feet in 53 of the 137 at the time of drilling. When checked one to nine days after drilling, ground water was measured at depths ranging from 4½ to 43 feet in 71 of the 137 test borings. Twenty-three of the 137 test borings wet caved at depths ranging from 6½ to 43½ feet. Test Borings 1 and 2 were destroyed when checked eight days after drilling. Ground water levels fluctuate with changing seasons and irrigation patterns and are expected to rise after construction is complete and landscape irrigation commences. Estimated depth and elevation of ground water are shown on Figures 28 and 29.

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8.0 GEOTECHNICAL CONCERNS

8.1 Existing Structures, Existing Fill, and Underground Utilities

As discussed in "Site Conditions", abandoned coal mine infrastructure, and an abandoned homestead occupy portions of the site. Any structures, including shallow foundation elements, must be removed from the site. If the existing structures were founded on piers, the piers should be removed or cut off down to a depth of at least 2 feet below the bottom of any planned construction. Any below grade appurtenances encountered should also be removed. All concrete pads should be removed from the site. Our experience indicates that other below grade or undisclosed structures such as root cellars, wells, cisterns, septic systems, etc. may be present. Any of these structures encountered should also be removed. Any wells encountered should be abandoned in accordance with the regulations of the Colorado State Engineer.

All existing fill encountered during development should be considered to have not been placed as fill capable of supporting a structure. The existing fill should be excavated prior to placement of new fill,

structures, or other structural appurtenances. Any fill encountered should be evaluated for quality at the time of removal to determine its suitability for placement as new fill on the site.

Underground utilities to be abandoned should be removed. This includes any pipes and trench backfill. After removal, the existing utility trenches should be widened at the base to a minimum of 8-feet and the sides of the trench should be sloped per the soil types described in Appendix B. Any new fill placed in the trench area should be placed and compacted as described in Appendix B.

8.2 Expansive Soils and Bedrock

Clay and claystone bedrock with high to very high expansion potential were encountered across the site. The average measured swell in the clay across the site was 1.6% under a 1,000 psf surcharge with a range from -0.5% to 8.5%. The average measured swell in the claystone bedrock across the site was 6.0% under a 1,000 psf surcharge with a range from -0.1% to 14.7%. We believe that the structures across the site will be constructed near expansive materials should traditional methods of grading be employed. Overexcavation and placement of a moisture treated fill to reduce swell potential will be necessary. This may allow for shallow foundations and slab-on-grade construction or a reduction in the length of the straight shaft piers. The entire site will require overexcavation. The interior floors for the structures founded on drilled piers or helical piles will need to be supported structurally.

8.3 Shallow Ground Water and Associated Soft/Loose Soils

Ground water was encountered less than 15 feet beneath the existing ground surface in 32 of the 137 test borings located near the ditch. Ground water less than 15 feet below the site grading elevation will likely affect utility construction and some site grading operations. Ground water was encountered less than 10 feet beneath the existing ground surface in 10 of the 137 test borings. Ground water less than 10 feet below the site grading elevation will likely affect foundation excavations. In addition, ground water was encountered less than 5 feet beneath the existing ground surface in 32 of the 137 test borings. Ground water less than 5 feet below the existing or final ground surface will pose stabilization problems during site grading, foundation construction, and may cause problems during pavement construction. We recommend that foundations be constructed at least 4 feet above ground water level to reduce the potential for future water problems.

Site development should be planned to avoid or manage the ground water. Avoidance may entail raising the site grades to provide sufficient distance between the bottom of foundations and the ground water, allowing only at-grade construction (no basements) or other methods. Removing the ground water may entail the construction of drain systems and/or barriers that draw the ground water down sufficiently to allow below grade construction. A geohydrologist familiar with long term dewatering of projects of this nature should be consulted.

Soft to medium stiff and loose soils were encountered near the ground surface or assumed excavation elevations in 34 of the 137 test borings. The soft to medium stiff clays and loose sands presents concerns for site grading, foundation excavations, and pavement construction. Any significant fills or foundation loads placed on top of the soft or loose soils could cause significant settlement over time. Movement of large, rubber-tired equipment may cause severe rutting which may result in not being

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able to traverse the areas. It will be necessary to stabilize the soft areas prior to fill placement. It will also be necessary to stabilize the soils prior to foundation and pavement construction.

8.4 Ironstone

Ironstone lenses were encountered in the claystone bedrock in 17 of the 137 test borings at depths ranging from 8½ to 34 feet and were between ½ and 5 feet thick. We believe the ironstone will need to be ripped for excavation using a single hydraulic ripper tooth mounted on a dozer. Excavation of the ironstone will require more effort. Trench or foundation excavations that encounter ironstone may require specialized excavation equipment, hydraulic hammering, or blasting. Materials loosened by hydraulic hammering or blasting should be removed from the site or, if feasible, broken down (crushed) to sizes that would allow for placement in fills on the site. If deep foundations are to be constructed, the use of a commercial drill rig or specialized drilling equipment may be necessary where ironstone is encountered. Predrilling may be required for helical piles.

8.5 Moderately to Well Cemented Sandstone

Moderately to well cemented sandstone bedrock was encountered in 19 of the 137 test borings at depths ranging from 8½ to 34 feet. We believe the moderately cemented sandstone will need to be ripped for excavation using a single hydraulic ripper tooth mounted on a dozer. Excavation of well cemented sandstone bedrock will require more effort. Trench or foundation excavations that encounter very hard sandstone may require specialized excavation equipment, hydraulic hammering, or blasting. Materials loosened by hydraulic hammering or blasting should be removed from the site or broken down (crushed) to sizes that would allow for placement in fills on the site.

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8.6 Lignite and Coal Mines

Lignite lenses were encountered in the claystone bedrock in 26 of the 137 test borings at depths ranging from 10½ to 41 feet and were between 1 and 11 feet thick. Lignite layers were encountered in nine of the 137 test borings at depths ranging from 11 to 31½ feet. These layers ranged from 1 to 8 feet thick. Lignite is a soft coal which is commonly found within the bedrock formation which underlies this site. It can be found in thin layers within claystone or in layers that are very soft and wet to relatively hard and dry. Our experience in areas underlain by this bedrock formation indicates that the presence and amount of lignite and coal in the bedrock can be very erratic in consistency and distribution, exhibiting itself in a random manner across the site. Since the material is not considered suitable for foundation support, its presence adds another level of uncertainty to the drilling of piers. Often lignite or coal is encountered only in a portion of the piers for a structure. Where the lignite is wet, it must be cased to prevent caving and inflow of water. If it is encountered at the bottom of a long pier, it may not be possible to extend the pier through the lignite or coal with currently available residential drill rigs. Additionally, placement of excavated lignite and coal during the site grading process will require close monitoring and may require placement in non-structural areas or exporting from the site.

The site is identified as being underlain by abandoned underground coal mines on the "Statewide Historic Underground Coal Mine Extents and Reported Coal Mine-Related Subsidence Events Map" available on the Colorado Geological Survey's website. Evaluation of the condition of these areas is beyond the scope of this report. The "Preliminary Mine Subsidence Investigation, State Land Board

Parcel, 414.38 Acres in Section 16, Township 1 North, Range 68 West, Weld County, Colorado" report, prepared by Western Environment and Ecology, Inc. (WEE), WEE Project Number 778-005-02, dated December 19, 2022, was prepared for this site.

9.0 SITE DEVELOPMENT

9.1 Overlot Grading

We understand the fill materials to be used at the site will be from on-site cut areas. In general, suitable inorganic on-site or off-site soils may be used for structural fill. Existing fill should be excavated prior to placement of new fill. Topsoil, soil containing significant vegetation, organic debris or other deleterious material should be excavated and removed from the structural areas. Off-site material considered for new fill should be evaluated by AGW prior to importing to the site. Construction of the fill embankments throughout the site should consist of proper foundation preparation, constructing embankment benching where necessary, disposition of strippings, proper fill placement and compaction, and designing slopes in accordance with the recommendations provided in this report and the applicable governing regulations. The following are general site grading recommendations:

1. Grading plans should be provided to AGW prior to commencement of work at the site.
2. It is recommended that we be retained on an essentially full-time basis to observe and test the fill placement. We should also be retained to provide observations and/or testing of the other items discussed below. The purpose of this observation and testing is to provide the Client with a greater degree of confidence that the work is being performed within the recommendations of this geotechnical study and the project specifications.
3. Various structures were observed within the site. The existing structures, including their foundations, should be completely removed from the site. Our experience indicates that other below grade or undisclosed structures such as root cellars, wells, cisterns, septic systems, etc. may be present. Any of these structures encountered should also be removed. Any wells encountered should be abandoned in accordance with the regulations of the Colorado State Engineer.
4. Existing fill was found in Test Boring 15 and abandoned railroad embankments were observed in portions of the site. The fill was placed under unknown conditions. Therefore, we recommend that the fill be entirely excavated. The fill should be observed during excavation in order to determine whether the excavated material may be re-used in the structural areas as new fill. Excavation of isolated test pits (with or without density-compaction testing) will not provide enough information, in our opinion, to allow the fill to remain in place.
5. Utilities beneath structural areas that are to be abandoned should be entirely removed. The excavation should then be widened to allow access to a self-propelled compactor. New fill should be placed and compacted as described in this section and Appendix B.
6. All topsoil and vegetation should be stripped and removed prior to fill placement. The vegetation, organic soils, or topsoil should be wasted from the site, placed in

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non-structural areas (e.g., parks, landscaping, tracts, etc.) and/or stockpiled for future use in revegetating the surface of exposed slopes. In no case should these materials be used in the structural areas or where the stability of slopes will be affected. If placed in lots, topsoil must be placed outside of the structure setbacks and should not be placed where the fill depths exceed 5 feet. If placed in depth across the back of lots, movements of fences and dry utilities should be expected.

7. Ironstone and moderately to well cemented sandstone was encountered in the test borings. These materials will likely require some extra effort to remove and process. The use of a Caterpillar D8 or larger dozer using a single shank ripper tool may be necessary. Some areas of well cemented sandstone may require removal using hydraulic hammers or blasting.
8. Where soft, rutting soils are found beneath planned fill areas, removal, in-place drying, or stabilization may be necessary. Stabilization prior to fill placement may be accomplished by placing crushed rock or equivalent material, which should be evaluated by AGW prior to use. The material should be spread across the area and worked into the underlying soft or loose soils with fully-loaded rubber-tired equipment. This procedure should continue until scraper-type equipment can be supported on the rock fill with no significant deflection or rutting. In some instances, a geogrid or geotextile stabilization fabric may be economical for use in conjunction with rock stabilization.
9. Where the existing slopes are steeper than a 5:1 (horizontal:vertical), benching will be required for structural integrity of any fills (see Figure 30).
10. The stripped foundation areas should be observed by AGW prior to fill placement. Any soft soils found in these areas must be removed or stabilized as necessary prior to fill placement.
11. After the fill areas have been cleared, the exposed soils should be scarified to a minimum depth of 6 inches, brought to the proper moisture content, and then compacted according to Appendix B.
12. Should significant amounts of lignite be excavated by individual scrapers, it should be stockpiled or wasted. Significant layers of lignite must not be constructed within the grading fills.
13. The compaction and moisture content of the soils will be dependent upon material types and the depth and location of placement. The specifications outlined in Appendix B are based upon providing a fill with sufficient shear strength to support structures and sufficient moisture to reduce the potential of swell of the expansive soil used in the fill.
14. The results of standard Proctor tests performed on bulk samples of the upper level soils likely to be used for fill are shown on Figures A-230 and A-231 in Appendix A. These results can be used as a guideline for contractors to estimate how much additional moisture may be required to bring the on-site soils to the required moisture content.
15. **Additional processing of the excavated claystone bedrock may be required due to the hardness of the material and low moisture content. The**

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earthwork contractor should be made aware of the extra processing required.

16. Where fill depths exceed 20 feet, additional compactive effort will be necessary to limit settlement of the fill. Where fill depths exceed 25 feet, we recommend a granular fill (less than 35% passing the U. S. Standard Number 200 Sieve) be placed below the 25-foot depth. If this is not feasible, additional testing of the proposed deep fill material will be required to estimate settlements. In any case, monitoring of fills greater than 25 feet in depth will be necessary. Compaction and moisture content specifications are provided in Appendix B.
17. Particular attention should be paid to compaction of the exterior faces of slopes.
18. Placement and compaction of fill should continue to final overlot grade. We recommend that the lots not be left low or "dished-out" and that placement of fill not stop at foundation elevation.
19. Other specifications outlined in Appendix B should be followed.

9.2 Overexcavation and Placement of Moisture Treated Fill

Based on the expansion potential of the clay and claystone bedrock, we recommend the site be overexcavated if the use of shallow foundations is desired. Our experience indicates that overexcavation and placement of a moisture treated fill would be most effectively performed using mass grading techniques. The ideal time to do this would be during site development operations. As some overexcavation beneath the roadways will likely be required, it would be advantageous to perform this overexcavation during site grading. The following recommendations should be followed in order to enable the placement of a moisture treated fill that could be used for slab and foundation support. These recommendations may be modified during construction if soil conditions differing from those anticipated are encountered.

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1. These recommendations are based upon our understanding that basement or crawl space depth products will be constructed. If a different product is considered, these recommendations must be reviewed by AGW.
2. The final site grading plans should be provided to AGW prior to commencement of work at the site in order to evaluate which areas and to what depth overexcavation should be performed.
3. The expansive clay and claystone should be excavated to a depth of at least 12 feet below the basement foundation elevation or 14 feet below crawl spaces. The base of the excavation should extend, at a minimum, to a width of at least 5 feet beyond the foundation footprint (including any counterforts, covered porches, patios, decks, etc.). Excavations that do not extend to these minimums risk future foundation performance issues. It may be prudent to extend the base of the excavation to 5 feet outside of the front and rear setbacks in order to accommodate potential changes in structure dimension. Additionally, the street subgrade should be overexcavated as described in the "Preliminary Street Pavement Design" section. The excavation should be sloped following current OSHA regulations. We will not be responsible for testing near excavations that do not meet OSHA regulations. A licensed surveyor must verify the extents of the excavation prior to any fill placement.

4. Water flow into the overexcavation may occur in areas of shallow ground water. We believe that the water can be handled during construction by channeling the water in the excavation(s) and pumping from sumps. It may be prudent to provide permanent drains at the base of the overexcavation in these areas. However, if an outfall for the drains cannot be found, they should not be constructed. The drain(s) should be sloped to a positive gravity outfall. Depending on the location of the inflow, chimney drains may be necessary to convey water from sidewall seepage areas to the drain. The configuration of these drains should be determined at the time of construction.
5. Should significant amounts of lignite be excavated by individual scrapers, it should be stockpiled or wasted. Significant layers of lignite must not be constructed within the grading fills.
6. Once the excavation depth and width have been verified, fill placement may begin. The bottom of the excavation should be scarified and moistened prior to fill placement. The fill, consisting of the excavated materials, should be placed in maximum 8-inch loose lifts. Moisture should be added and the lift processed. The use of a construction disc to mix and process each lift is suggested. Mixing should be performed until the moisture content is relatively uniform throughout the lift and the majority of the particles are less than 3 inches in dimension. **Additional processing of the excavated claystone bedrock may be required due to the hardness of the material and low moisture content. The earthwork contractor should be made aware of the extra processing required.** It may be necessary to excavate the soils and bedrock, apply moisture to the excavated material, and stockpile prior to use as fill. The stockpiled material should then be moisture conditioned and used as fill, following the specifications described in Appendix B. The fill should then be compacted as described in Appendix B.
7. The results of standard Proctor tests performed on bulk samples of the upper level soils likely to be used for fill are shown on Figures A-230 and A-231 in Appendix A. These results can be used as guideline for contractors to estimate how much additional moisture may be required to bring the on-site soils to the required moisture content.
8. Essentially full-time observation and testing of fill placement must be performed by AGW. Testing should include in-place moisture content and dry density. Swell-consolidation or other testing may also be performed at the discretion of AGW.
9. Placement and compaction of fill should continue to final overlot grade. We recommend that the lots not be left low or "dished-out" and that placement of fill not stop at foundation elevation. If the structures will not be constructed within two years of completion of the fill, additional effort may be necessary to help maintain the moisture within the fill. This may include the addition of more soil to blanket the compacted fill, the placement of mechanical or chemical barriers, or applying water periodically to the fill surface. We are available to discuss this with you.

It must be understood that while this method is used to reduce the likelihood of future heave, it is not free of risk of foundation movement. While future heave is less likely, the possibility of settlement induced by excess moisture is increased. Therefore, the control and removal of surface water at the site will continue to be very important. Our experience indicates that clay materials of the type encountered at this site will likely exhibit an average swell of less than 2% under a surcharge load of 1,000 pounds per square foot (psf) when thoroughly mixed with water and processed with typical

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earthmoving equipment. It is anticipated that if this level of swell reduction is achieved, the foundations may be constructed by placing footings upon the fill. This level of swell should also provide for a low to moderate risk of basement slab movement. However, it must be understood that even with the procedures outlined above, it is highly likely that moderate to high measured swells will be found in the fill. This will require rework of portions of the fill or the use of deep foundations and structural support of interior floors. Additional drilling after the soil modification has been completed will be required to provide final foundation recommendations and basement slab risk assessments for each residence.

9.3 Slopes and Retaining Walls

Slope stability and retaining wall analyses were not conducted as part of this study. In areas where existing slopes exceed 5:1 (horizontal:vertical), benching prior to fill placement will be required (see Figure 30). Construction of conventional fill slopes should be limited to 3 to 1 or flatter. Cut slopes steeper than 2 to 1 should be evaluated for stability. Specific analysis will also be necessary if retaining walls are to be constructed.

9.4 Construction Excavation

In our opinion, the site grading, utility, and foundation excavations may be constructed using conventional earth-moving equipment for the Front Range area. In some areas, unstable soils beneath earth-moving equipment may be encountered. Care should be taken so that the foundation soils are not disturbed or are properly stabilized. It was previously mentioned the sandstone is very hard. Very hard ironstone lenses should be anticipated. Poorly to moderately cemented sandstone may be excavated using a single tooth hydraulic ripper tooth mounted on a D8 Dozer. Well cemented bedrock and ironstone will require more effort. Very hard sandstone or ironstone may be encountered in trenches which may require excavation with specialized equipment, hydraulic hammering or blasting for removal. Material loosened by hydraulic hammering or blasting must be removed.

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Excavations deeper than 3 feet should be properly sloped or braced to prevent collapse of potentially caving soils. For planning purposes, the fill, sand, and any soil influenced by ground water are "Type C" soils, the clay is a "Type B" soil, and the underlying bedrock is a "Type A" soil according to OSHA regulations. A final determination of the soil type must be made by the Contractor's "Competent Person" (as defined by OSHA Regulation). Local, city, county, state, and federal (OSHA) regulations should be followed.

The presence of ground water will be a constraint on construction excavation in portions of the site. It will be necessary to dewater all excavations constructed below the ground water level. Dewatering may include pumping from the work area or construction of well points. The excavation and utility contractor(s) must be made aware of the ground water conditions so that contract bidding will include the appropriate provisions.

9.5 Utility Construction

In our experience, utility excavations may be constructed using conventional earth-moving equipment for the Front Range area. Utility excavations may encounter hard to very hard bedrock or ironstone that may require extra effort to remove in portions of the site. The use of rock buckets,

hydraulic hammers, specialty equipment, or light blasting may be required. All excavations should be sloped or shored in the interest of safety, following local and federal (OSHA) regulations. For planning purposes, OSHA soil type designations are discussed under "Construction Excavations". Final determination of the soil types must be made by the contractor's "Competent Person" (as defined by OSHA) at the time of construction.

Trench backfill within all structural areas should, as a minimum, be compacted using the same methods and to the same specifications as required for overlot grading. This is especially important where utility lines and laterals are constructed beneath foundation, alley, and driveway areas. Trenches in streets should be compacted to the Town of Erie specifications. Observation and testing of fill placement must be performed during trench backfilling.

The presence of ground water will likely be a constraint upon utility construction in portions of the site. It will be necessary to dewater all trenches constructed below the ground water level. A possible method for dewatering would be to begin construction of the deeper (sewer) utilities at their outfall and to work upstream. Other methods include pumping from the trench in the work area or construction of well points along the trenches. The utility contractor must be made aware of the ground water conditions.

The choice of compaction equipment can have a significant effect on the performance of trench fills. It is our experience that utility trench backfills compacted with a compaction wheel attached to an excavator experience more settlement (both in area and magnitude) than those compacted with self-propelled equipment. While the contractor has control of the means and methods of construction, the Client should be aware of this issue.

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9.6 Subsurface Drainage

The Developer, after consideration, may or may not elect to construct an area drain for this subdivision, it is entirely the Developer's choice, unless there are jurisdictional regulations requiring an area drain be installed. The existing ground water levels may cause problems in portions of the site during development. In addition, clay soils and bedrock were encountered in the test borings drilled for this study. These types of material have a relatively low permeability and can develop a perched water condition. Perched water conditions generally occur after development and construction have taken place, when landscape irrigation and surface drainage conditions are changed.

An overall area drain, if constructed, could provide a discharge and collection point for individual foundation drains. If an area drain discharge is not available, the individual foundation drains will discharge collected water to the ground surface near each residence. Surface discharge can result in water recycling to the foundation drain and ponding of water where surface grading is not sufficient for water flow. Foundation drain discharge can also result in algae growth where water continually crosses sidewalks which become ice hazards on walkways and gutters in the winter months.

Typically, overall area drains can be designed and constructed with installation of the sanitary sewer system. However, the local municipality should be consulted to determine where an overall system

is allowed. The civil engineering company contracted to design the infrastructure should be able to provide this design. We are available to assist in drain design. For the system to work, the area drain must be graded to a positive discharge point. If a permanent outfall for an area drain cannot be determined, the area drain should not be constructed.

If it is decided not to install an overall area drain, an alternative would be to establish points of positive gravity discharge for the gravel bedding beneath the sewer. We also recommend any basement or below grade area be provided with a perimeter subsurface drainage system sloped to drain to a positive gravity discharge such as a sump or connected directly to the overall area drain system.

9.7 Surface Drainage

We recommend that provisions be made to divert surface runoff away from development areas. This may reduce potential problems associated with excess water in structure bearing soils. The site should be designed such that a 10% slope can be established near the structures after foundation construction. Slopes of at least 2% should be planned in landscaped areas once the water is away from the foundations.

10.0 SITE CONCRETE AND CORROSIVITY

Laboratory tests conducted on selected soil samples yielded water soluble sulfates ranging from less than 100 parts per million (ppm) to 28,400 ppm. Based upon these results and our experience in the area, the site soils and bedrock are assigned to possess very severe (S3 or RS3) sulfate exposure per ACI 318 or ACI 332. We recommend the "ACI Manual of Concrete Practice", of the most recent edition be used for proper concrete mix design properties as they relate to these conditions.

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The pH test results ranged from 7.9 to 8.5, the resistivity test results ranged from 260 to 4,500 ohm·cm, and the chloride test results ranged from 0.0002% to 0.0087%. These results are summarized on Figures 2 through 25 and in Appendix A. The results of this testing should be used as an aid in choosing the construction materials in contact with these soils which will be resistant to the various corrosive forces. Manufacturer's representatives should be contacted regarding the specific corrosivity resistance for their products. In addition, local specifications should be consulted when selecting pipe materials.

11.0 PRELIMINARY FOUNDATION DESIGN CONCEPTS

The foundation recommendations for each structure are dependent upon the subsurface profile and engineering properties of the materials encountered at and near the depth of the proposed foundation. These are dependent upon the final configuration of and construction methods used during overlot grading at the site. The information in the following sections presents preliminary foundation concepts which must be finalized for each building site upon completion of the overlot grading operations. AGW should be retained to perform design level soil and foundation studies after completion of site grading.

11.1 Footings

If the site is overexcavated, it likely that the structures could be founded on spread or pad type footings bearing on moisture treated fill. The footings must be founded below frost depth. The footings will likely be designed for maximum soil bearing pressures ranging from 1,000 to 3,000 psf. Minimum dead load pressure on the order of 700 to 1,000 psf will be required.

11.2 Straight Shaft Piers

If overexcavation is not performed, the structures may be founded on straight shaft piers drilled into bedrock. The piers will likely be designed for an end bearing pressure in the range of 25,000 to 30,000 psf, a minimum dead load pressure in the range of 25,000 to 35,000 psf, and a side shear in the range of 2,000 to 3,000 psf. Pier lengths on the order of 35 to 45 feet with bedrock penetration from 15 to 25 feet can be anticipated. If lignite is encountered at the bottom of a pier, the pier must be extended to competent bedrock. Difficult drilling may be experienced should strongly cemented sandstone lenses or ironstone be encountered. A commercial drill rig will be required.

11.3 Helical Piles

If overexcavation is not performed, helical piles drilled into the underlying bedrock may be considered. The length of piles will be dependent upon the depth of fill beneath the structures. Where no fill is placed beneath the structure, pile lengths ranging from 25 to 35 feet below the foundation can be anticipated. The piles should extend to bedrock in which a minimum installation torque of 3,000 ft-lbs is achieved. Higher installation torques may be required depending upon structural loading conditions. Due to the hardness of the bedrock and ironstone lenses, pre-drilling may be required.

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11.4 Lateral Earth Pressures

Foundation walls with fill on only one side will need to be designed for lateral earth pressures. For this site, lateral earth pressures calculated based upon equivalent fluid densities on the order of 50 to 90 pcf should be anticipated. The preliminary estimates are for properly placed and compacted fill at foundation walls. They should not be used for site retaining walls.

11.5 Interior Floors (Footings)

Where footings are constructed, the structures will likely be assessed low to moderate slab risk performance evaluations. If the risk tolerance for slab movement is zero, structural floors should be constructed.

11.6 Interior Floors (Deep Foundations)

Where deep foundations are required for foundation support, the structures will be assessed with moderate to very high slab risk performance. If structural floor is not desired, soil modification to a depth of at least 10 feet below the basement slab-on-grade may be considered. This may allow for the construction of slab-on-grade floors depending on the amount of potential floor movement acceptable to the Client. Structures with at least 10 feet of fill beneath the slab will likely be assessed low to moderate slab risk performance evaluations.

11.7 Drain Systems

Drain systems will be required around the lowest excavation level for below grade spaces for each structure. Either interior or exterior drains may be used for most of the site. Where ground water is within 4 feet of the foundation, a more extensive drain system will be required. This may include gravel across the entire foundation, drain laterals, or combination interior and exterior drains. The drains must be led to a positive gravity outfall or sump.

11.8 Backfill and Surface Drainage

Foundation backfill should be moistened and compacted to reduce future settlement. The site grading should consider a slope of 10% away from the foundation at the completion of construction. All other drainage swales in landscaped areas should slope at a minimum of 2%.

12.0 PRELIMINARY STREET PAVEMENT DESIGN

Pavement design is based on the engineering properties of the subgrade and pavement materials, the assumed design traffic conditions, and the Town of Erie pavement regulations. Effective pavement structures are composed of various pavement materials bearing upon properly prepared subgrade soils. The following preliminary pavement recommendations are based upon the subsurface conditions encountered and our experience in the area.

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It appears the proposed subgrade materials will likely be clays and claystone, or fill constructed from these materials with an AASHTO Soil Classification System of A-4, A-6, and A-7-6. Based upon our laboratory testing and our experience in the area, it is anticipated that the subgrade materials encountered on this site can be expected to exhibit enough swell to negatively impact the performance of the pavement and will likely be in excess of those allowed by the Town of Erie. Therefore, we recommend that the expansive subgrade materials be modified during site grading operations to reduce the potential future heave of the pavement. The clays and claystone should be overexcavated to a depth of at least 5 feet below the pavement subgrade. The overexcavation should be performed during site grading prior to construction of utilities within the right-of-way. Overexcavation should cover the area from 1 foot beyond back of sidewalk (for attached sidewalk areas) or back of curb (for detached sidewalks). The excavated material may be placed as moisture treated fill (see Appendix B) within the right-of-way. This should result in a reduction in pavement thickness. All fill placed within 5 feet of the subgrade elevation should be placed as moisture treated fill. Lime or other chemical treatment, placement of additional base course, or other methods of subgrade preparation will likely be required dependent upon the results of the final pavement design report.

Moisture treatment is the process of removing subgrade materials, adding moisture between 0 to 4% above optimum moisture content, and compacting the subgrade to at least 95% of Proctor maximum dry density. The Client should understand soils treated to 4% above optimum moisture content will have low support values and may be soft and yielding under load. Stabilization by chemical or mechanical means will likely be necessary to achieve a stable paving platform.

Based upon the subgrade soil classifications, we have estimated the relative strengths of the subgrade soils presented above to determine the preliminary pavement thicknesses. Based on this information and utilizing the design methodology determined from the pavement design regulations for the Town of Erie, the alternatives presented below were calculated.

Pavement Thickness Alternatives for Interior Streets		
Traffic Category	**HBP / ABC (in)**	**Concrete (in)**
Alleys	-	8.0 - 9.0*
Local Street	4.5 – 6.0 / 8.0 – 12.0	-
Collector	5.5 – 6.5 / 10.0 – 12.0	-

HBP = Hot Bituminous Pavement ABC = Aggregate Base Course
*9.0 if inverted

The above preliminary thickness recommendations are based on a design life of 20 years. It should be emphasized that the design alternatives provided above are preliminary for the materials anticipated. The final design thicknesses could be more or less than indicated depending upon the materials sampled during the final pavement design.

Proper surface and subsurface drainage are essential for adequate performance of pavements. It has been our experience that water from landscaped areas can infiltrate pavement subgrade soils and result in softening of the subgrade followed by pavement damage. Therefore, provisions should be made to maintain adequate drainage and/or contain runoff from such areas. The Town of Erie requires an edge drain be constructed along the pavement in landscaped areas. In addition, water and irrigation lines should be thoroughly pressure tested for leaks prior to placement of pavement materials.

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The information contained in this section is preliminary in nature. More detailed information will be required by the Town of Erie prior to issuance of a paving permit. Therefore, when overlot grading is complete at the site, a final pavement evaluation must be performed.

13.0 FINAL DESIGN CONSULTATION AND CONSTRUCTION OBSERVATION

This report has been prepared for the exclusive use of Southern Land Company, LLC for the purpose of providing geotechnical criteria for the proposed project. The data gathered and the conclusions and recommendations presented herein are based upon the consideration of many factors including, but not limited to, the type of structures proposed, the configuration of the structures, the proposed usage of the site, the configuration of surrounding structures, the geologic setting, the materials encountered, and our understanding of the level of risk acceptable to the Client. Therefore, the conclusions and recommendations contained in this report should not be considered valid for use by others unless accompanied by written authorization from AGW.

AGW should be contacted if the Client desires an explanation of the contents of this report. AGW should be retained to provide future geotechnical services for the site including, but not limited to, design level geotechnical studies, consultation during design, observation and testing during

construction, and other geotechnically related services. Failure to contract with AGW for these services or selection of a firm other than AGW to provide these services will eliminate liability for AGW. We are available to discuss this with you.

14.0 GEOTECHNICAL RISK

The concept of risk is an important aspect of any geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be tempered by engineering judgment and experience. Therefore, the solutions or recommendations presented in any geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structures will perform as desired or intended. What the engineering recommendations presented in the preceding sections do constitute is our judgement of those measures that increase the chances for the structures and improvements performing satisfactorily. The Developer, Builder, and Owner must understand this concept of risk, as it is they who must ultimately decide what is an acceptable level of risk for the proposed development of the site.

15.0 LIMITATIONS

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We believe the professional judgments expressed in this report are consistent with that degree of skill and care ordinarily exercised by practicing design professionals performing similar design services in the same locality, at the same time, at the same site and under the same or similar circumstances and conditions. No other warranty, express or implied, is made. In the event that any changes in the nature, design or location of the facility are made, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing. Because of the constantly changing state of the practice in geotechnical engineering, and the potential for site changes after our field exploration, this report must not be relied upon after a period of three years without AGW being given the opportunity to review and, if necessary, revise our findings.

The test borings drilled for this study were spaced to obtain an understanding of subsurface conditions for design purposes. Variations frequently occur from these conditions which are not indicated by the test borings. These variations are sometimes sufficient to necessitate modifications in the designs. If unexpected subsurface conditions are observed by any party during site development, we must be notified to review our recommendations.

Our scope of services for this project did not include, either specifically or by implication, any research, identification, testing, or assessment relative to past or present contamination of the site by any source, including biological (i.e., mold, fungi, bacteria, etc.). If such contamination were present, it is likely that the exploration and testing conducted for this report would not reveal its existence. If the Client is concerned about the potential for such contamination or pollution, additional studies should be undertaken. We are available to discuss the scope of such studies with you.

Our scope of services for this project did not include a local or global geological risk assessment. Therefore, issues such as mine subsidence, slope stability, faults, etc. were not researched or addressed as part of this study. If the Client is concerned about these issues, we are available to discuss the scope of such studies upon your request.

Sincerely,

A. G. Wassenaar, Inc.

Ashley A. McDaniels, P.E.
Senior Engineer

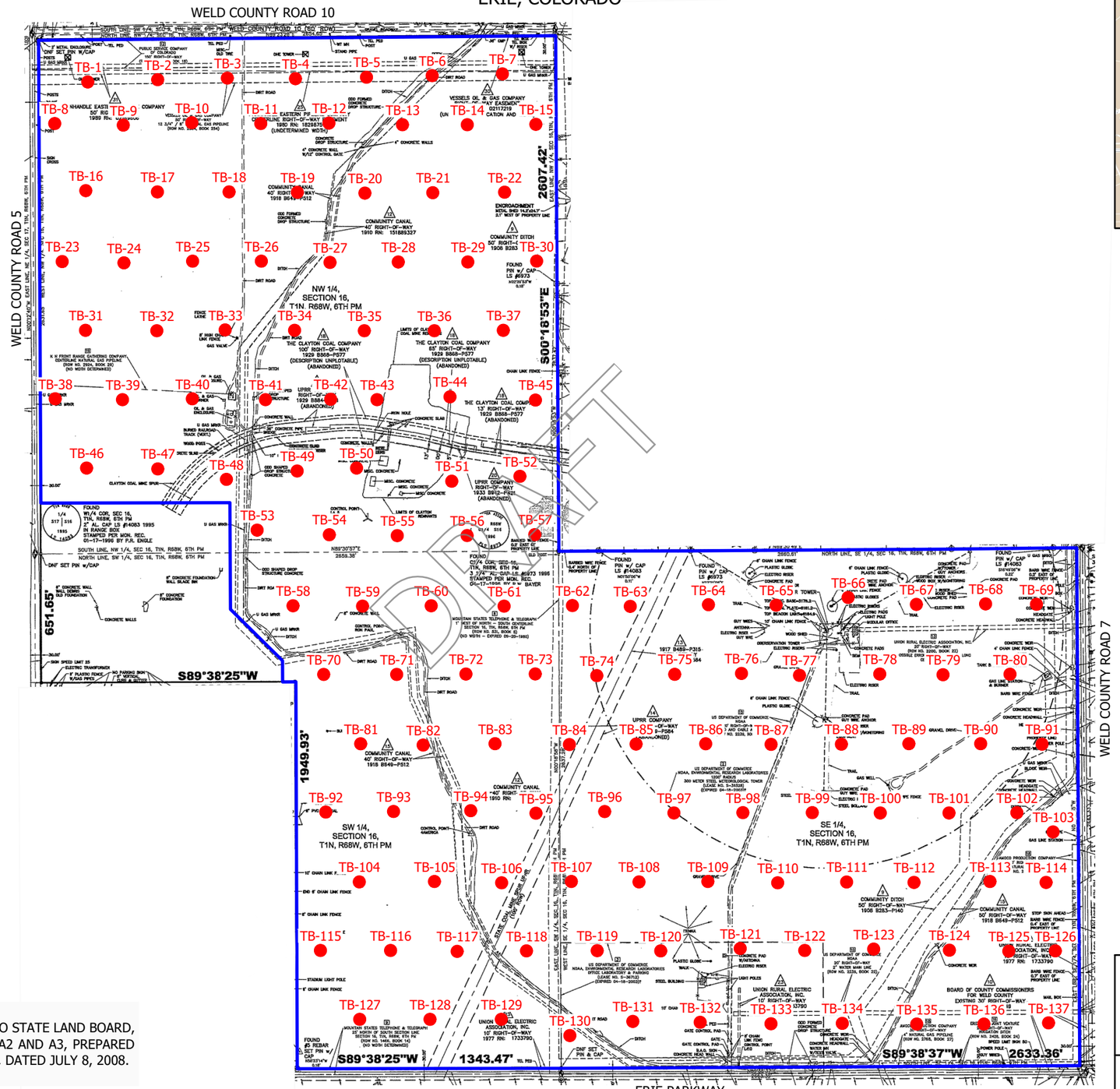
Reviewed by:

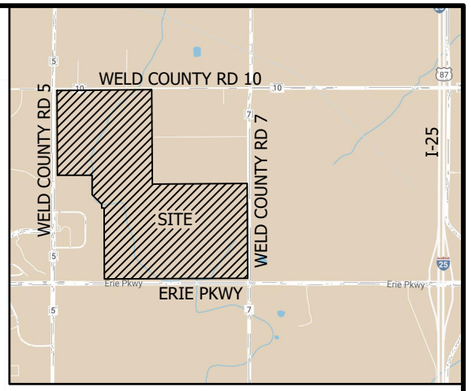
Kathleen A. Noonan, M.S., P.E.
Senior Geotechnical Engineer

AAM/KAN/aam

DRAFT

COLORADO STATE LAND BOARD PARCEL
ERIE, COLORADO





VICINITY MAP
NOT TO SCALE

0 600 1200
Scale in Feet

STUDY AREA

NOTES:
1. TEST BORINGS ARE OVERLAID ON THE "COLORADO STATE LAND BOARD, ALTA/ACSM LAND TITLE SURVEY" PLAN, SHEETS A2 AND A3, PREPARED BY CALIBRE ENGINEERING, INC., JOB NO. LA ERIE, DATED JULY 8, 2008.
2. ALL LOCATIONS ARE APPROXIMATE.

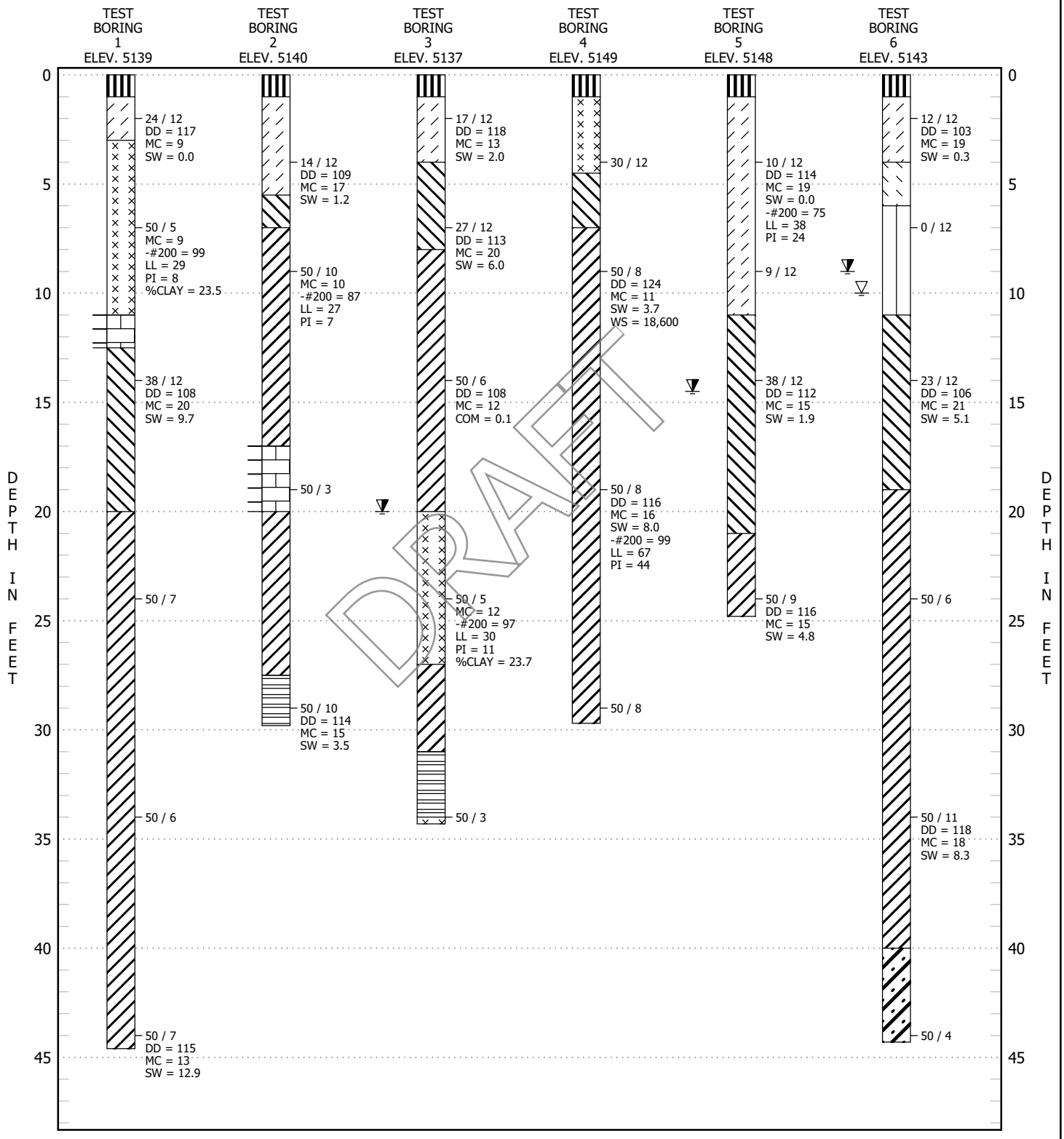
A.G. WASSENAAR, INC.

SITE PLAN AND VICINITY MAP	PROJECT NO. 223122 FIGURE 1

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

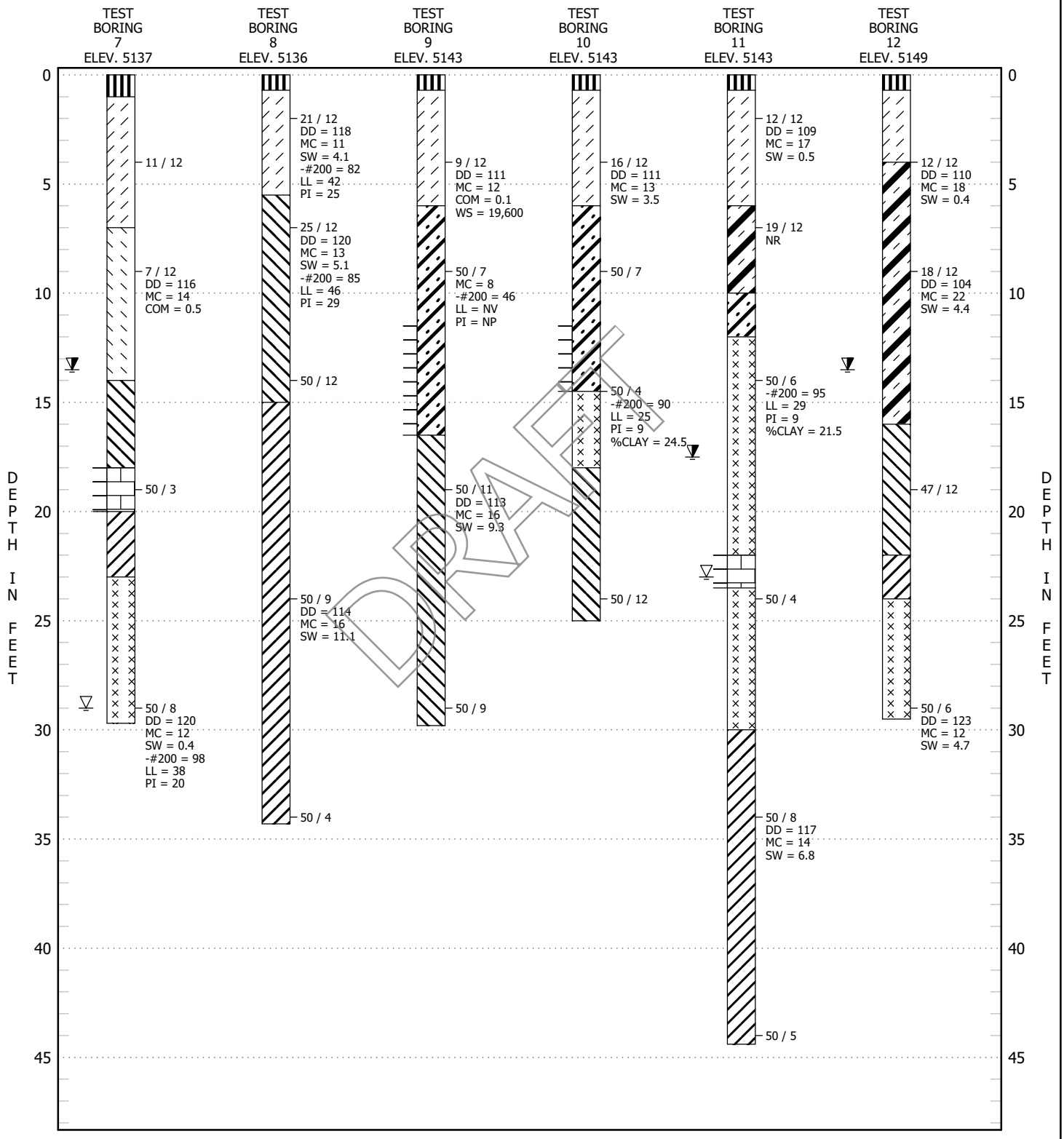
TEST BORING LOGS

FIGURE 2

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



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SEE FIGURE 25 FOR LEGEND AND NOTES

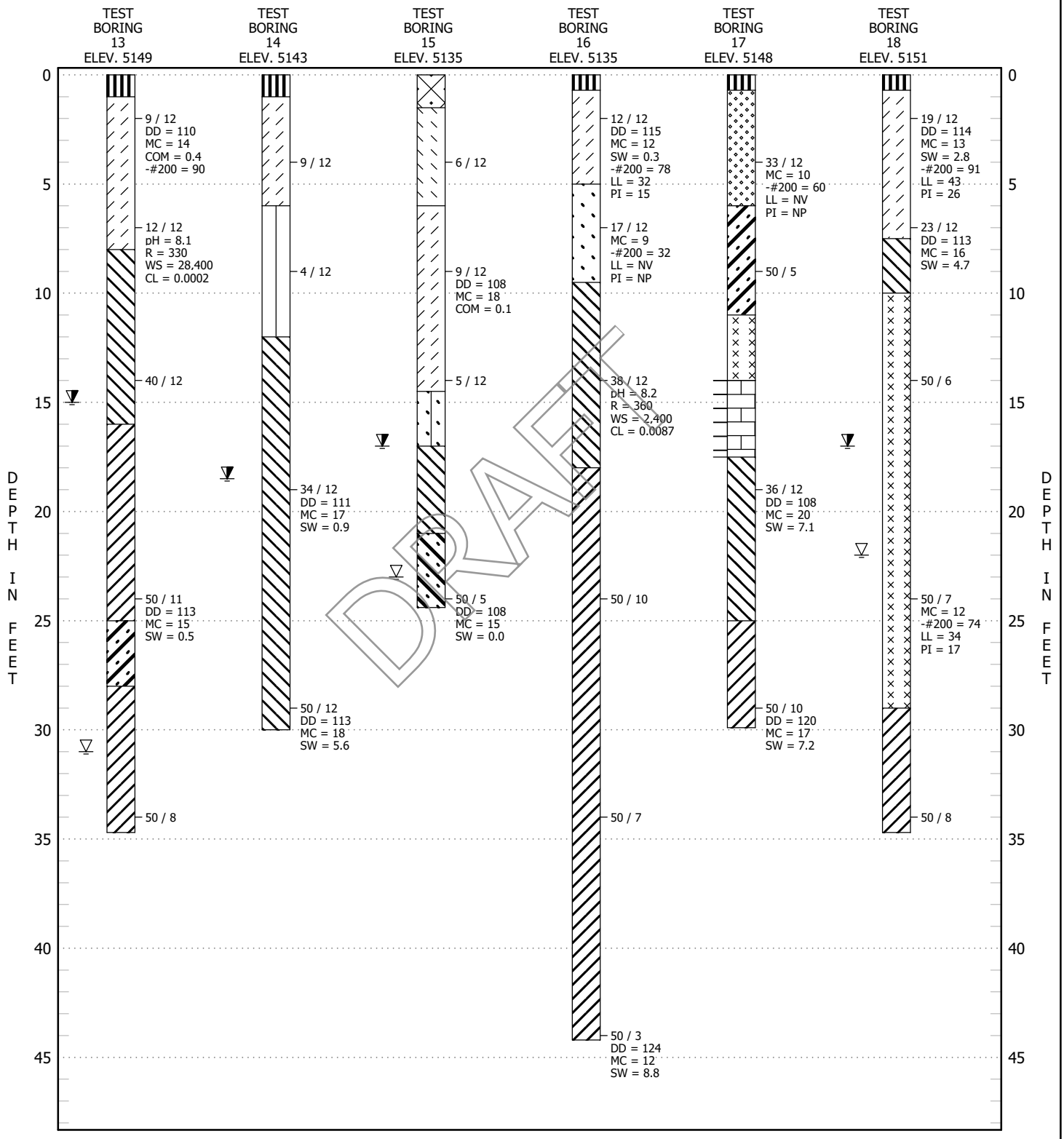
TEST BORING LOGS

FIGURE 3

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

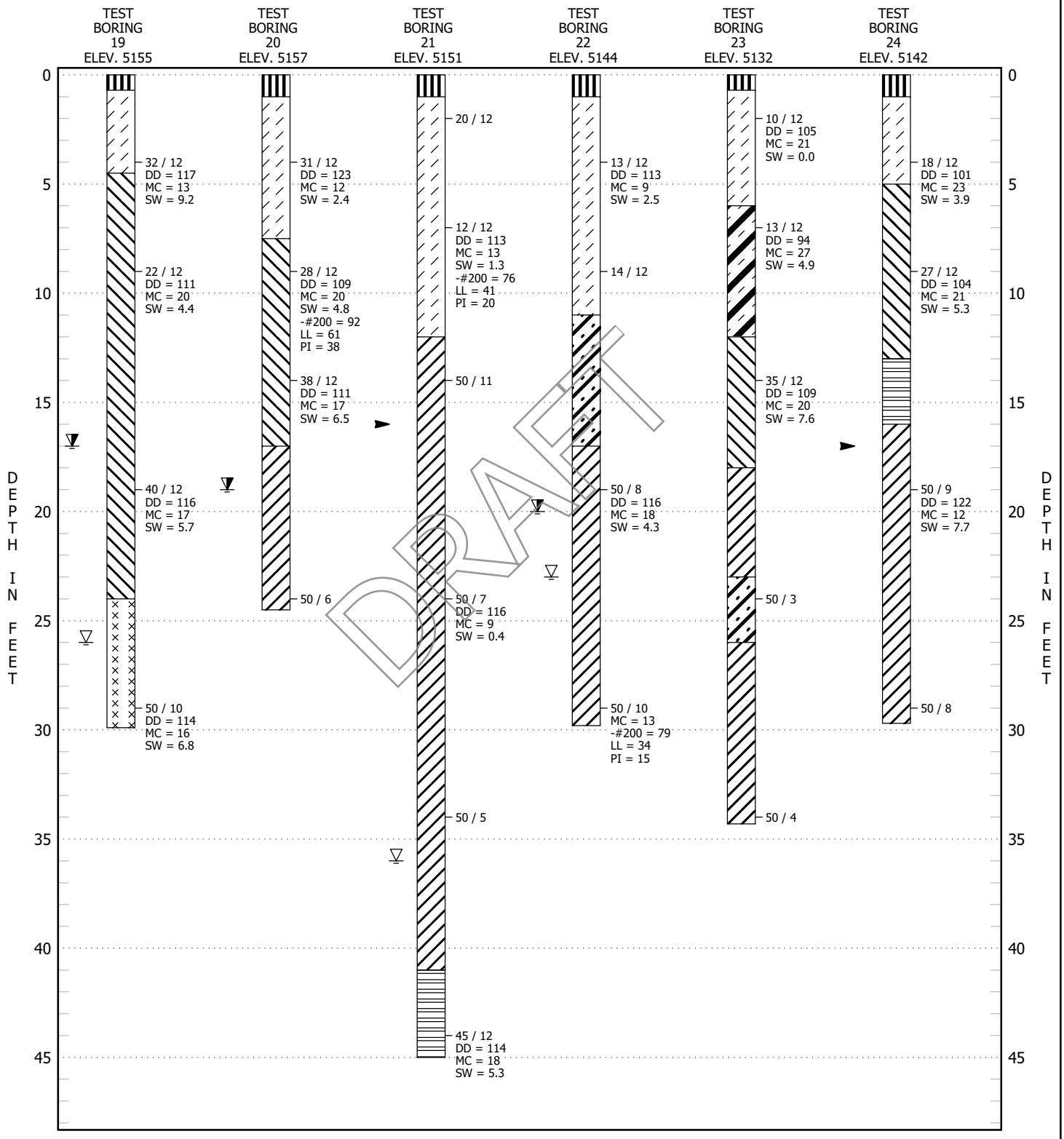
TEST BORING LOGS

FIGURE 4

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

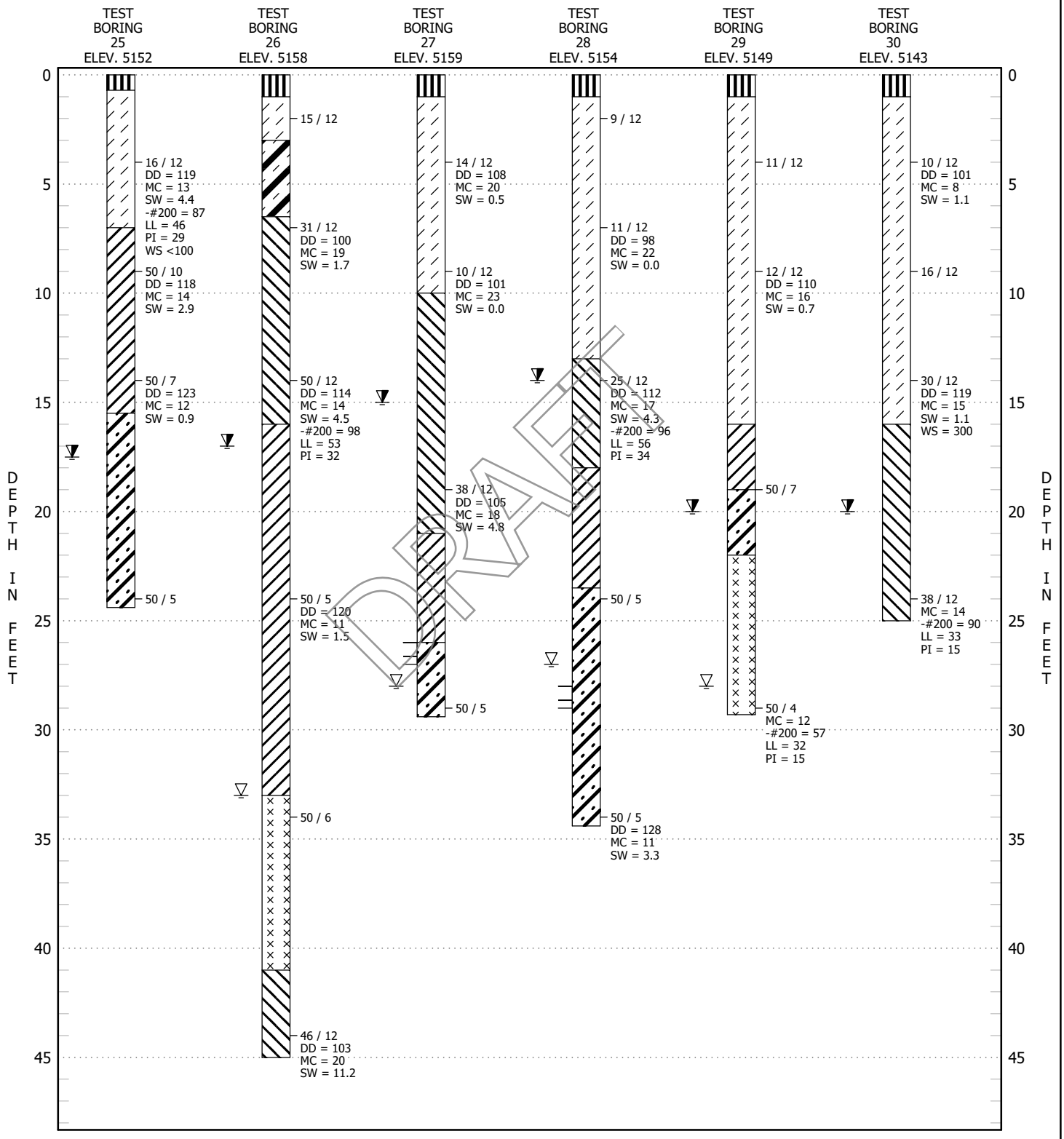
TEST BORING LOGS

FIGURE 5

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

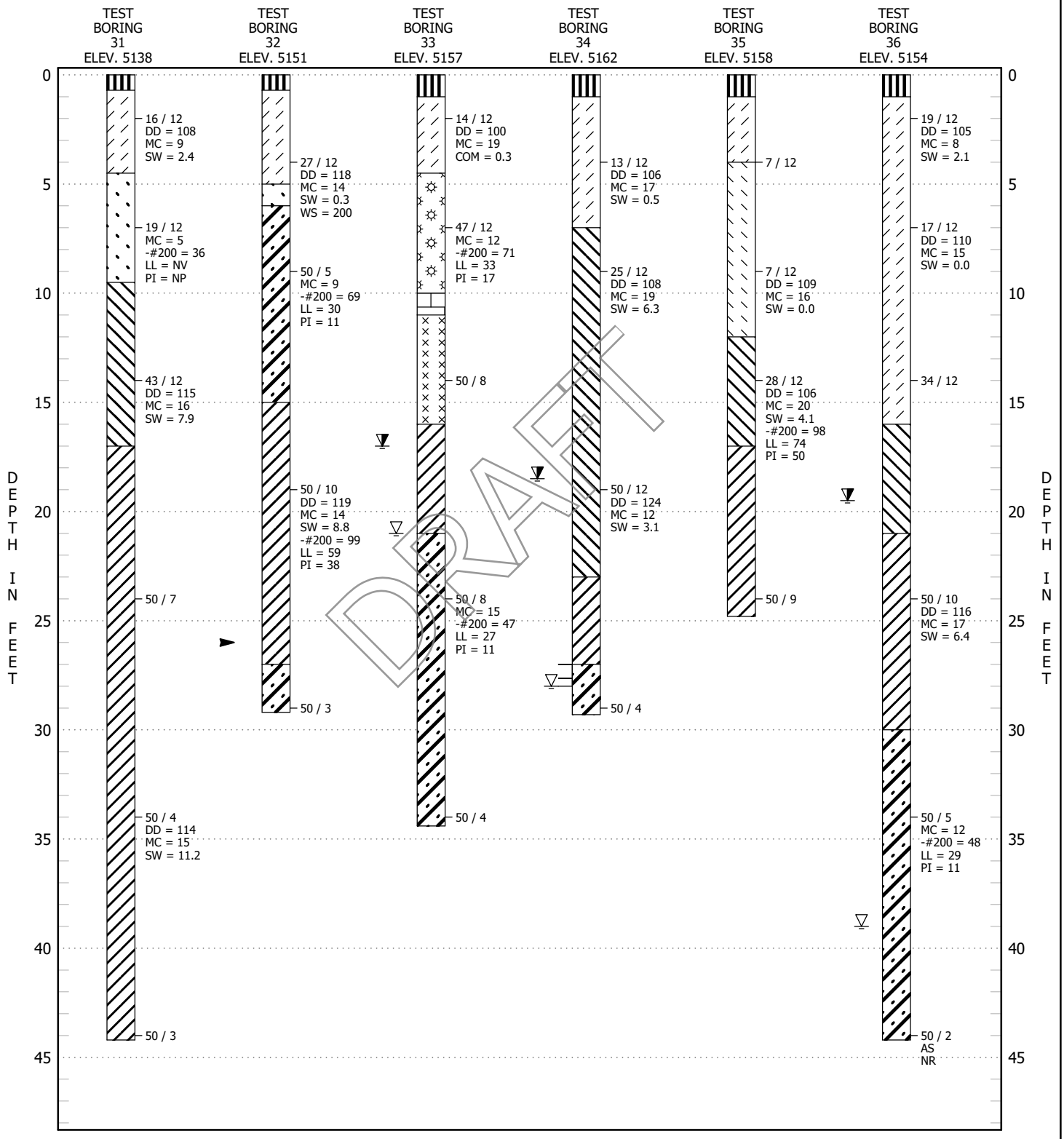
TEST BORING LOGS

FIGURE 6

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

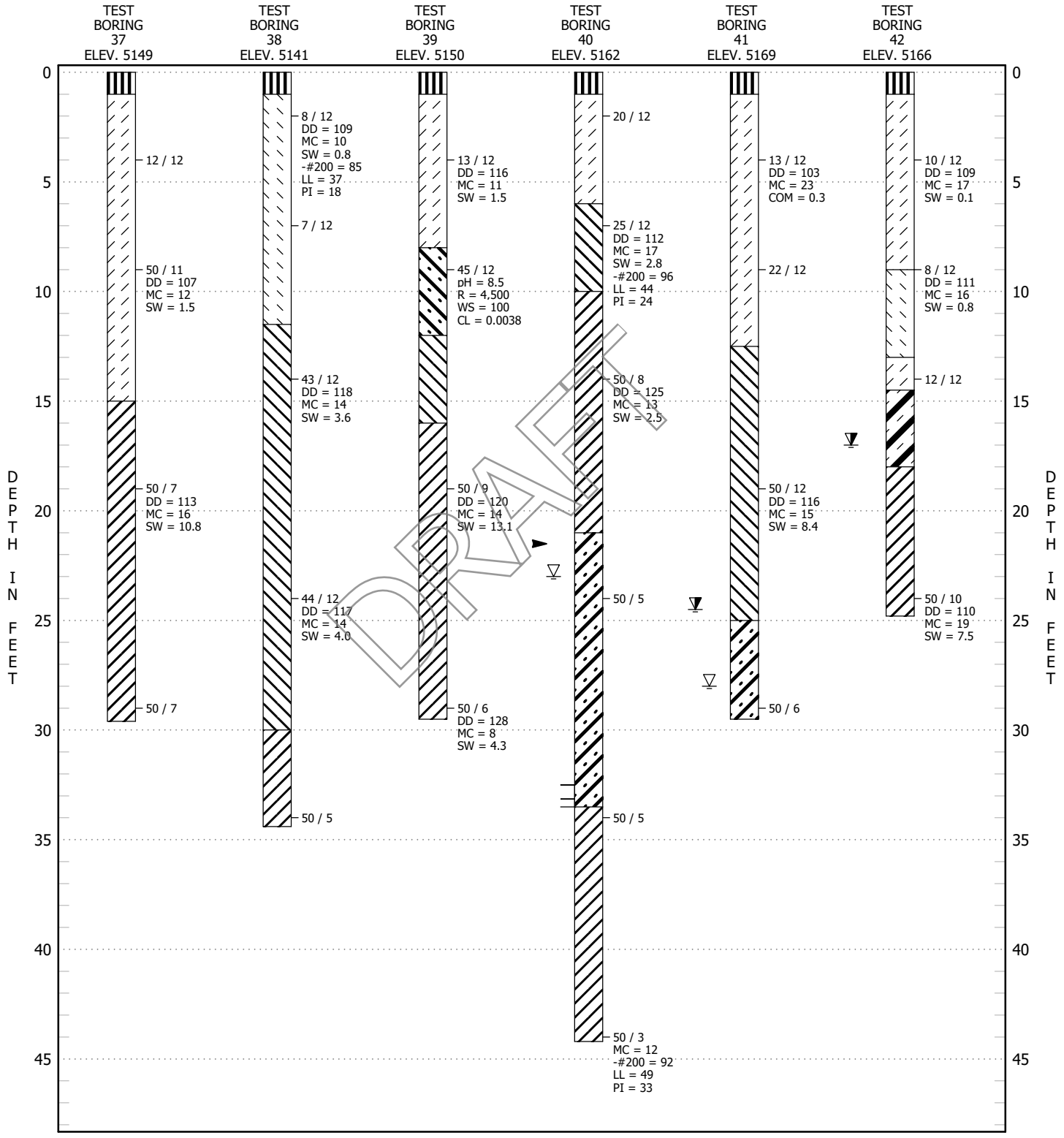
TEST BORING LOGS

FIGURE 7

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

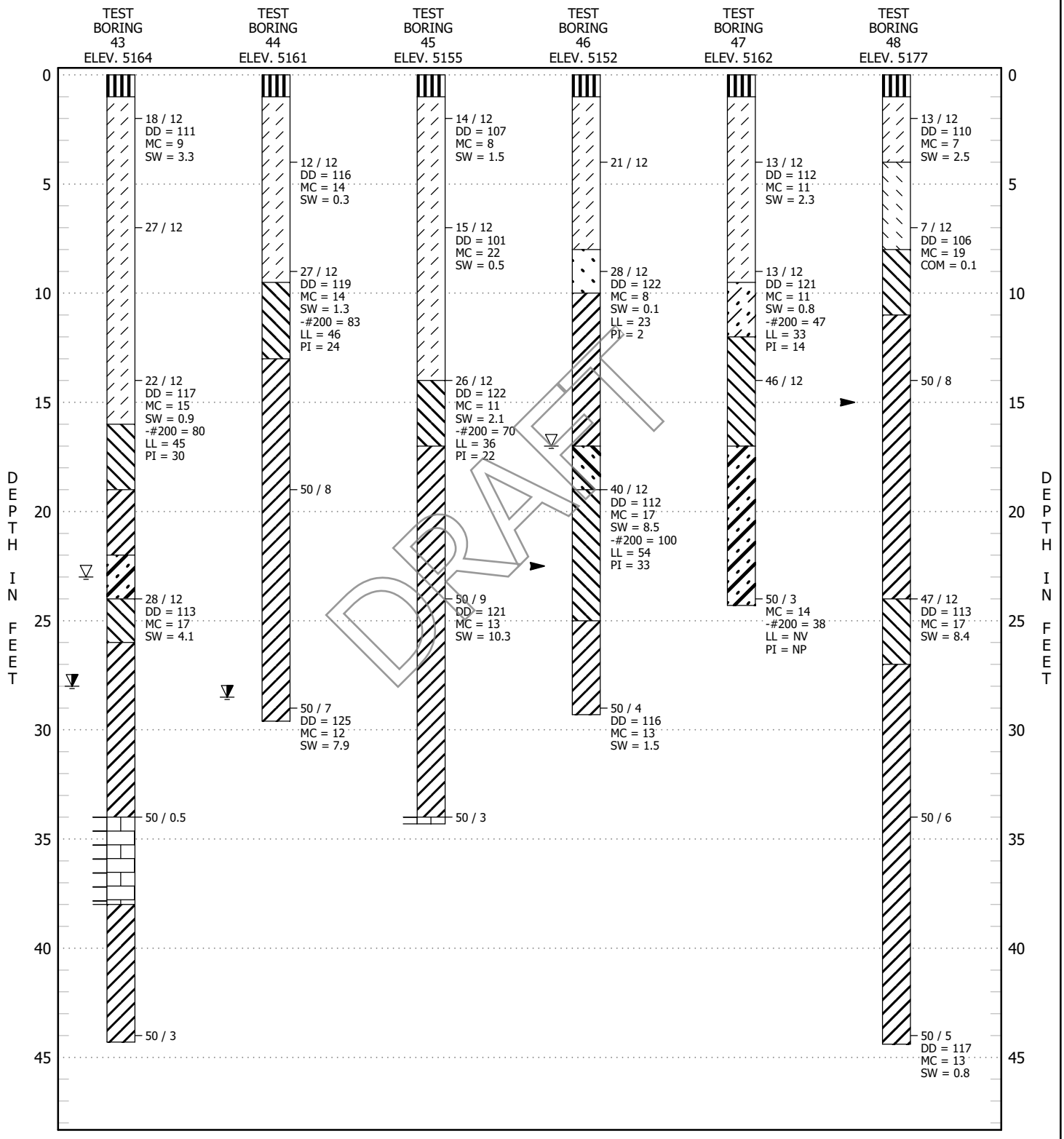
TEST BORING LOGS

FIGURE 8

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

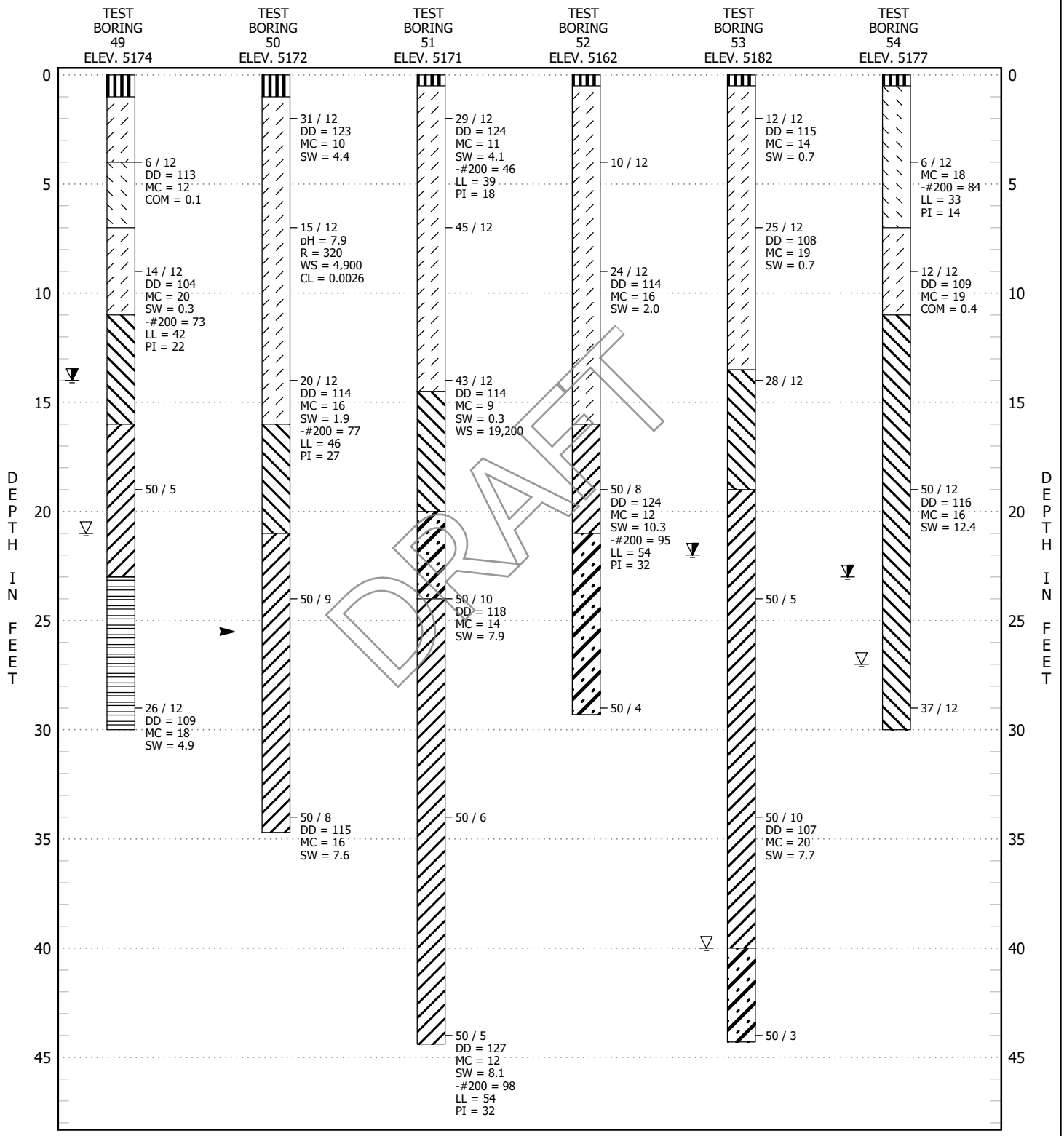
TEST BORING LOGS

FIGURE 9

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

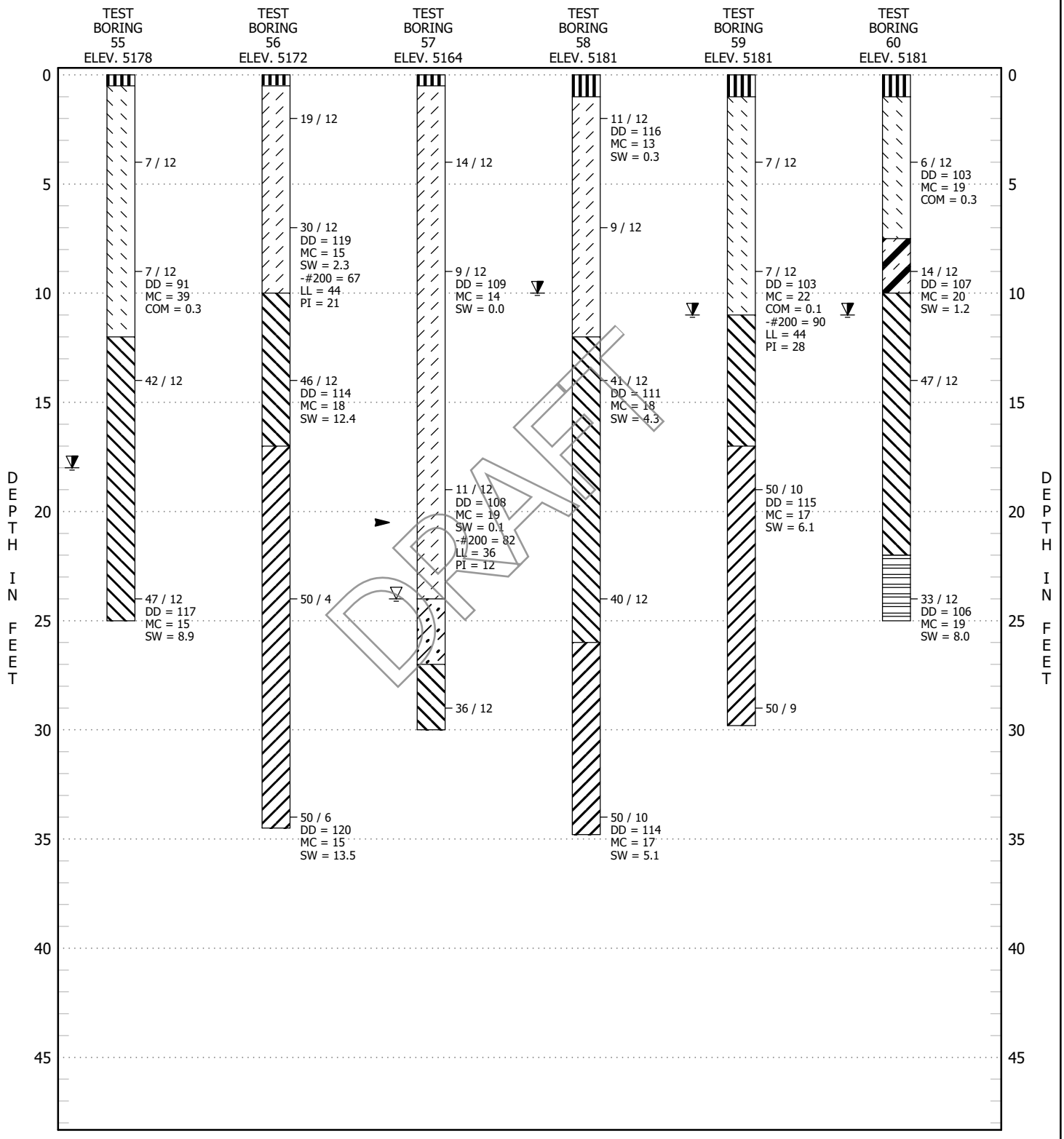
TEST BORING LOGS

FIGURE 10

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

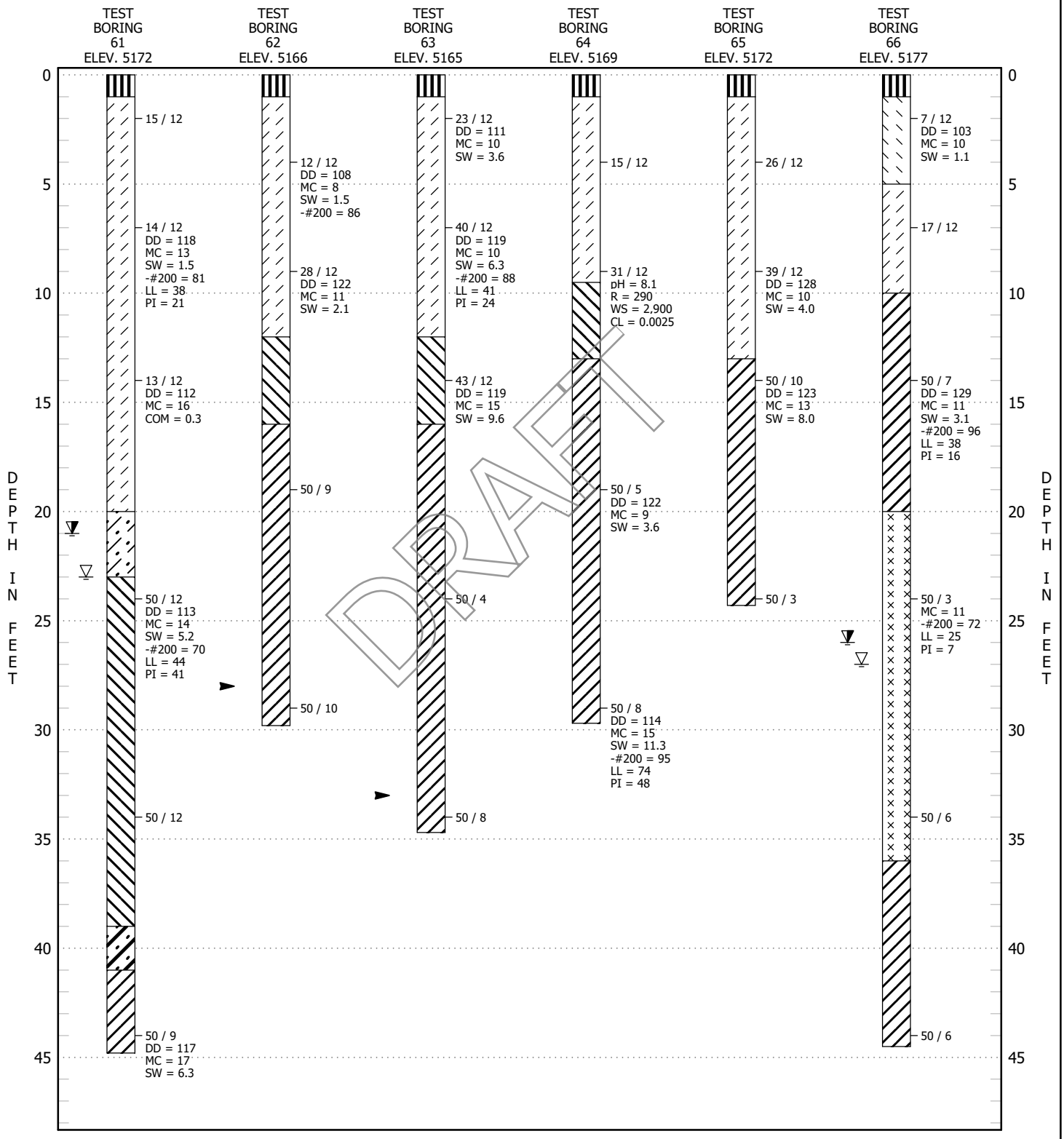
TEST BORING LOGS

FIGURE 11

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

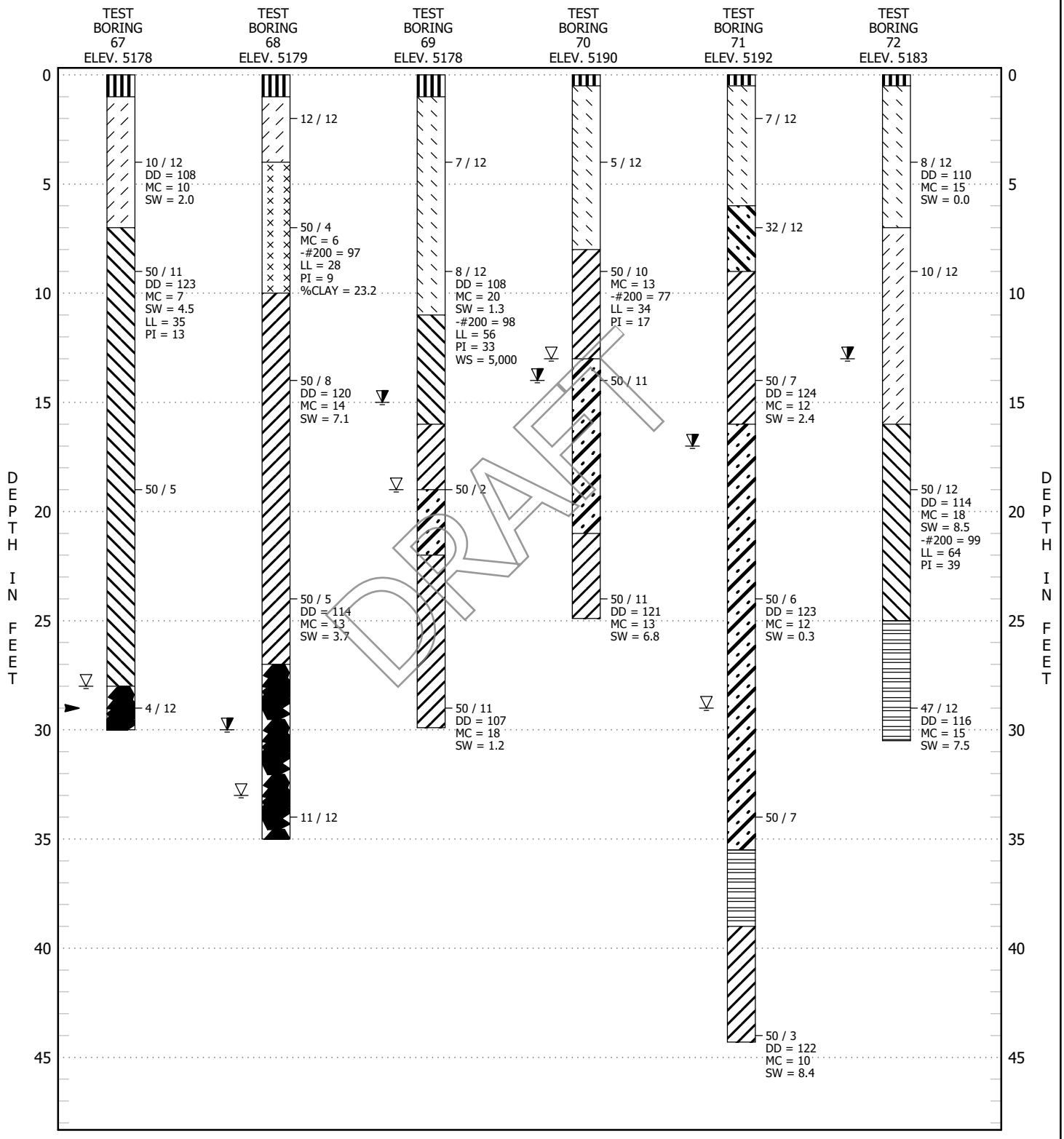
TEST BORING LOGS

FIGURE 12

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

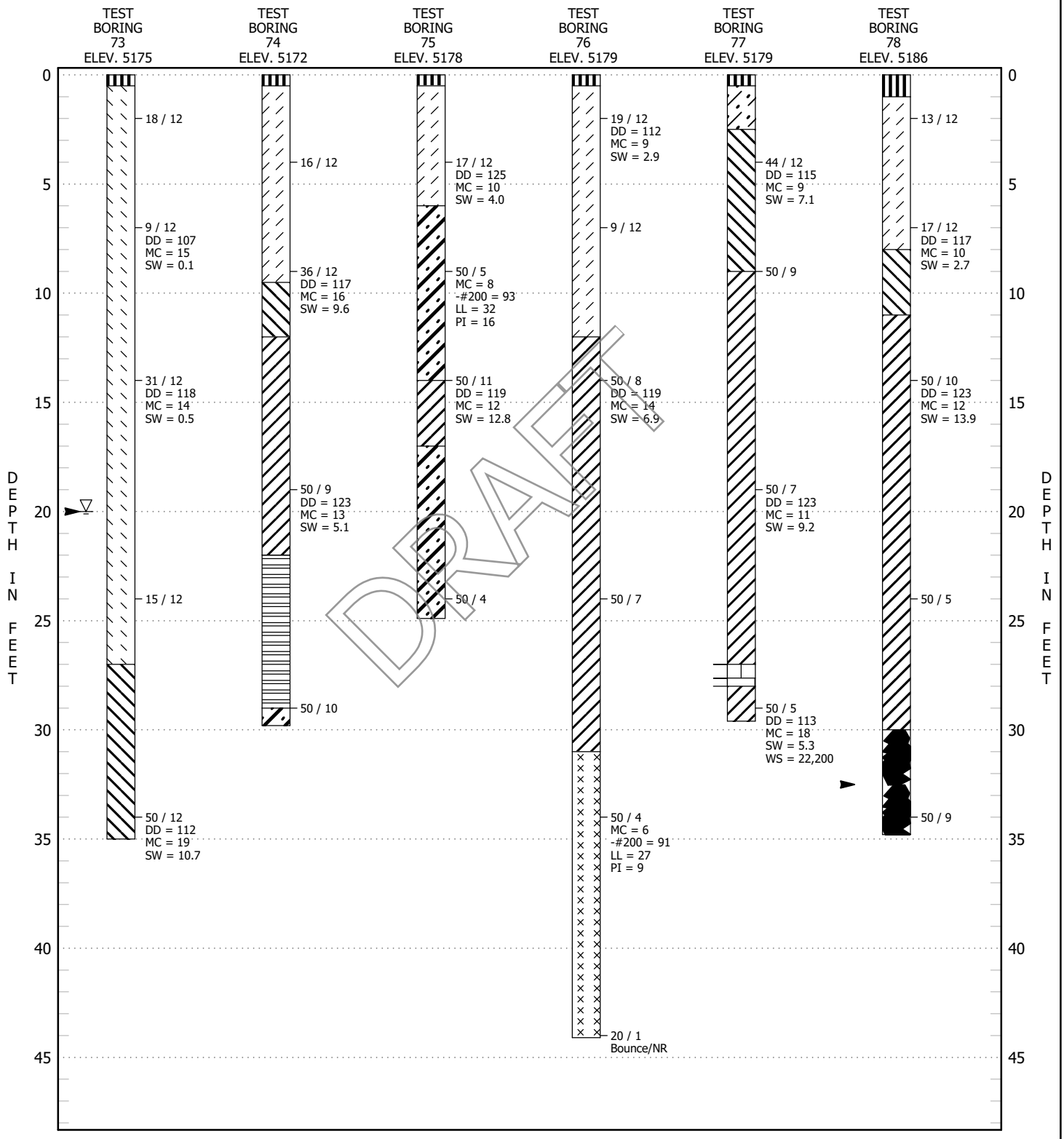
TEST BORING LOGS

FIGURE 13

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



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SEE FIGURE 25 FOR LEGEND AND NOTES

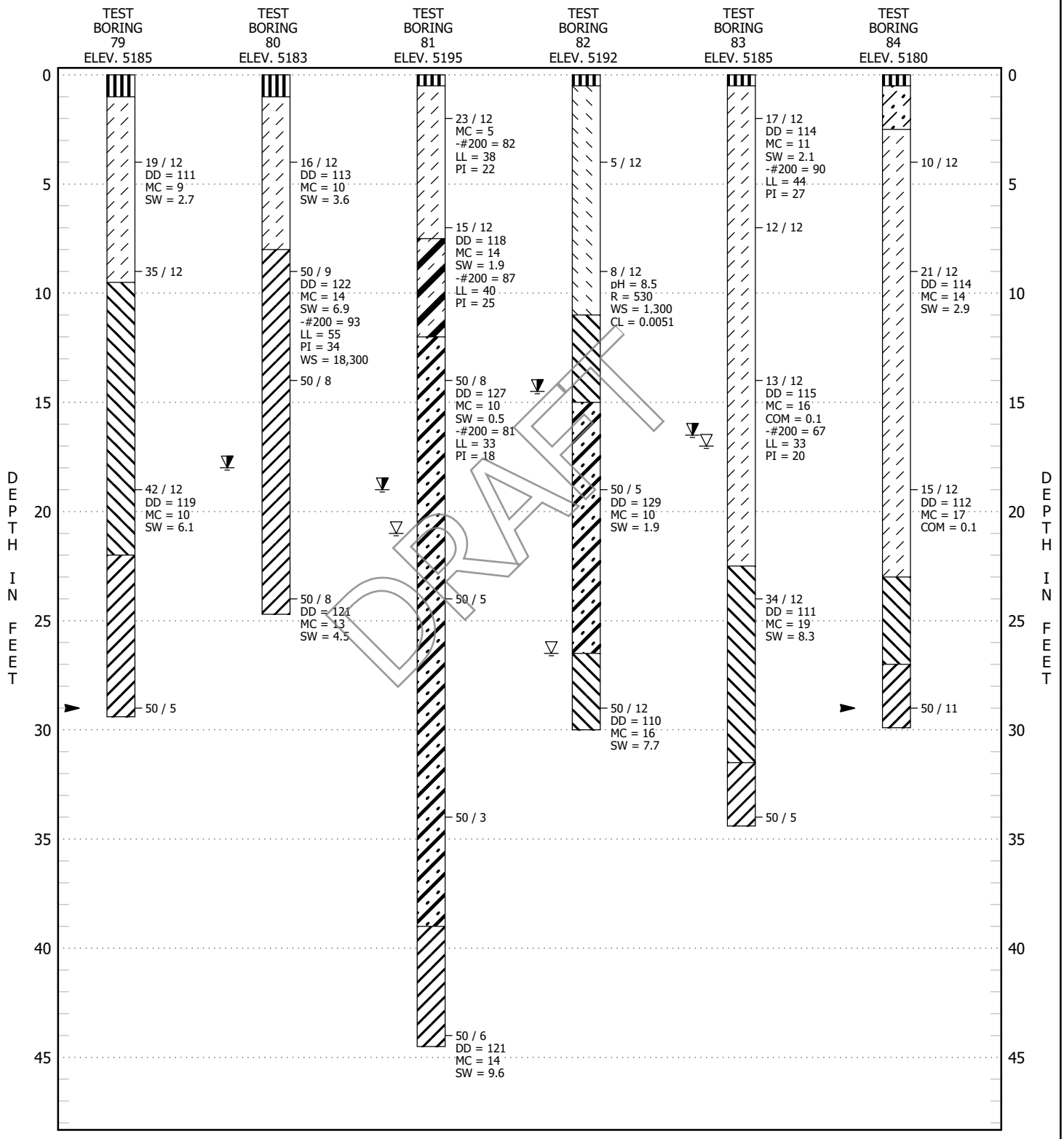
TEST BORING LOGS

FIGURE 14

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

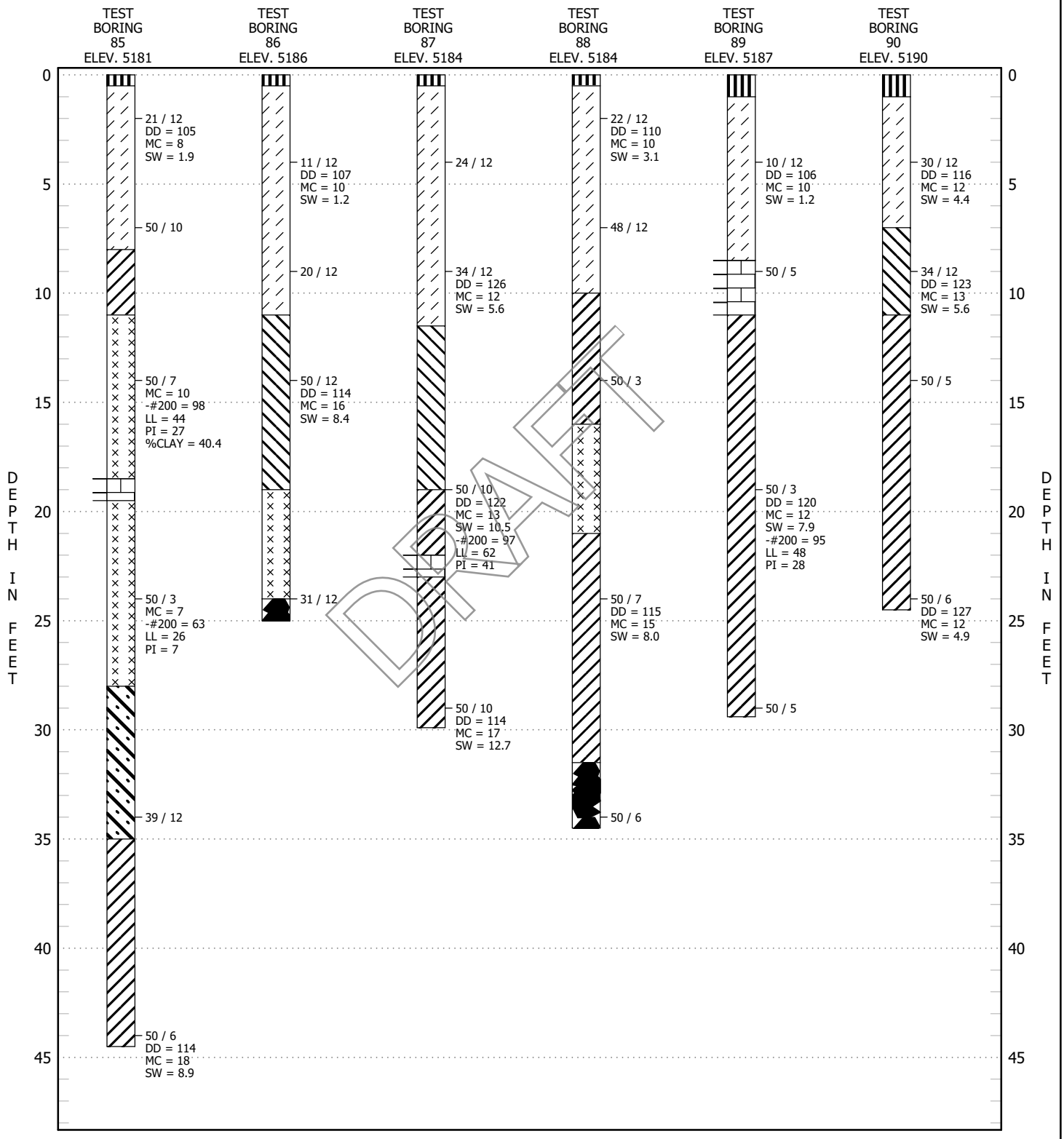
TEST BORING LOGS

FIGURE 15

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

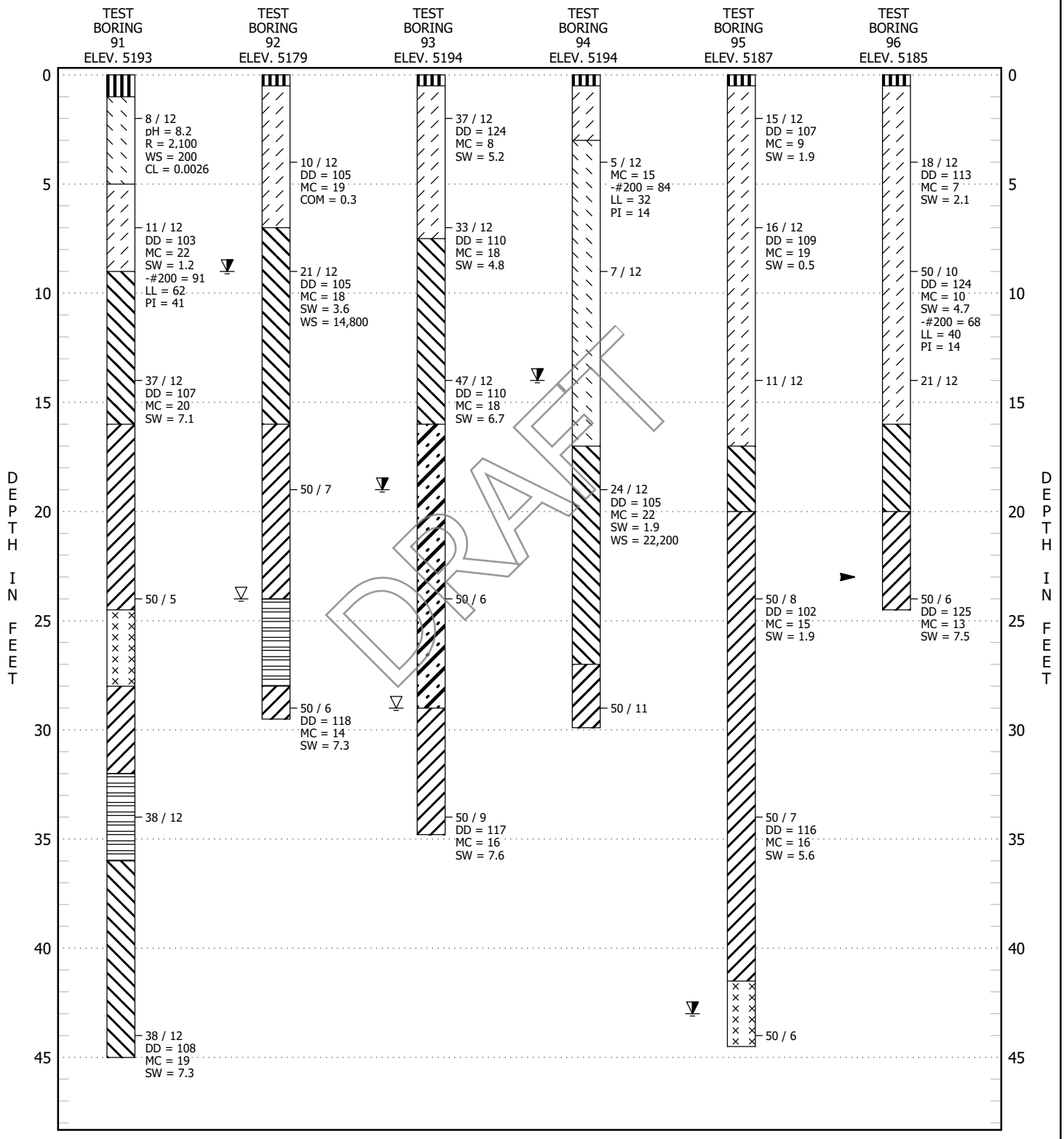
TEST BORING LOGS

FIGURE 16

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

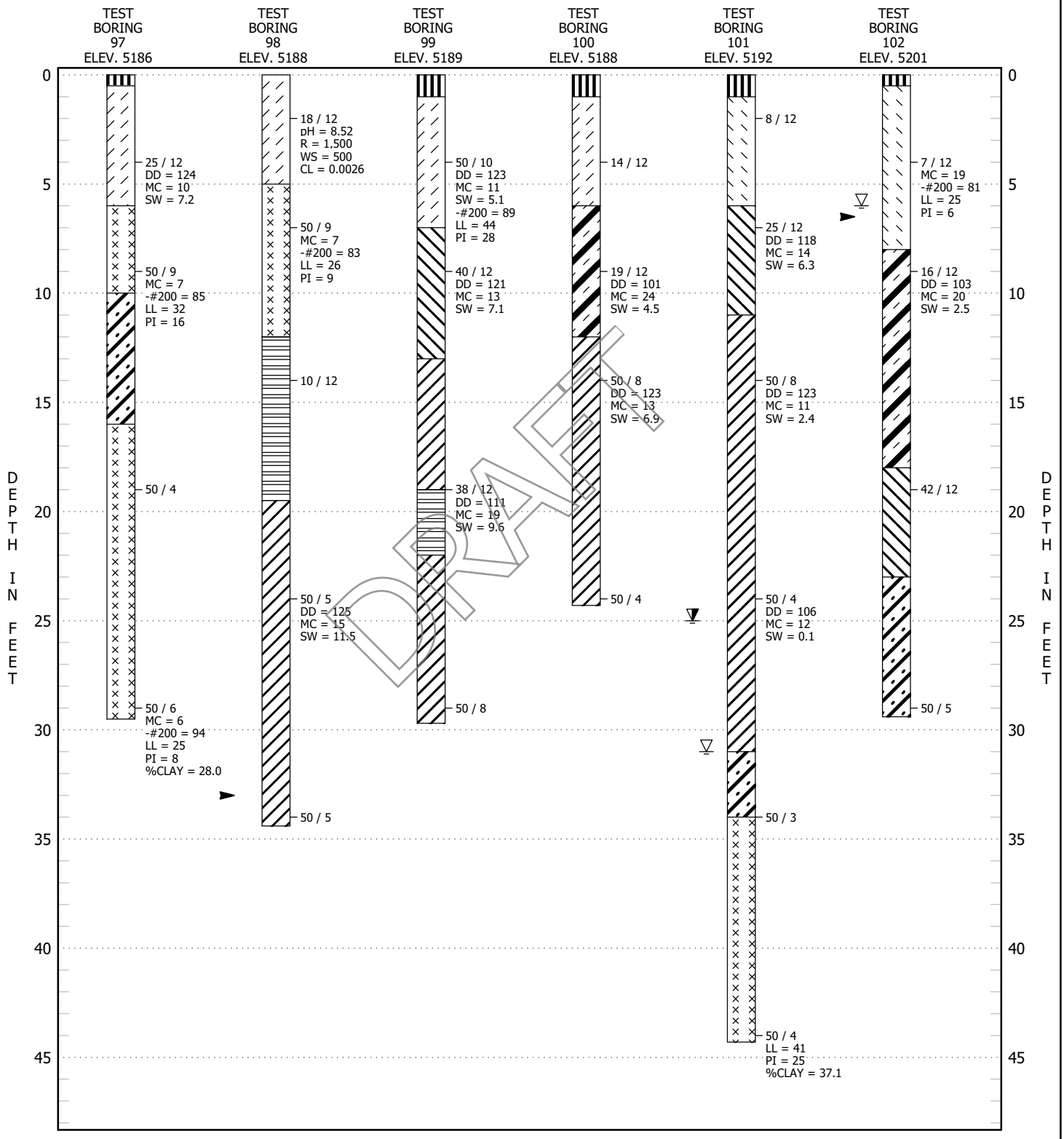
TEST BORING LOGS

FIGURE 17

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

TEST BORING LOGS

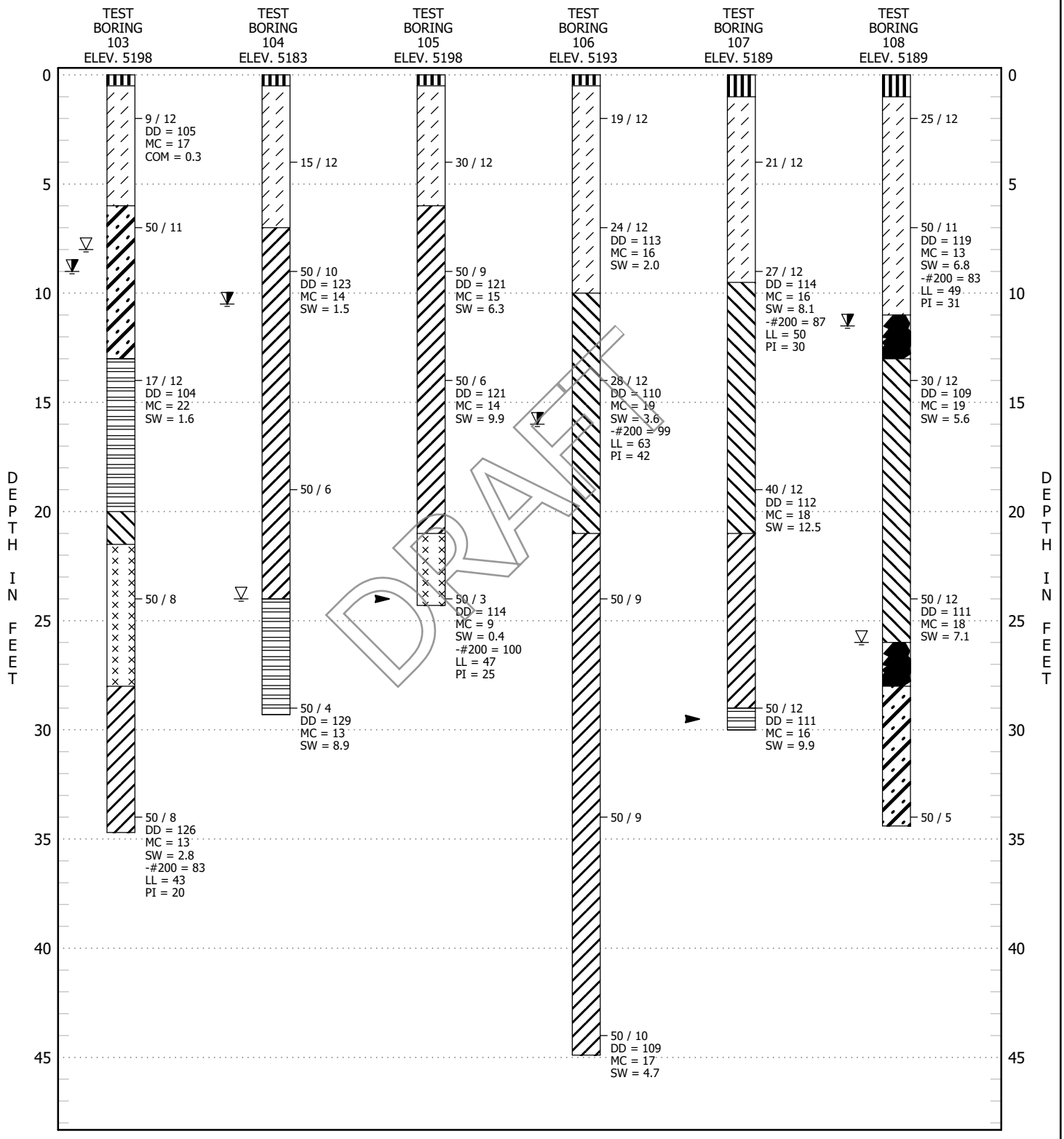
FIGURE 18

AGW

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

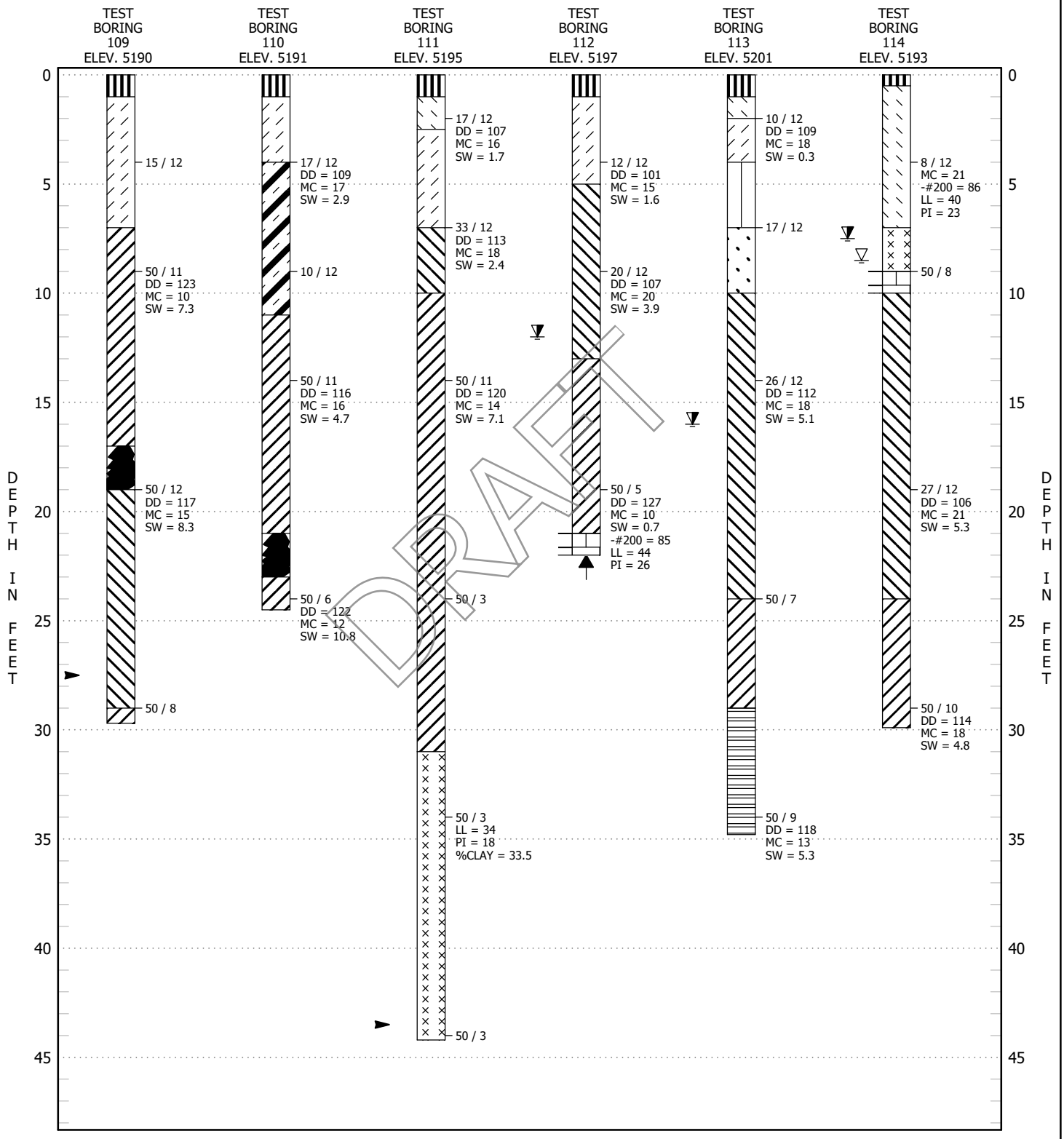
TEST BORING LOGS

FIGURE 19

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

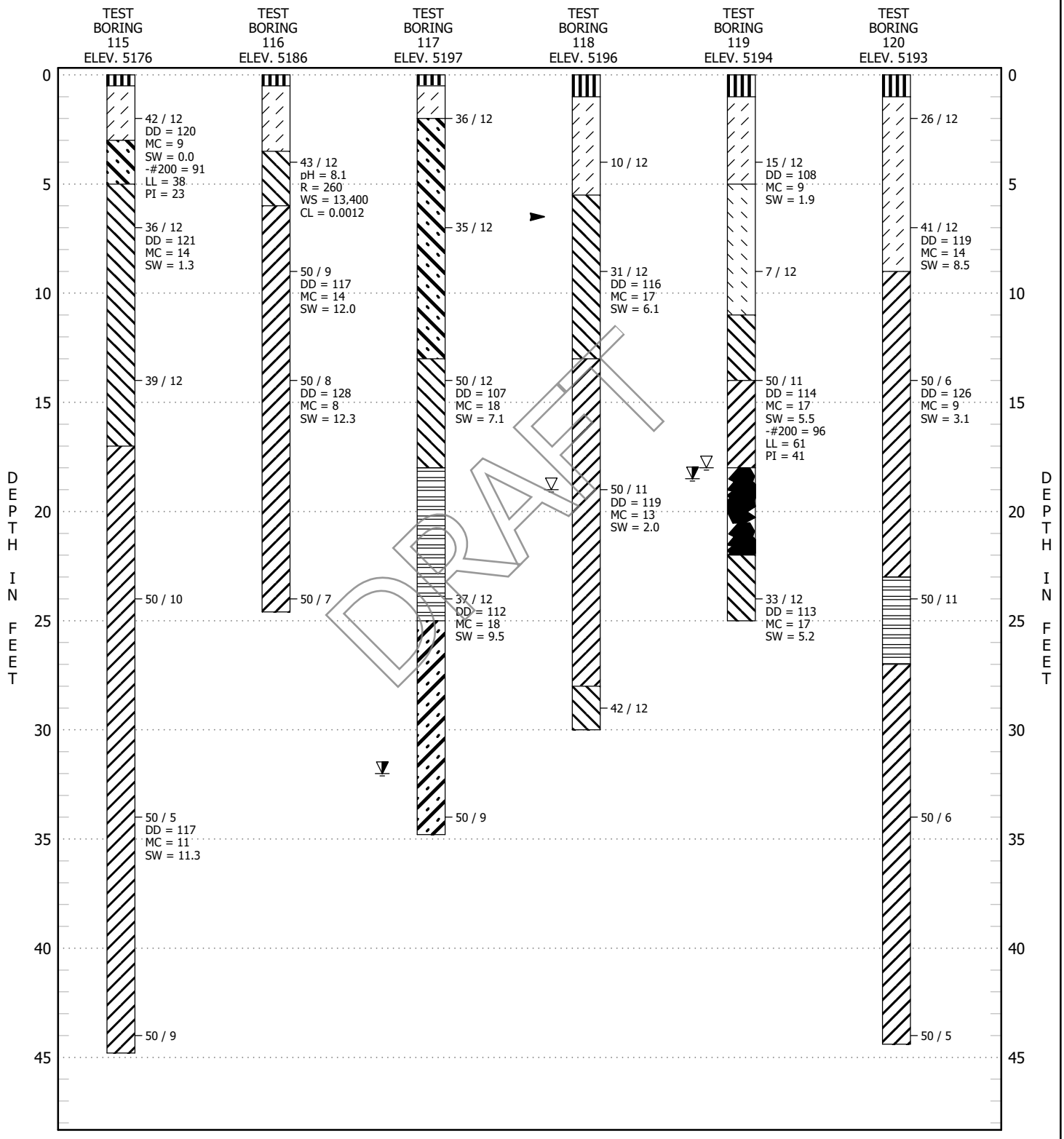
TEST BORING LOGS

FIGURE 20

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



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SEE FIGURE 25 FOR LEGEND AND NOTES

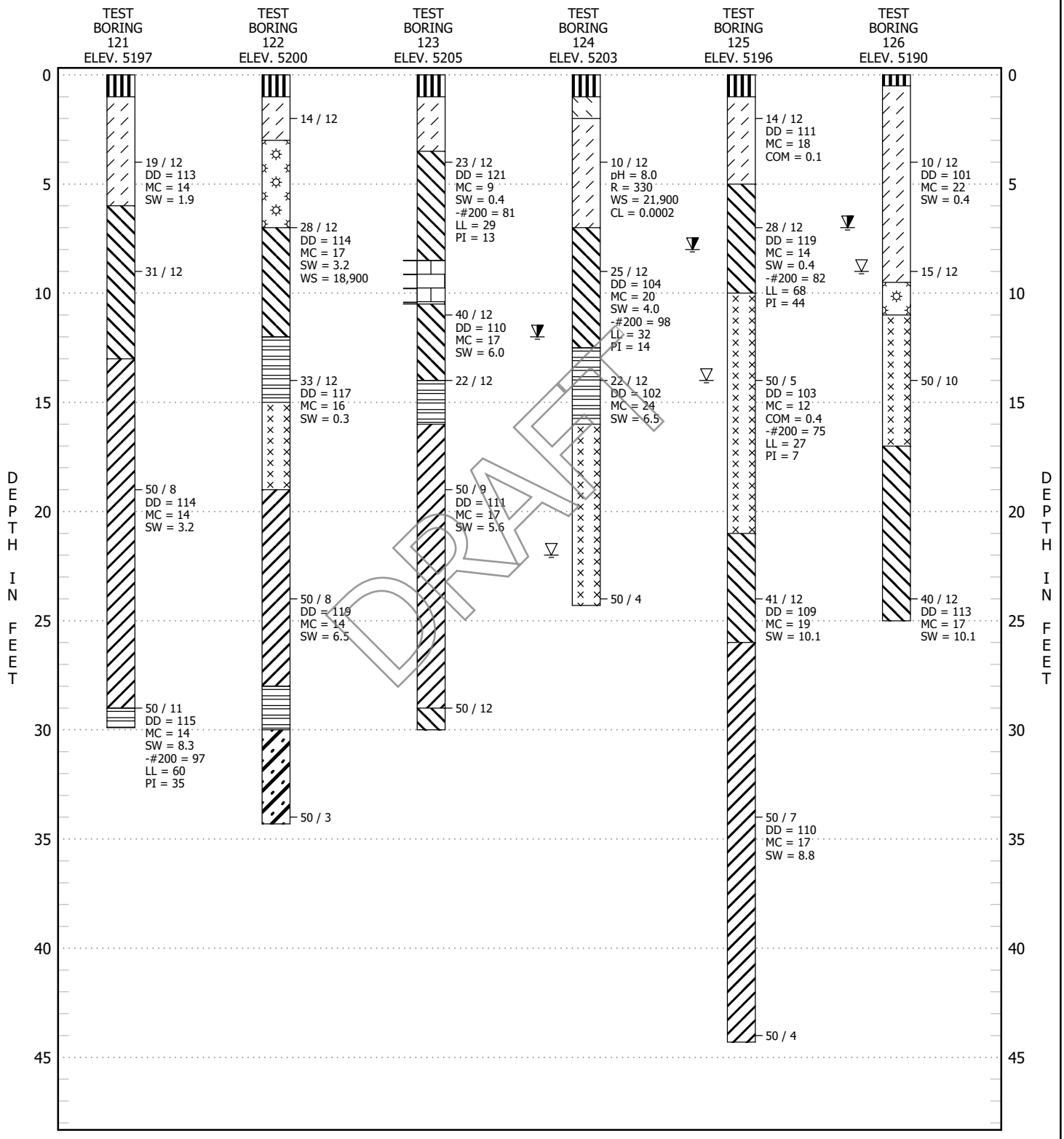
TEST BORING LOGS

FIGURE 21

AGW
A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

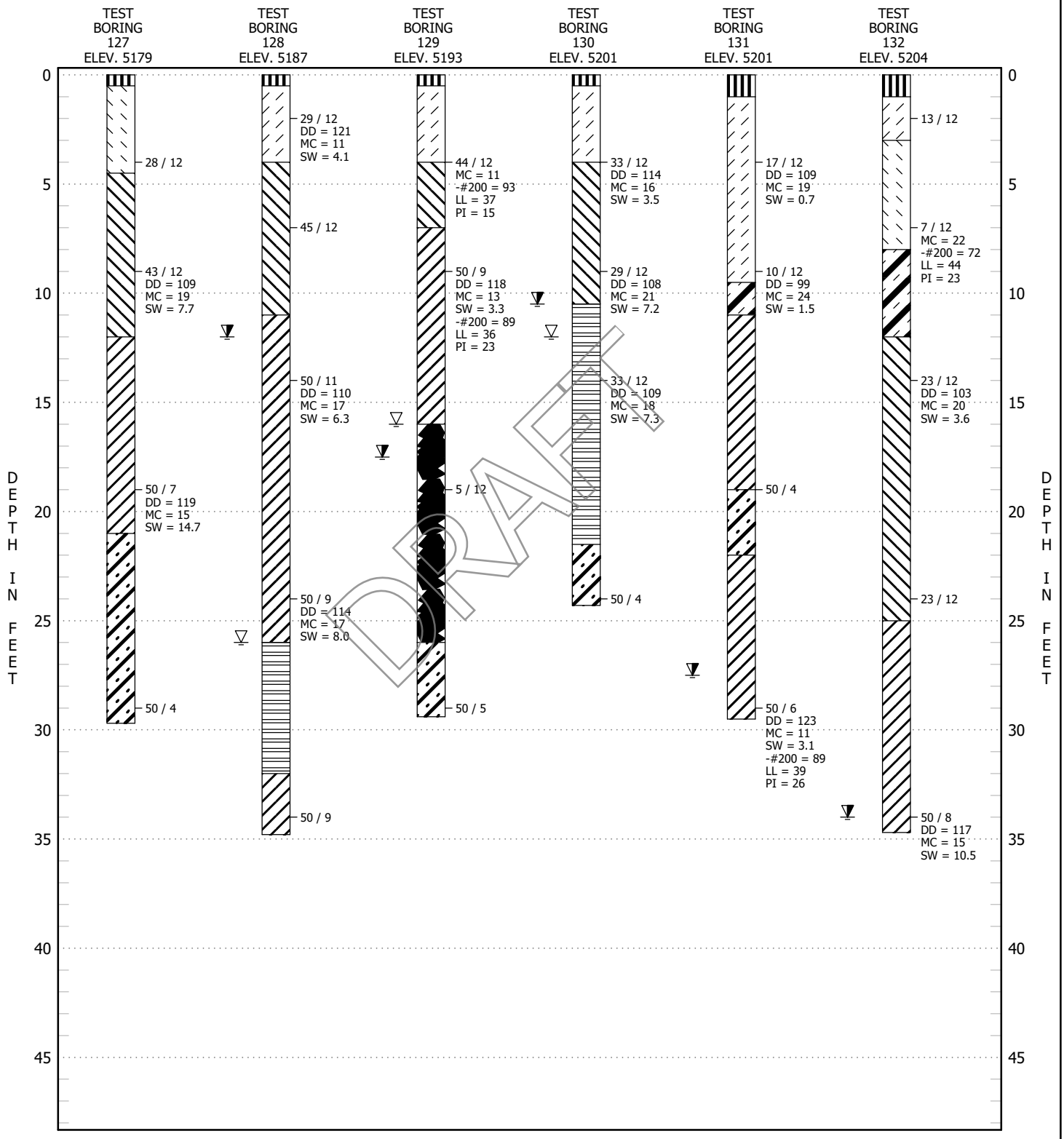
TEST BORING LOGS

FIGURE 22

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



SEE FIGURE 25 FOR LEGEND AND NOTES

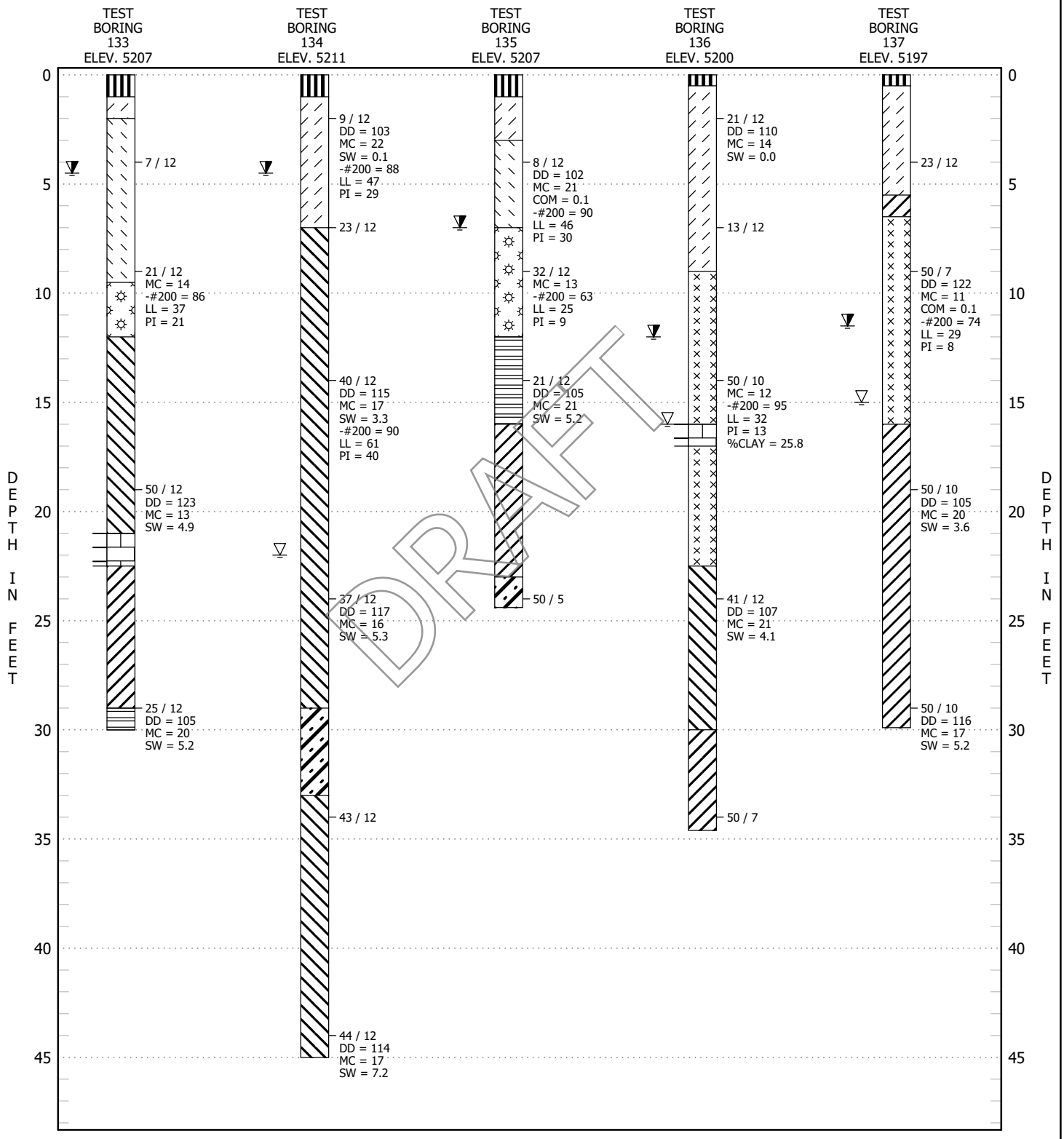
TEST BORING LOGS

FIGURE 23

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



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SEE FIGURE 25 FOR LEGEND AND NOTES

TEST BORING LOGS

FIGURE 24

AGW

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado

SOIL DESCRIPTIONS


Fill, sand, medium dense, silty, clayey


Topsoil, clay, sandy, organic


Clay, soft


Clay, medium stiff


Clay, stiff to very stiff


Sand, loose


Sand, medium dense, silty


Sand, medium dense, silty, clayey


Sand, dense to very dense, silty


Clay (Weathered Claystone), medium stiff to stiff


Claystone (Bedrock), firm to medium hard


Claystone (Bedrock), hard to very hard


Claystone (Bedrock), with lignite


Ironstone (Bedrock), very hard


Lignite, black


Siltstone (Bedrock), weathered to medium hard


Siltstone (Bedrock), hard to very hard


Sandstone (Bedrock), firm to medium hard


Sandstone (Bedrock), hard to very hard

ABBREVIATIONS

DD	Dry density of sample, pounds per cubic foot (pcf)
MC	Moisture content, percentage of dry weight of soil (%)
SW	Swell under a surcharge of 1000 pounds per square foot (psf) upon wetting (%)
COM	Compression under a surcharge of 1000 psf upon wetting (%)
UC	Unconfined compressive strength (psf)
-#200	Percent passing the No. 200 sieve (%)
LL	Liquid Limit
PI	Plasticity Index
NP	Nonplastic
NV	No Value
pH	Acidity or alkalinity of sample
R	Resistivity (ohms-cm)
WS	Water soluble sulfates, parts per million (ppm)
CL	Chlorides (%)
x/y	x blows of a 140-pound hammer falling 30 inches were required to drive a 2.5-inch outside diameter sampler y inches
x/y SS	x blows of a 140-pound hammer falling 30 inches were required to drive a 2.0-inch outside diameter sampler y inches
C-x	Depth of cut to grade of x feet
F-x	Depth of fill to grade of x feet
FG	Finished grade
NR	No sample recovered
ND	No drive taken
Bounce	Sampler bounced during driving
B	Bulk sample
AS	Auger sample
	Well to very well cemented layer
	Practical drilling refusal
	Water level at time of drilling
	Water level 1 to 9 day(s) after drilling
	Caved depth 1 to 9 day(s) after drilling

Notes:

1. Test borings were drilled October 7, 2022 to November 1, 2022.
2. Locations of the test borings were staked by others at locations chosen by this firm.
3. The horizontal lines shown on the logs differentiate materials and represent the approximate boundaries between materials. The transitions between materials may be gradual.
4. Elevations were obtained from staking provided by others and have been rounded to the nearest foot.
5. Test boring logs shown are subject to the limitations, explanations, and conclusions of this report.

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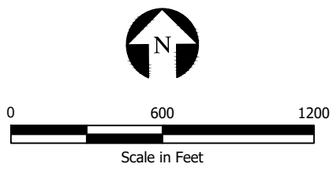
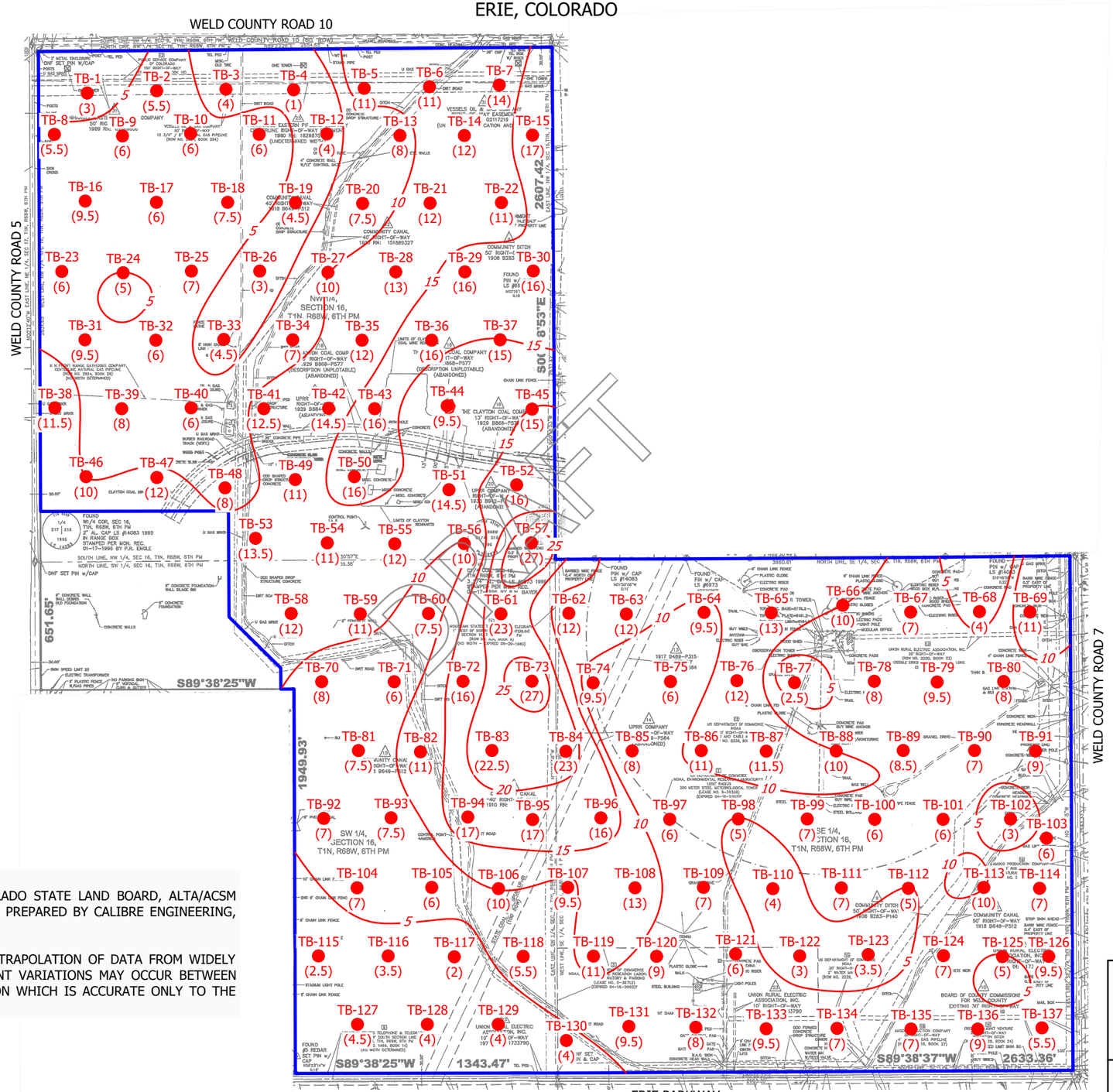
LEGEND AND NOTES

FIGURE 25

COLORADO STATE LAND BOARD PARCEL
ERIE, COLORADO





NOTES:

1. TEST BORINGS ARE OVERLAID ON THE "COLORADO STATE LAND BOARD, ALTA/ACSM LAND TITLE SURVEY" PLAN, SHEETS A2 AND A3, PREPARED BY CALIBRE ENGINEERING, INC., JOB NO. LA ERIE, DATED JULY 8, 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. BEDROCK CONTOURS ARE BASED UPON THE EXTRAPOLATION OF DATA FROM WIDELY SPACED TEST BORINGS. LOCAL AND SIGNIFICANT VARIATIONS MAY OCCUR BETWEEN BORINGS. THIS FIGURE REPRESENTS AN OPINION WHICH IS ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

(XX) BEDROCK ENCOUNTERED AT A DEPTH OF XX FEET

STUDY AREA

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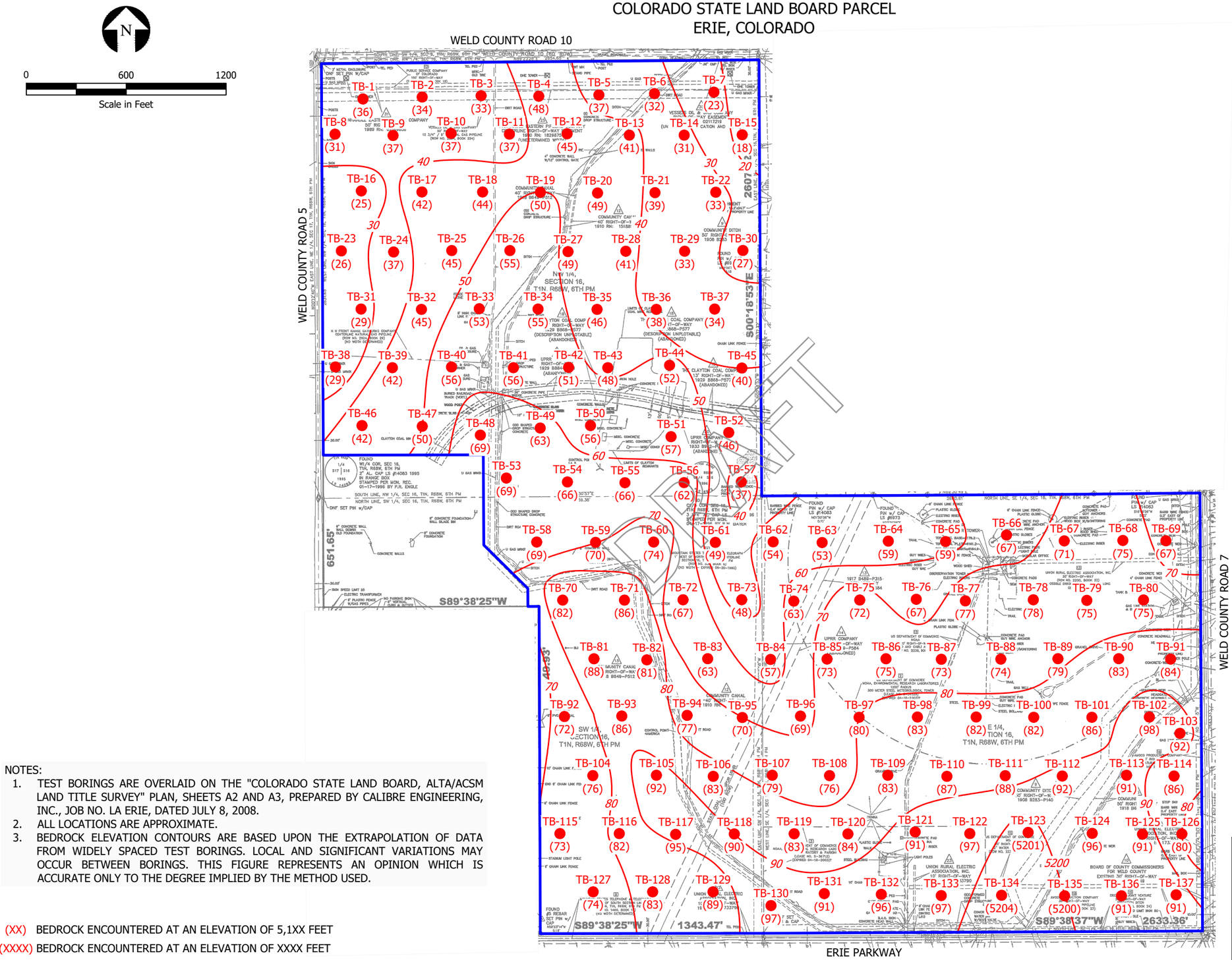
ESTIMATED DEPTH TO BEDROCK

PROJECT NO. 223122
FIGURE 26

COLORADO STATE LAND BOARD PARCEL
ERIE, COLORADO



NOTES:

1. TEST BORINGS ARE OVERLAID ON THE "COLORADO STATE LAND BOARD, ALTA/ACSM LAND TITLE SURVEY" PLAN, SHEETS A2 AND A3, PREPARED BY CALIBRE ENGINEERING, INC., JOB NO. LA ERIE, DATED JULY 8, 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. BEDROCK ELEVATION CONTOURS ARE BASED UPON THE EXTRAPOLATION OF DATA FROM WIDELY SPACED TEST BORINGS. LOCAL AND SIGNIFICANT VARIATIONS MAY OCCUR BETWEEN BORINGS. THIS FIGURE REPRESENTS AN OPINION WHICH IS ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

(XX) BEDROCK ENCOUNTERED AT AN ELEVATION OF 5,1XX FEET

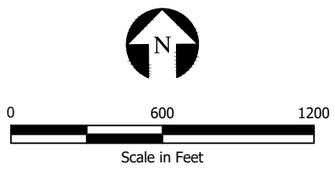
(XXXX) BEDROCK ENCOUNTERED AT AN ELEVATION OF XXXX FEET

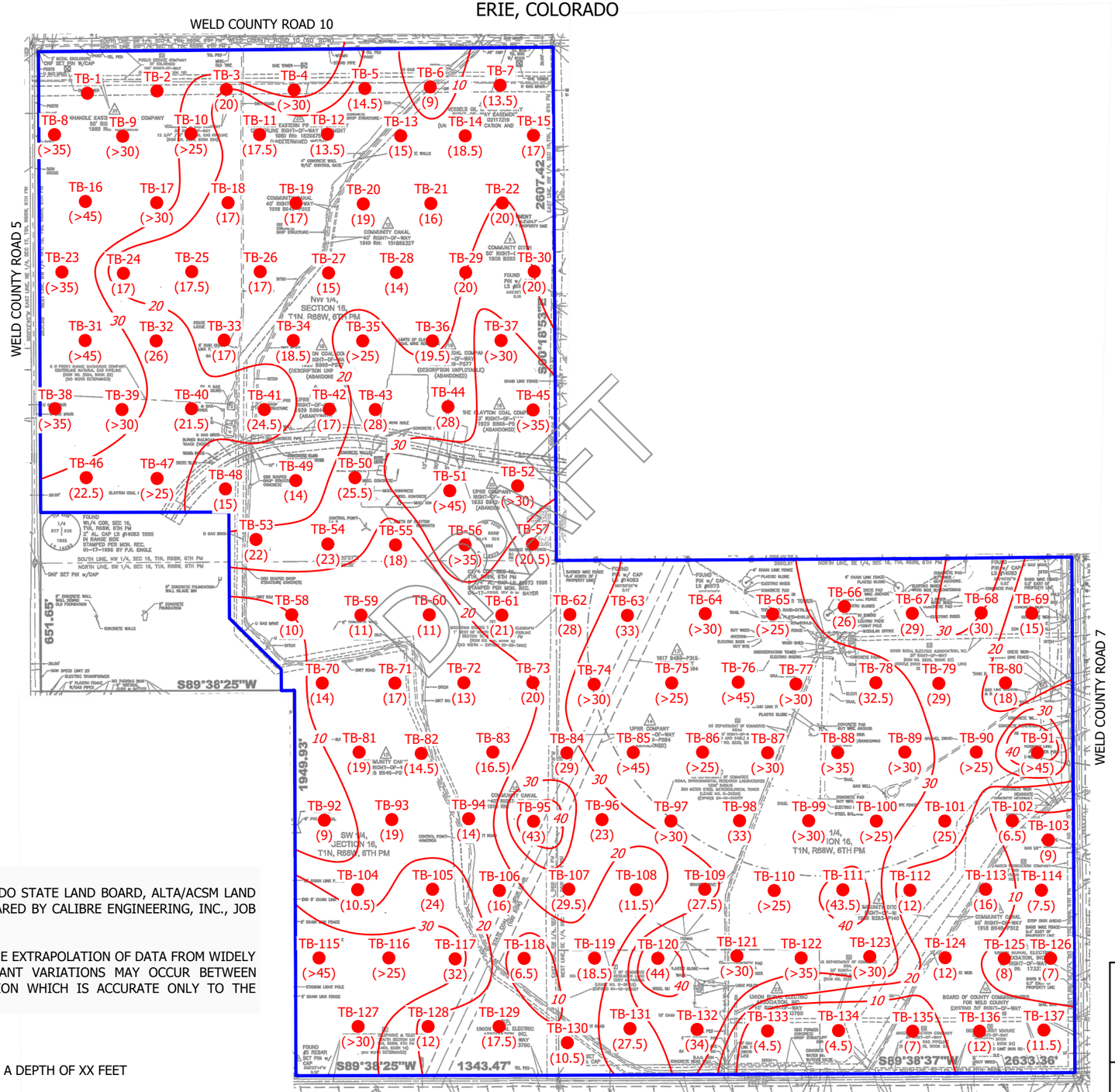
STUDY AREA

AGW
A.G. WASSENAAR, INC.

ESTIMATED ELEVATION OF BEDROCK	PROJECT NO. 223122 FIGURE 27

COLORADO STATE LAND BOARD PARCEL
ERIE, COLORADO





NOTES:

1. TEST BORINGS ARE OVERLAID ON THE "COLORADO STATE LAND BOARD, ALTA/ACSM LAND TITLE SURVEY" PLAN, SHEETS A2 AND A3, PREPARED BY CALIBRE ENGINEERING, INC., JOB NO. LA ERIE, DATED JULY 8, 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. GROUND WATER CONTOURS ARE BASED UPON THE EXTRAPOLATION OF DATA FROM WIDELY SPACED TEST BORINGS. LOCAL AND SIGNIFICANT VARIATIONS MAY OCCUR BETWEEN BORINGS. THIS FIGURE REPRESENTS AN OPINION WHICH IS ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

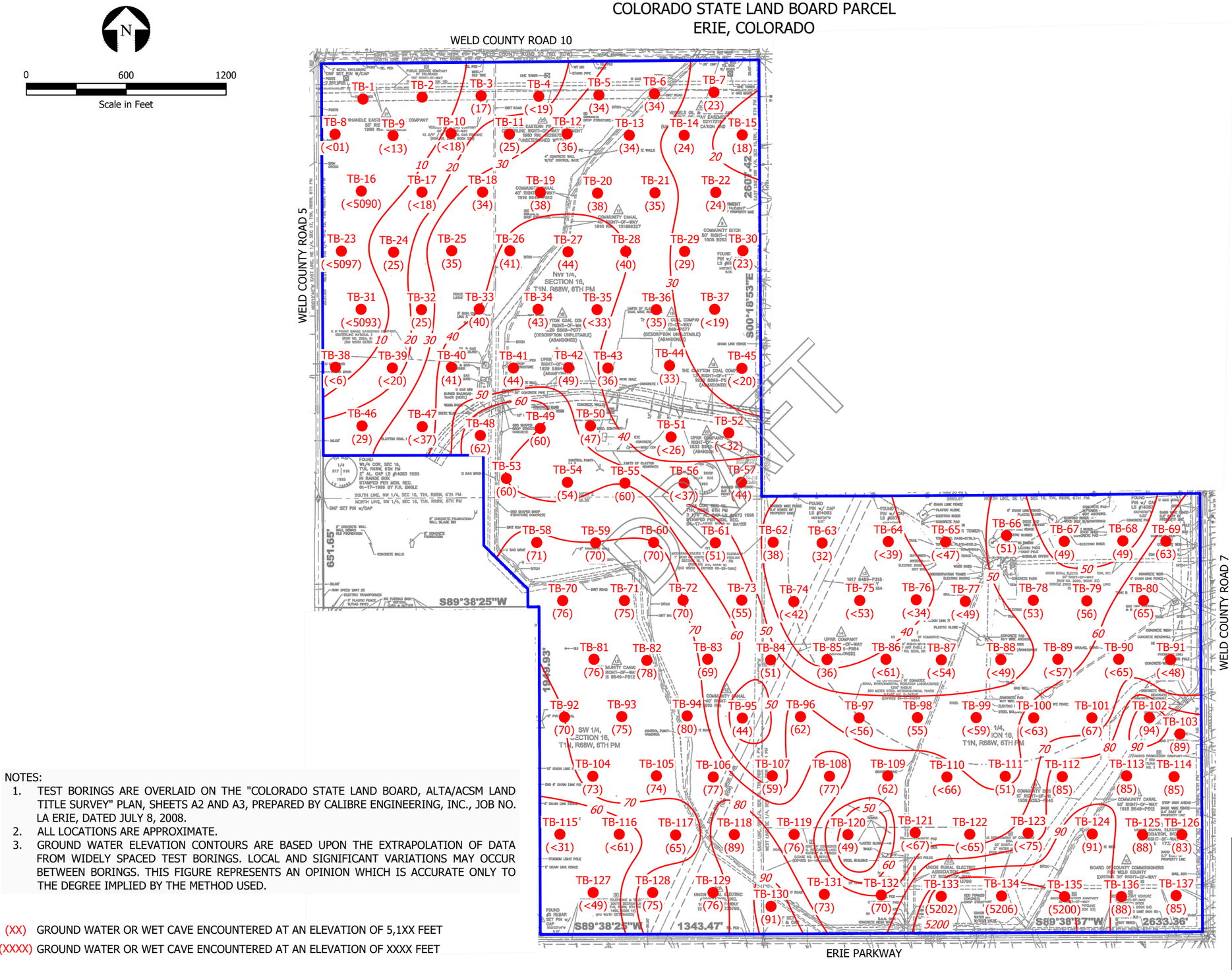
(XX) GROUND WATER OR WET CAVE ENCOUNTERED AT A DEPTH OF XX FEET

STUDY AREA

AGW
A.G. WASSENAAR, INC.

ESTIMATED DEPTH TO GROUND WATER	PROJECT NO. 223122 FIGURE 28

COLORADO STATE LAND BOARD PARCEL
ERIE, COLORADO



NOTES:

1. TEST BORINGS ARE OVERLAID ON THE "COLORADO STATE LAND BOARD, ALTA/ACSM LAND TITLE SURVEY" PLAN, SHEETS A2 AND A3, PREPARED BY CALIBRE ENGINEERING, INC., JOB NO. LA ERIE, DATED JULY 8, 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. GROUND WATER ELEVATION CONTOURS ARE BASED UPON THE EXTRAPOLATION OF DATA FROM WIDELY SPACED TEST BORINGS. LOCAL AND SIGNIFICANT VARIATIONS MAY OCCUR BETWEEN BORINGS. THIS FIGURE REPRESENTS AN OPINION WHICH IS ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

(XX) GROUND WATER OR WET CAVE ENCOUNTERED AT AN ELEVATION OF 5,1XX FEET

(XXXX) GROUND WATER OR WET CAVE ENCOUNTERED AT AN ELEVATION OF XXXX FEET

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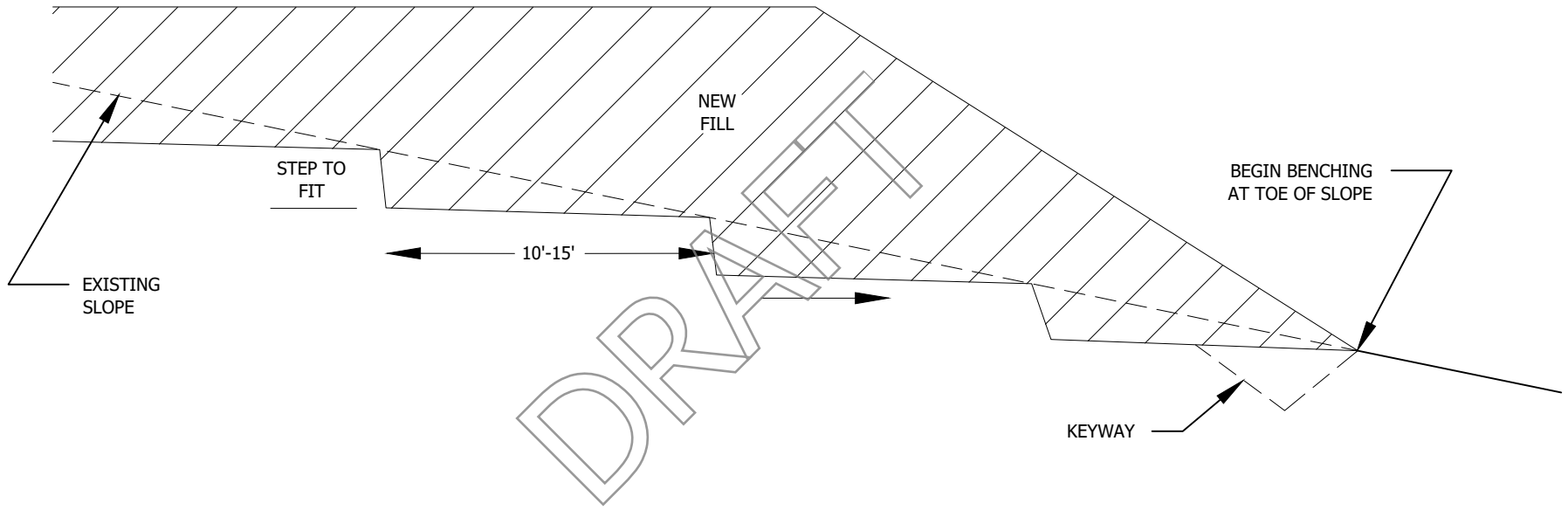
ESTIMATED ELEVATION OF GROUND WATER	PROJECT NO. 223122 FIGURE 29



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NOTES:

1. BENCHING REQUIRED WHEN EXISTING SLOPE IS 5 : 1 (HORIZONTAL : VERTICAL) OR STEEPER
2. CONTINUE BENCHING UNTIL NATURAL SLOPE FLATTENS OR DAYLIGHTS
3. DRAINS MAY BE REQUIRED IF GROUND WATER IS ENCOUNTERED
4. ADDITIONAL EXCAVATION MAY BE REQUIRED BY AGW IF SLOPE INSTABILITY IS NOTED
5. A KEYWAY MAY BE REQUIRED BY AGW DEPENDING UPON SLOPE CONFIGURATION
6. NOT TO SCALE

AGW
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GENERALIZED BENCHING DETAIL	PROJECT NO. 223122 FIGURE 30

APPENDIX A
LABORATORY TEST RESULTS

SUMMARY OF LABORATORY TEST RESULTS.....TABLE A-1

SWELL-CONSOLIDATION TEST RESULTS .....FIGURES A-1 THROUGH A-175

GRADATION/ATTERBERG TEST RESULTS.....FIGURES A-176 THROUGH A-225

GRADATION/ATTERBERG WITH HYDROMETER TEST RESULTS .....FIGURES A-226 THROUGH A-229

STANDARD PROCTOR TEST RESULTS..... FIGURES A-230 AND A-231

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
1	2	Clay, sandy	117	9	0.0	NA									
1	7	Siltstone, clayey, trace sand		9			2.711	99	23.5	29	8				
1	14	Claystone, slightly sandy	108	20	9.7	—									
1	44	Claystone, slightly sandy	115	13	12.9	14,800									
2	4	Clay, sandy	109	17	1.2	5,400									
2	9	Claystone, slightly sandy		10				87		27	7				
2	29	Claystone, slightly sandy	114	15	3.5	5,800									
3	2	Clay, sandy	118	13	2.0	7,100									
3	7	Claystone, slightly sandy	113	20	6.0	8,500									
3	14	Claystone, slightly sandy	108	12	-0.1	NA									
3	24	Siltstone, clayey, trace sand		12			2.696	97	23.7	30	11				
4	9	Claystone, trace sand	124	11	3.7	10,000								18,600	
4	19	Claystone, trace sand	116	16	8.0	26,200		99		67	44				
5	4	Clay, sandy, trace gravel	114	19	0.0	NA		75		38	24				
5	14	Claystone, slightly sandy	112	15	1.9	5,000									
5	24	Claystone, slightly sandy	116	15	4.8	13,200									
6	2	Clay, sandy	103	19	0.3	2,100									
6	14	Claystone, slightly sandy	106	21	5.1	3,500									
6	34	Claystone, slightly sandy	118	18	8.3	—									
7	9	Clay, sandy	116	14	-0.5	NA									
7	29	Siltstone, clayey, trace sand	120	12	0.4	2,100		98		38	20				
8	2	Clay, sandy, trace gravel	118	11	4.1	11,000		82		42	25				
8	7	Claystone, sandy	120	13	5.1	13,200		85		46	29				
8	24	Claystone, slightly sandy	114	16	11.1	20,600									
9	4	Clay, sandy	111	12	-0.1	NA								19,600	

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
9	9	Sandstone, very silty		8				46		NV	NP				
9	19	Claystone, slightly sandy	113	16	9.3	16,700									
10	4	Clay, sandy	111	13	3.5	6,700									
10	14.5	Siltstone, clayey, slightly sandy					2.693	90	24.5	25	9				
11	2	Clay, sandy	109	17	0.5	2,500									
11	14	Siltstone, clayey, slightly sandy					2.652	95	21.5	29	9				
11	34	Claystone, slightly sandy	117	14	6.8	12,200									
12	4	Clay (Weathered Claystone), sandy	110	18	0.4	2,300									
12	9	Clay (Weathered Claystone), sandy	104	22	4.4	7,500									
12	29	Claystone, sandy (lens)	123	12	4.7	32,000									
13	2	Clay, sandy	110	14	-0.4	NA		90							
13	7	Clay, sandy										8.1	330	28,400	0.0002
13	24	Claystone, slightly sandy	113	15	0.5	2,300									
14	19	Claystone, slightly sandy	111	17	0.9	3,000									
14	29	Claystone, slightly sandy	113	18	5.6	12,700									
15	9	Clay, sandy	108	18	-0.1	NA									
15	24	Claystone, slightly sandy (lens)	108	15	0.0	NA									
16	2	Clay, sandy	115	12	0.3	2,000		78		32	15				
16	7	Sand, very silty		9				32		NV	NP				
16	14	Claystone, slightly sandy										8.2	360	2,400	0.0087
16	44	Claystone, slightly sandy	124	12	8.8	35,000									
17	4	Silt, very sandy (lens)		10				60		NV	NP				
17	19	Claystone, slightly sandy	108	20	7.1	11,000									

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A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
17	29	Claystone, slightly sandy	120	17	7.2	23,900									
18	2	Clay, slightly sandy	114	13	2.8	10,600		91		43	26				
18	7	Claystone, slightly sandy	113	16	4.7	9,500									
18	24	Siltstone, clayey, sandy		12				74		34	17				
19	4	Claystone, slightly sandy	117	13	9.2	15,200									
19	9	Claystone, slightly sandy	111	20	4.4	9,100									
19	19	Claystone, slightly sandy	116	17	5.7	13,000									
19	29	Claystone, sandy (lens)	114	16	6.8	15,500									
20	4	Clay, sandy	123	12	2.4	10,000									
20	9	Claystone, slightly sandy	109	20	4.8	8,700		92		61	38				
20	14	Claystone, slightly sandy	111	17	6.5	11,900									
21	7	Clay, sandy	113	13	1.3	4,500		76		41	20				
21	24	Claystone, slightly sandy	116	9	0.4	2,300									
21	44	Claystone, slightly sandy	114	18	5.3	12,600									
22	4	Clay, sandy	113	9	2.5	5,500									
22	19	Claystone, sandy	116	18	4.3	7,800									
22	29	Claystone, sandy		13				79		34	15				
23	2	Clay, sandy	105	21	0.0	NA									
23	7	Clay (Weathered Claystone), sandy	94	27	4.9	5,500									
23	14	Claystone, slightly sandy	109	20	7.6	13,500									
24	4	Clay, sandy	101	23	3.9	5,500									
24	9	Claystone, slightly sandy	104	21	5.3	4,100									
24	19	Claystone, slightly sandy	122	12	7.7	16,200									
25	4	Clay, slightly sandy	119	13	4.4	15,900		87		46	29			<100	
25	9	Claystone, slightly sandy	118	14	2.9	9,300									

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A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
25	14	Claystone, slightly sandy	123	12	0.9	5,000									
26	7	Claystone, trace sand	100	19	1.7	3,300									
26	14	Claystone, trace sand	114	14	4.5	4,500		98		53	32				
26	24	Claystone, trace sand	120	11	1.5	4,600									
26	44	Claystone, trace sand	103	20	11.2	11,400									
27	4	Clay, sandy	108	20	0.5	2,100									
27	9	Clay, sandy	101	23	0.0	NA									
27	19	Claystone, slightly sandy	105	18	4.8	7,400									
28	7	Clay, sandy	98	22	0.0	NA									
28	14	Claystone, trace sand	112	17	4.3	3,200		96		56	34				
28	34	Claystone, sandy (lens)	128	11	3.3	13,600									
29	9	Clay, sandy	110	16	0.7	3,000									
29	29	Siltstone, very sandy, clayey		12				57		32	15				
30	4	Clay, sandy	101	8	1.1	2,500									
30	14	Clay, sandy	119	15	1.1	3,600								300	
30	24	Claystone, slightly sandy		14				90		33	15				
31	2	Clay, sandy	108	9	2.4	5,200									
31	7	Sand, very silty		5				36		NV	NP				
31	14	Claystone, slightly sandy	115	16	7.9	13,300									
31	34	Claystone, slightly sandy	114	15	11.2	22,100									
32	4	Clay, sandy	118	14	0.3	3,000								200	
32	9	Claystone, very sandy (lens)		9				69		30	11				
32	19	Claystone, trace sand	119	14	8.8	24,500		99		59	38				
33	2	Clay, sandy	100	19	-0.3	NA									
33	7	Siltstone, clayey, sandy		12				71		33	17				

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
33	24	Sandstone, very clayey		15				47		27	11				
34	4	Clay, sandy	106	17	0.5	2,600									
34	9	Claystone, slightly sandy	108	19	6.3	10,000									
34	19	Claystone, slightly sandy	124	12	3.1	6,200									
35	9	Clay, sandy	109	16	0.0	NA									
35	14	Claystone, trace sand	106	20	4.1	4,000		98		74	50				
36	2	Clay, sandy	105	8	2.1	3,300									
36	7	Clay, sandy	110	15	0.0	NA									
36	24	Claystone, slightly sandy	116	17	6.4	16,500									
36	34	Sandstone, very clayey		12				48		29	11				
37	9	Clay, sandy	107	12	1.5	3,000									
37	19	Claystone, slightly sandy	113	16	10.8	15,500									
38	2	Clay, sandy	109	10	0.8	5,000		85		37	18				
38	14	Claystone, slightly sandy	118	14	3.6	10,000									
38	24	Claystone, slightly sandy	117	14	4.0	9,100									
39	4	Clay, sandy	116	11	1.5	6,000									
39	9	Sandstone, silty										8.5	4,500	100	0.0038
39	19	Claystone, slightly sandy	120	14	13.1	28,300									
39	29	Claystone, slightly sandy	128	8	4.3	12,400									
40	7	Claystone, trace sand	112	17	2.8	5,000		96		44	24				
40	14	Claystone, trace sand	125	13	2.5	13,600									
40	44	Claystone, slightly sandy		12				92		49	33				
41	4	Clay, sandy	103	23	-0.3	NA									
41	19	Claystone, slightly sandy	116	15	8.4	15,700									
42	4	Clay, sandy	109	17	0.1	1,300									

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
42	9	Clay, sandy	111	16	0.8	3,000									
42	24	Claystone, slightly sandy	110	19	7.5	15,900									
43	2	Clay, sandy	111	9	3.3	7,400									
43	14	Clay, sandy, trace gravel	117	15	0.9	3,300		80		45	30				
43	24	Claystone, slightly sandy	113	17	4.1	9,100									
44	4	Clay, sandy	116	14	0.3	1,800									
44	9	Claystone, sandy	119	14	1.3	4,100		83		46	24				
44	29	Claystone, sandy	125	12	7.9	21,900									
45	2	Clay, sandy	107	8	1.5	4,100									
45	7	Clay, sandy	101	22	0.5	2,200									
45	14	Claystone, sandy	122	11	2.1	5,000		70		36	22				
45	24	Claystone, slightly sandy	121	13	10.3	21,400									
46	9	Sand, very clayey	122	8	0.1	2,500		46							
46	19	Claystone, silty	112	17	8.5	17,900		100		54	33				
46	29	Claystone, silty	116	13	1.5	3,500									
47	4	Clay, sandy	112	11	2.3	7,500									
47	9	Sand, very clayey, slightly gravelly	121	11	0.8	4,200		47		33	14				
47	24	Sandstone, very silty		14				38		NV	NP				
48	2	Clay, sandy	110	7	2.5	5,900									
48	7	Clay, sandy	106	19	-0.1	NA									
48	24	Claystone, slightly sandy	113	17	8.4	15,900									
48	44	Claystone, slightly sandy	117	13	0.8	6,600									
49	4	Clay, sandy	113	12	-0.1	NA									
49	9	Clay, sandy	104	20	0.3	2,500		73		42	22				
49	29	Claystone, slightly sandy	109	18	4.9	7,800									

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
50	2	Clay, sandy	123	10	4.4	32,000									
50	7	Clay, sandy										7.9	320	4,900	0.0026
50	14	Clay, sandy, trace gravel	114	16	1.9	4,300		77		46	27				
50	34	Claystone, slightly sandy	115	16	7.6	24,100									
51	2	Clay, very sandy, slightly gravelly	124	11	4.1	18,700		46		39	18				
51	14	Claystone, slightly sandy	114	9	0.3	1,300								19,200	
51	24	Claystone, trace sand	118	14	7.9	20,700									
51	44	Claystone, trace sand	127	12	8.1	17,000		98		54	32				
52	9	Clay, sandy	114	16	2.0	7,600									
52	19	Claystone, slightly sandy	124	12	10.3	32,000		95		54	32				
53	2	Clay, sandy	115	14	0.7	2,500									
53	7	Clay, sandy	108	19	0.7	4,200									
53	34	Claystone, slightly sandy	107	20	7.7	13,300									
54	4	Clay, sandy		18				84		33	14				
54	9	Clay, sandy	109	19	-0.4	NA									
54	19	Claystone, slightly sandy	116	16	12.4	12,200									
55	9	Clay, sandy	91	39	-0.3	NA									
55	24	Claystone, slightly sandy	117	15	8.9	11,900									
56	7	Clay, very sandy	119	15	2.3	10,000		67		44	21				
56	14	Claystone, slightly sandy	114	18	12.4	18,500									
56	34	Claystone, slightly sandy	120	15	13.5	21,700									
57	9	Clay, sandy	109	14	0.0	NA									
57	19	Clay, sandy	108	19	0.1	1,800		82		36	12				
58	2	Clay, sandy	116	13	0.3	1,800									
58	14	Claystone, slightly sandy	111	18	4.3	7,900									

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
58	34	Claystone, slightly sandy	114	17	5.1	7,700									
59	9	Clay, slightly sandy	103	22	-0.1	NA		90		44	28				
59	19	Claystone, slightly sandy	115	17	6.1	33,000									
60	4	Clay, sandy	103	19	-0.3	NA									
60	9	Clay (Weathered Claystone), sandy	107	20	1.2	2,800									
60	24	Claystone, slightly sandy	106	19	8.0	9,700									
61	7	Clay, sandy	118	13	1.5	5,900		81		38	21				
61	14	Clay, sandy	112	16	-0.3	NA									
61	24	Claystone, sandy	113	14	5.2	6,700		70		44	41				
61	44	Claystone, sandy	117	17	6.3	18,500									
62	4	Clay, slightly sandy	108	8	1.5	4,600		86							
62	9	Clay, sandy	122	11	2.1	10,800									
63	2	Clay, slightly sandy	111	10	3.6	12,000									
63	7	Clay, slightly sandy	119	10	6.3	24,500		88		41	24				
63	14	Claystone, slightly sandy	119	15	9.6	13,400									
64	9	Claystone, slightly sandy										8.1	290	2,900	0.0025
64	19	Claystone, slightly sandy	122	9	3.6	14,100									
64	29	Claystone, slightly sandy	114	15	11.3	25,700		95		74	48				
65	9	Clay, sandy	128	10	4.0	14,100									
65	14	Claystone, slightly sandy	123	13	8.0	16,800									
66	2	Clay, sandy	103	10	1.1	2,600									
66	14	Claystone, trace sand	129	11	3.1	11,300		96		38	16				
66	24	Siltstone, clayey, sandy		11				72		25	7				
67	4	Clay, sandy	108	10	2.0	4,100									
67	9	Claystone, slightly sandy	123	7	4.5	6,500				35	13				

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
68	7	Siltstone, clayey, trace sand		6			2.681	97	23.2	28	9				
68	14	Claystone, slightly sandy	120	14	7.1	17,100									
68	24	Claystone, slightly sandy	114	13	3.7	28,000									
69	9	Clay, trace sand	108	20	1.3	2,700		98		56	33			5,000	
69	29	Claystone, slightly sandy	107	18	1.2	4,300									
70	9	Claystone, sandy		13				77		34	17				
70	24	Claystone, slightly sandy	121	13	6.8	11,200									
71	14	Claystone, sandy	124	12	2.4	8,100									
71	24	Sandstone, clayey	123	12	0.3	2,500									
71	44	Claystone, slightly sandy	122	10	8.4	20,800									
72	4	Clay, sandy	110	15	0.0	NA									
72	19	Claystone, trace sand	114	18	8.5	12,700		99		64	39				
72	29	Claystone, trace sand	116	15	7.5	13,500									
73	7	Clay, sandy	107	15	0.1	1,800									
73	14	Clay, sandy	118	14	0.5	2,100									
73	34	Claystone, slightly sandy	112	19	10.7	16,200									
74	9	Claystone, slightly sandy	117	16	9.6	14,700									
74	19	Claystone, slightly sandy	123	13	5.1	16,400									
75	4	Clay, sandy	125	10	4.0	21,700									
75	9	Claystone, slightly sandy (lens)		8				93		32	16				
75	14	Claystone, slightly sandy	119	12	12.8	24,900									
76	2	Clay, sandy	112	9	2.9	6,400									
76	14	Claystone, slightly sandy	119	14	6.9	17,700									
76	34	Claystone, slightly sandy		6				91		27	9				
77	4	Claystone, sandy	115	9	7.1	14,100									

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SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
77	19	Claystone, slightly sandy	123	11	9.2	21,500									
77	24	Claystone, slightly sandy													
77	29	Claystone, slightly sandy	113	18	5.3	11,800								22,200	
78	7	Clay, sandy	117	10	2.7	8,400									
78	14	Claystone, slightly sandy	123	12	13.9	32,000									
79	4	Clay, sandy	111	9	2.7	6,400									
79	19	Claystone, slightly sandy	119	10	6.1	11,200									
80	4	Clay, sandy	113	10	3.6	7,200									
80	9	Claystone, slightly sandy	122	14	6.9	32,000		93		55	34			18,300	
80	24	Claystone, slightly sandy	121	13	4.5	12,200									
81	2	Clay, sandy		5				82		38	22				
81	7	Clay (Weathered Claystone), slightly sandy	118	14	1.9	3,900		87		40	25				
81	14	Claystone, sandy (lens)	127	10	0.5	2,000		81		33	18				
81	44	Claystone, slightly sandy	121	14	9.6	20,000									
82	9	Clay, sandy										8.5	530	1,300	0.0051
82	19	Claystone, sandy (lens)	129	10	1.9	5,700									
82	29	Claystone, slightly sandy	110	16	7.7	10,800									
83	2	Clay, slightly sandy	114	11	2.1	6,800		90		44	27				
83	14	Clay, sandy, trace gravel	115	16	-0.1	NA		67		33	20				
83	24	Claystone, slightly sandy	111	19	8.3	15,300									
84	9	Clay, sandy	114	14	2.9	10,000									
84	19	Clay, sandy	112	17	-0.1	NA									
85	2	Clay, sandy	105	8	1.9	4,600									
85	14	Siltstone, very clayey, trace sand		10			2.661	98	40.4	44	27				

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
85	24	Siltstone, clayey, very sandy		7				63		26	7				
85	44	Claystone, slightly sandy	114	18	8.9	25,300									
86	4	Clay, sandy	107	10	1.2	2,600									
86	14	Claystone, slightly sandy	114	16	8.4	18,700									
87	9	Clay, sandy	126	12	5.6	13,600									
87	19	Claystone, trace sand	122	13	10.5	30,000		97		62	41				
87	29	Claystone, trace sand	114	17	12.7	13,700									
88	2	Clay, sandy	110	10	3.1	7,400									
88	24	Claystone, slightly sandy	115	15	8.0	18,700									
89	4	Clay, sandy	106	10	1.2	2,800									
89	19	Claystone, slightly sandy	120	12	7.9	15,500		95		48	28				
90	4	Clay, sandy	116	12	4.4	17,200									
90	9	Claystone, slightly sandy	123	13	5.6	7,700									
90	24	Claystone, slightly sandy	127	12	4.9	10,000									
91	2	Clay, slightly sandy										8.2	2,100	200	0.0026
91	7	Clay, slightly sandy, trace gravel	103	22	1.2	3,200		91		62	41				
91	14	Claystone, slightly sandy	107	20	7.1	11,100									
91	44	Claystone, slightly sandy	108	19	7.3	10,800									
92	4	Clay, sandy	105	19	-0.3	NA									
92	9	Claystone, slightly sandy	105	18	3.6	5,000								14,800	
92	29	Claystone, slightly sandy	118	14	7.3	12,600									
93	2	Clay, sandy	124	8	5.2	12,400									
93	7	Claystone, slightly sandy	110	18	4.8	11,500									
93	14	Claystone, slightly sandy	110	18	6.7	10,700									
93	34	Claystone, slightly sandy	117	16	7.6	14,900									

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
94	4	Clay, sandy		15				84		32	14				
94	19	Claystone, slightly sandy	105	22	1.9	4,200								22,200	
95	2	Clay, sandy	107	9	1.9	3,900									
95	7	Clay, sandy	109	19	0.5	2,200									
95	24	Claystone, slightly sandy	102	15	1.9	2,500									
95	34	Claystone, slightly sandy	116	16	5.6	10,800									
96	4	Clay, very sandy	113	7	2.1	4,100									
96	9	silt, very sandy (lens)	124	10	4.7	10,500		68		40	14				
96	24	Claystone, slightly sandy	125	13	7.5	27,400									
97	4	Clay, sandy	124	10	7.2	24,500									
97	9	Siltstone, clayey, sandy		7				85		32	16				
97	29	Siltstone, clayey, slightly sandy		6			2.658	94	28.0	25	8				
98	2	Clay, sandy										8.5	1,500	500	0.0026
98	7	Siltstone, clayey, sandy		7				83		26	9				
98	24	Claystone, slightly sandy	125	15	11.5	23,800									
99	4	Clay, slightly sandy	123	11	5.1	11,900		89		44	28				
99	9	Claystone, slightly sandy	121	13	7.1	26,600									
99	19	Claystone, slightly sandy	111	19	9.6	—									
100	9	Clay (Weathered Claystone), sandy	101	24	4.5	8,300									
100	14	Claystone, slightly sandy	123	13	6.9	16,800									
101	7	Claystone, slightly sandy	118	14	6.3	12,800									
101	14	Claystone, slightly sandy	123	11	2.4	8,700									
101	24	Claystone, slightly sandy	106	12	0.1	1,900									
101	44	Siltstone, very clayey, sandy					2.694		37.1	41	25				

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
102	4	Siltstone, clayey, sandy		19				81		25	6				
102	9	Clay (Weathered Claystone), sandy	103	20	2.5	3,600									
103	2	Clay, sandy	105	17	-0.3	NA									
103	14	Claystone, sandy	104	22	1.6	3,200									
103	34	Claystone, sandy	126	13	2.8	12,300		83		43	20				
104	9	Claystone, slightly sandy	123	14	1.5	2,700									
104	29	Claystone, slightly sandy	129	13	8.9	21,700									
105	9	Claystone, slightly sandy	121	15	6.3	20,000									
105	14	Claystone, slightly sandy	121	14	9.9	22,900									
105	24	Claystone, silty	114	9	0.4	1,900		100		47	25				
106	7	Clay, sandy	113	16	2.0	5,300									
106	14	Claystone, trace sand	110	19	3.6	6,600		99		63	42				
106	44	Claystone, trace sand	109	17	4.7	11,900									
107	9	Claystone, slightly sandy	114	16	8.1	17,000		87		50	30				
107	19	Claystone, slightly sandy	112	18	12.5	17,300									
107	29	Claystone, slightly sandy	111	16	9.9	13,300									
108	7	Clay, sandy	119	13	6.8	38,000		83		49	31				
108	14	Claystone, slightly sandy	109	19	5.6	11,900									
108	24	Claystone, slightly sandy	111	18	7.1	16,500									
109	9	Claystone, slightly sandy	123	10	7.3	13,000									
109	19	Claystone, slightly sandy	117	15	8.3	18,000									
110	4	Clay (Weathered Claystone), sandy	109	17	2.9	5,700									
110	14	Claystone, slightly sandy	116	16	4.7	11,100									
110	24	Claystone, slightly sandy	122	12	10.8	36,000									

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A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
111	2	Clay, sandy	107	16	1.7	2,900									
111	7	Claystone, slightly sandy	113	18	2.4	5,700									
111	14	Claystone, slightly sandy	120	14	7.1	19,200									
111	34	Siltstone, very clayey, sandy (lens)					2.640		33.5	34	18				
112	4	Clay, sandy	101	15	1.6	2,700									
112	9	Claystone, sandy	107	20	3.9	5,900									
112	19	Claystone, sandy	127	10	0.7	3,400		85		44	26				
113	2	Clay, sandy	109	18	0.3	1,900									
113	14	Claystone, slightly sandy	112	18	5.1	6,200									
113	34	Claystone, slightly sandy	118	13	5.3	13,500									
114	4	Clay, slightly sandy		21				86		40	23				
114	19	Claystone, slightly sandy	106	21	5.3	7,400									
114	29	Claystone, slightly sandy	114	18	4.8	11,900									
115	2	Clay, slightly sandy	120	9	0.0	NA		91		38	23				
115	7	Claystone, slightly sandy	121	14	1.3	3,900									
115	34	Claystone, slightly sandy	117	11	11.3	27,900									
116	4	Claystone, slightly sandy										8.1	260	13,400	0.0012
116	9	Claystone, slightly sandy	117	14	12.0	24,500									
116	14	Claystone, slightly sandy	128	8	12.3	25,900									
117	14	Claystone, slightly sandy	107	18	7.1	11,300									
117	24	Claystone, slightly sandy	112	18	9.5	11,500									
118	9	Claystone, slightly sandy	116	17	6.1	11,700									
118	19	Claystone, slightly sandy	119	13	2.0	7,900									
119	4	Clay, sandy	108	9	1.9	3,300									
119	14	Claystone, trace sand	114	17	5.5	12,600		96		61	41				

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
119	24	Claystone, trace sand	113	17	5.2	11,500									
120	7	Clay, sandy	119	14	8.5	21,400									
120	14	Claystone, slightly sandy	126	9	3.1	11,200									
121	4	Clay, sandy	113	14	1.9	6,400									
121	19	Claystone, trace sand	114	14	3.2	7,700									
121	29	Claystone, trace sand	115	14	8.3	17,900		97		60	35				
122	7	Claystone, slightly sandy	114	17	3.2	7,100								18,900	
122	14	Claystone, slightly sandy	117	16	0.3	2,500									
122	24	Claystone, slightly sandy	119	14	6.5	11,000									
123	4	Claystone, sandy	121	9	0.4	2,000		81		29	13				
123	11	Claystone, sandy	110	17	6.0	9,600									
123	19	Claystone, sandy	111	17	5.6	7,200									
124	4	Clay, sandy										8.0	330	21,900	0.0002
124	9	Claystone, trace sand	104	20	4.0	6,200		98		32	14				
124	14	Claystone, trace sand	102	24	6.5	10,300									
125	2	Clay, sandy	111	18	-0.1	NA									
125	7	Claystone, sandy	119	14	0.4	1,800		82		68	44				
125	14	Siltstone, clayey, sandy	103	12	-0.4	NA		75		27	7				
125	24	Claystone, slightly sandy	109	19	10.1	12,700									
125	34	Claystone, slightly sandy	110	17	8.8	17,500									
126	4	Clay, sandy	101	22	0.4	2,300									
126	24	Claystone, slightly sandy	113	17	10.1	15,500									
127	9	Claystone, slightly sandy	109	19	7.7	15,700									
127	19	Claystone, slightly sandy	119	15	14.7	26,900									
128	2	Clay, sandy	121	11	4.1	11,300									

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A.G. WASSENAAR, INC.

TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
128	14	Claystone, slightly sandy	110	17	6.3	12,300									
128	24	Claystone, slightly sandy	114	17	8.0	20,600									
129	4	Siltstone, clayey, slightly sandy (lens)		11				93		37	15				
129	9	Claystone, slightly sandy	118	13	3.3	6,300		89		36	23				
130	4	Claystone, slightly sandy	114	16	3.5	9,000									
130	9	Claystone, slightly sandy	108	21	7.2	12,200									
130	14	Claystone, slightly sandy	109	18	7.3	10,500									
131	4	Clay, sandy	109	19	0.7	2,100									
131	9	Clay (Weathered Claystone), sandy	99	24	1.5	2,400									
131	29	Claystone, slightly sandy	123	11	3.1	8,700		89		39	26				
132	7	Clay, sandy, slightly gravelly		22				72		44	23				
132	14	Claystone, slightly sandy	103	20	3.6	6,900									
132	34	Claystone, slightly sandy	117	15	10.5	17,500									
133	9	Siltstone, slightly sandy		14				86		37	21				
133	19	Claystone, slightly sandy	123	13	4.9	12,600									
133	29	Claystone, slightly sandy	105	20	5.2	8,300									
134	2	Clay, slightly sandy	103	22	0.1	2,200		88		47	29				
134	14	Claystone, slightly sandy	115	17	3.3	7,100		90		61	40				
134	24	Claystone, slightly sandy	117	16	5.3	15,600									
134	44	Claystone, slightly sandy	114	17	7.2	11,800									
135	4	Clay, slightly sandy	102	21	-0.1	NA		90		46	30				
135	9	Siltstone, very sandy, clayey		13				63		25	9				
135	14	Claystone, slightly sandy	105	21	5.2	7,500									
136	2	Clay, sandy	110	14	0.0	NA									

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TABLE A-1
SUMMARY OF LABORATORY TEST RESULTS
December 20, 2022

Test Boring Number	Depth (feet)	Soil Type	Natural Dry Density (pcf)	Natural Moisture (%)	Swell / Consolidation (-) (%) [1]	Swell Pressure (psf)	Specific Gravity	% Passing #200 Sieve	% Clay	Atterberg		pH	Resistivity (ohm•cm)	Water Soluble Sulfates (ppm)	Chlorides (%)
										Liquid Limit LL	Plasticity Index PI				
136	14	Siltstone, clayey, slightly sandy		12			2.710	95	25.8	32	13				
136	24	Claystone, slightly sandy	107	21	4.1	6,800									
137	9	Siltstone, clayey, sandy	122	11	-0.1	NA		74		29	8				
137	19	Claystone, slightly sandy	105	20	3.6	5,400									
137	29	Claystone, slightly sandy	116	17	5.2	16,600									
Bulk 1 [2]	—	Clay, slightly sandy	107.6 [4]	18.0 [4]				89		41	23			11,400	
Bulk 1 [2]	—	Clay, slightly sandy	102	18	0.0 [5]	NA									
Bulk 2 [3]	—	Clay, slightly sandy, trace gravel	103.5 [4]	20.1 [4]				82		43	22			8,800	
Bulk 2 [3]	—	Clay, slightly sandy, trace gravel	98	20	0.0 [5]	NA									

Notes:
NA - Not Applicable, NV - No Value, NP - Nonplastic

[1] Indicates percent swell or consolidation (-) when wetted under a 1,000 psf load
[2] Bulk 1 is a blended bulk sample obtained from the auger cuttings of Test Borings 1 throu
[3] Bulk 2 is a blended bulk sample obtained from the auger cuttings of Test Borings 51 throu
[4] Maximum dry density (MDD) and optimum moisture content (OMC)
[5] Sample was remolded to approximately 95% MDD

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AGW
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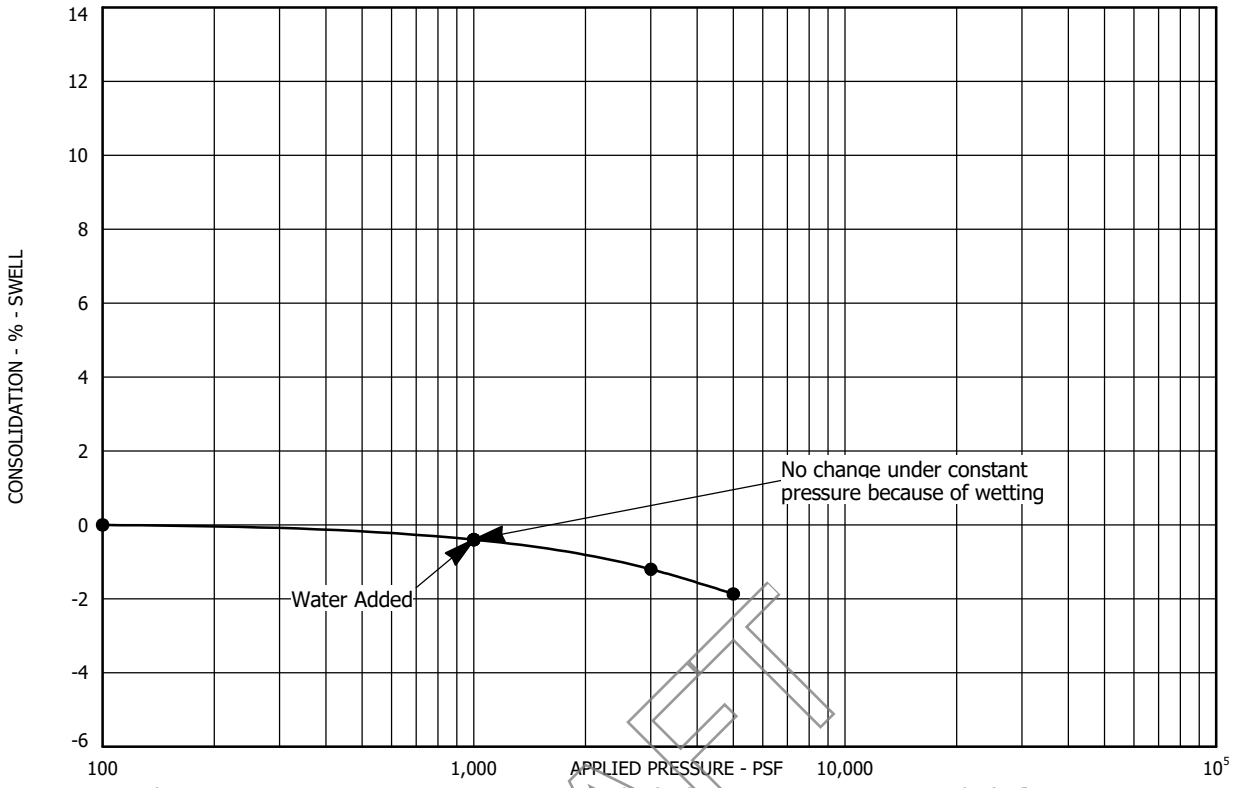

Sample Location: Test Boring No. 1 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 9

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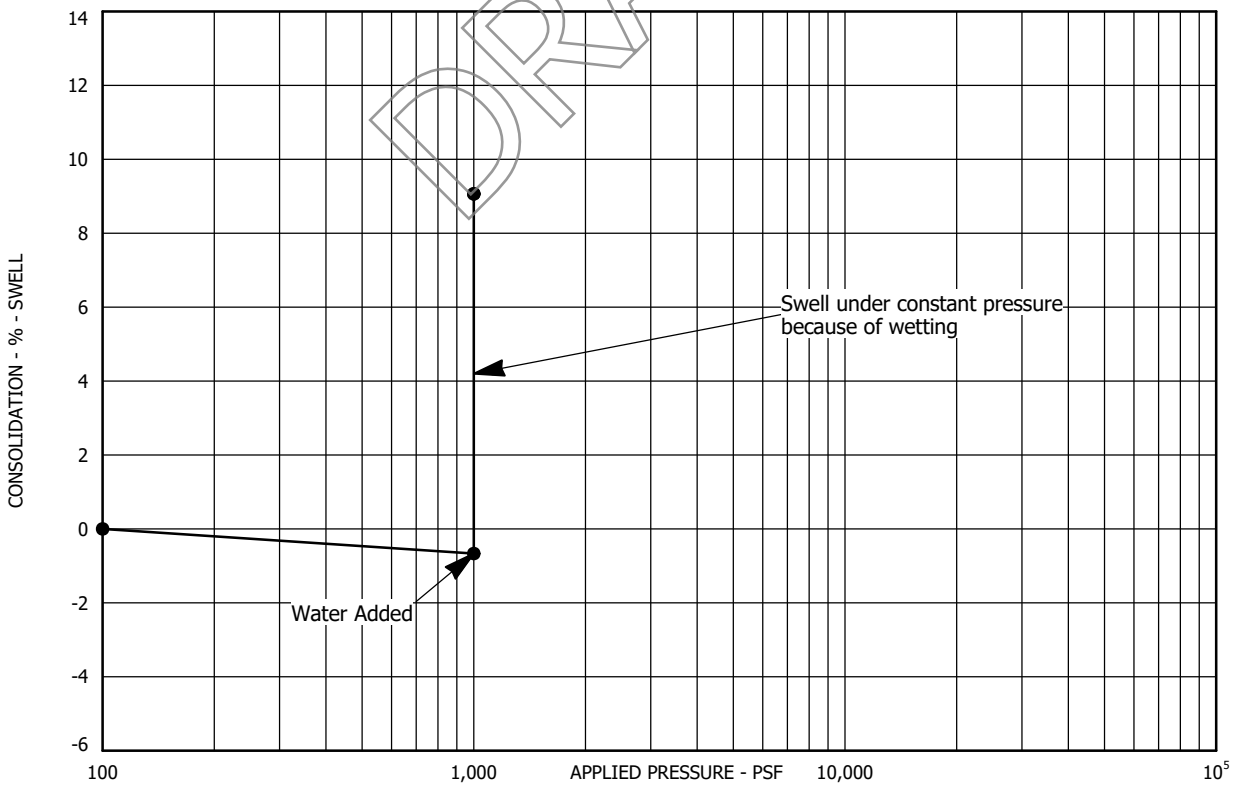

Sample Location: Test Boring No. 1 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 20

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-1
PROJECT NO. 223122

AGW
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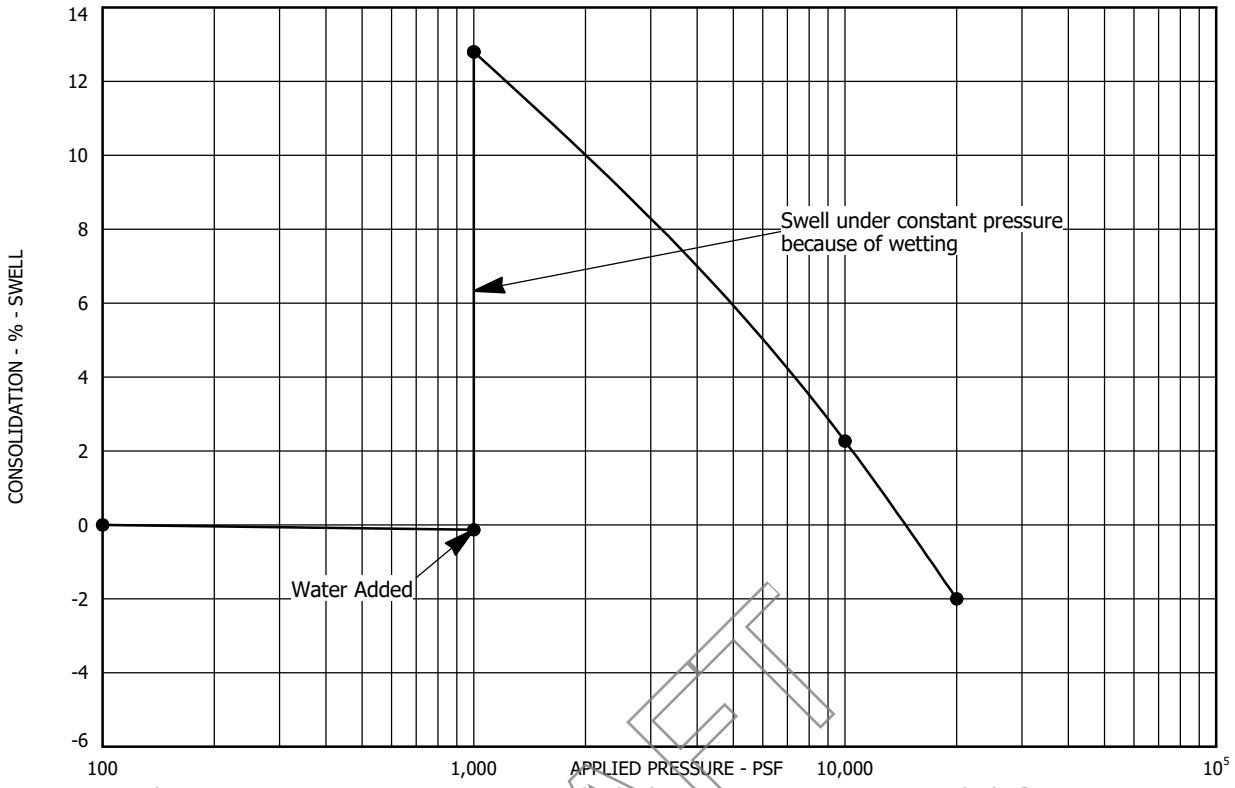
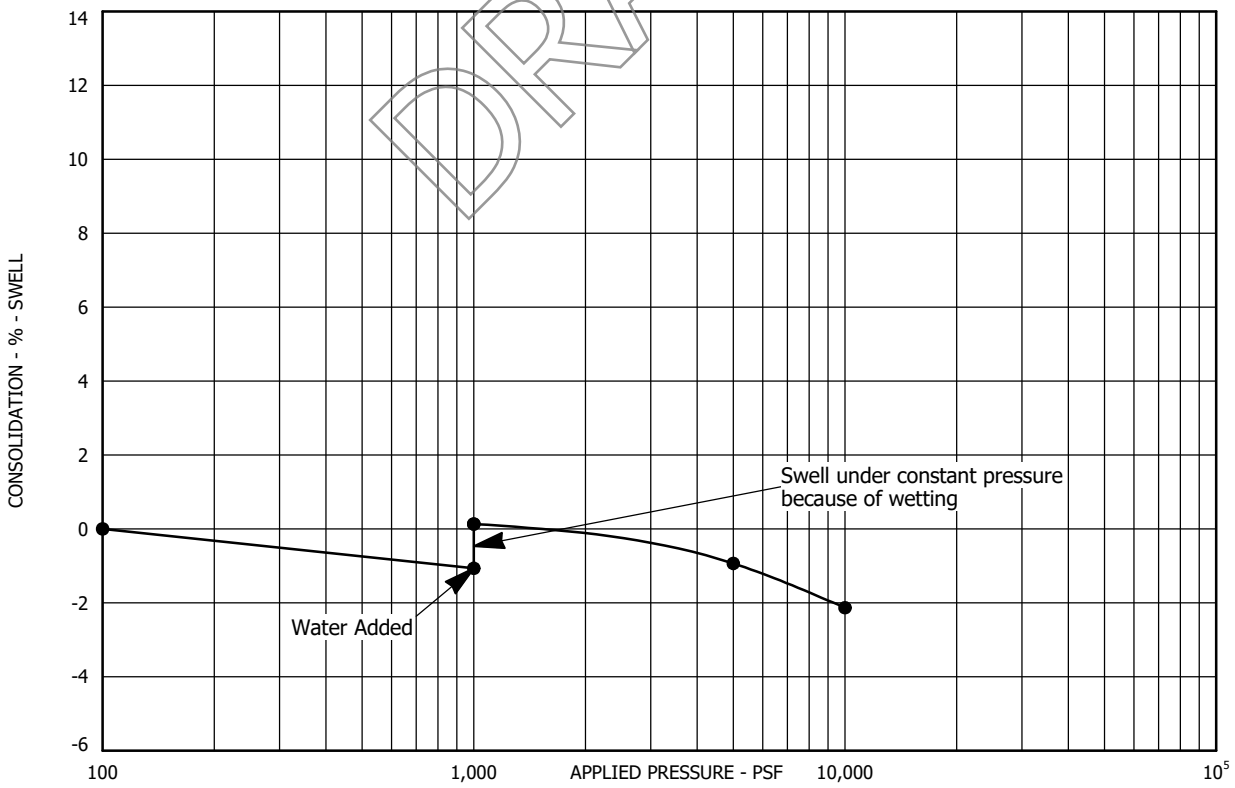


Sample Location: Test Boring No. 1 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 13

DRAFT



Sample Location: Test Boring No. 2 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 17

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-2
PROJECT NO. 223122

AGW
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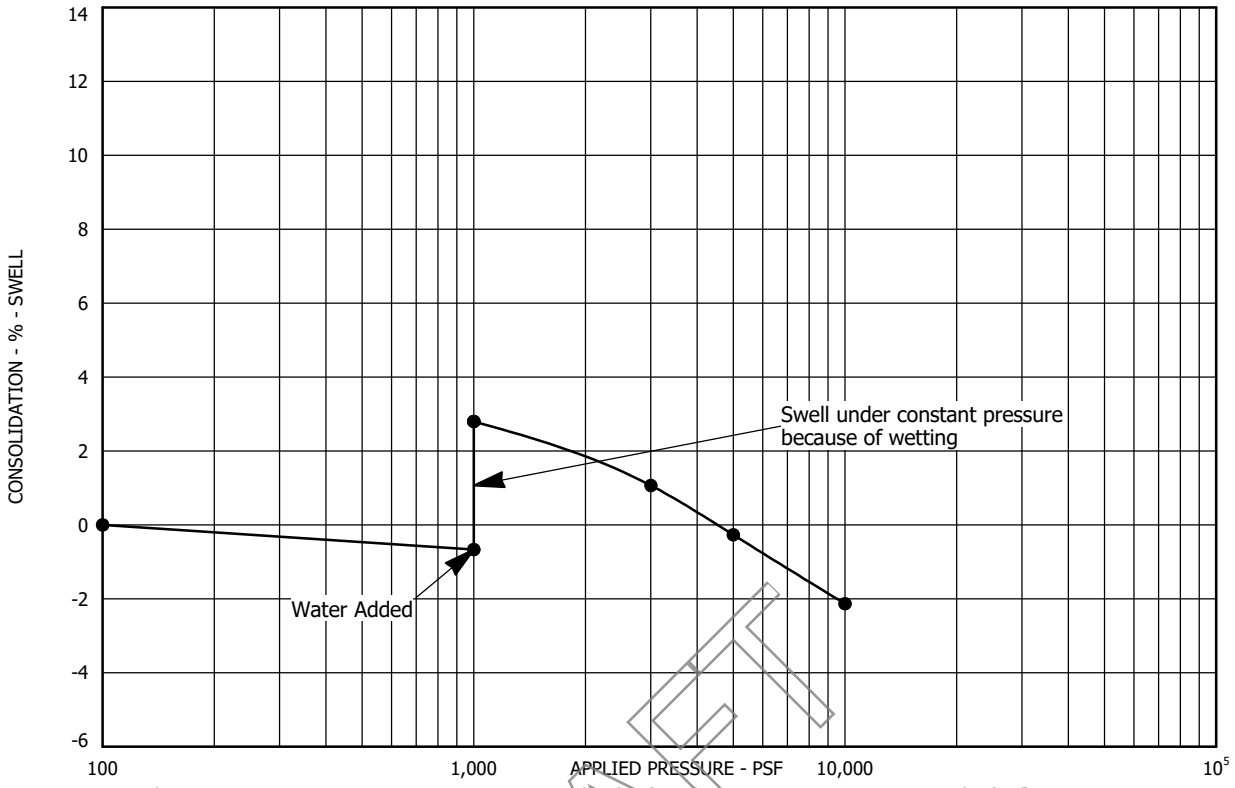
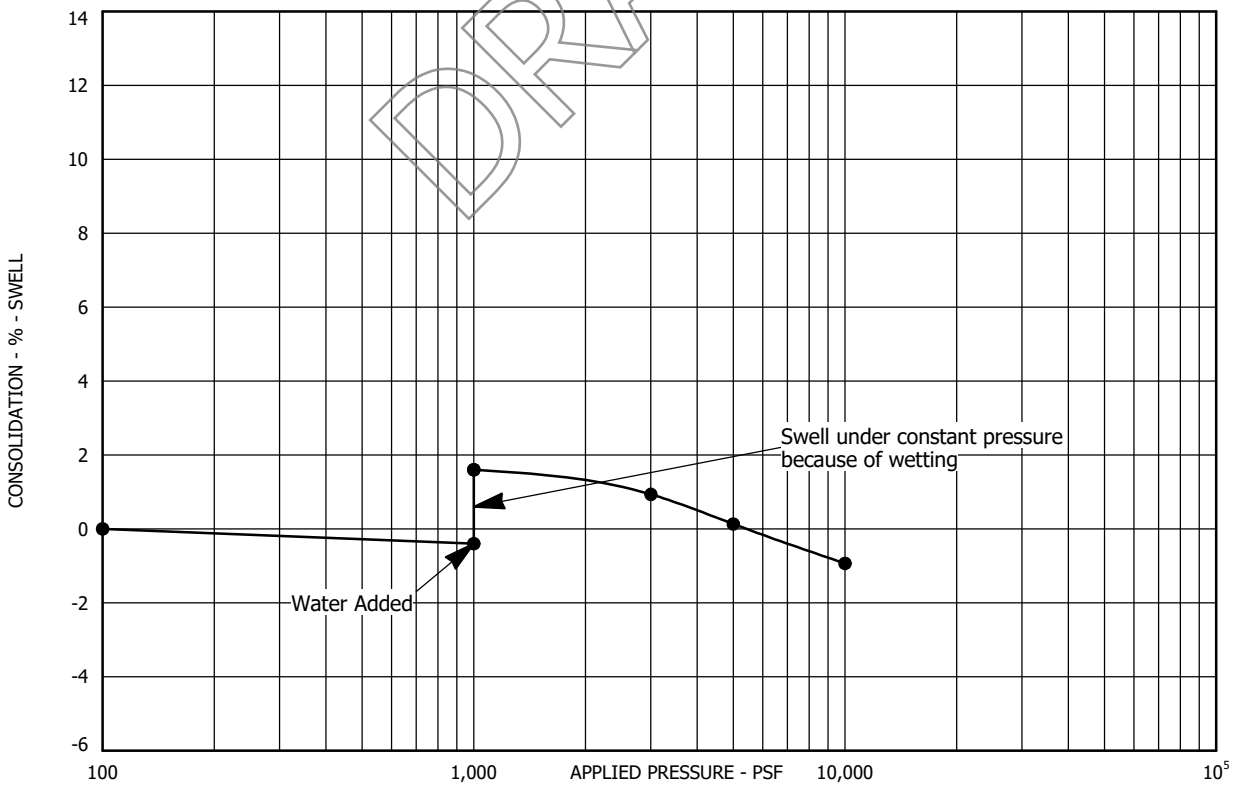


Sample Location: Test Boring No. 2 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 15

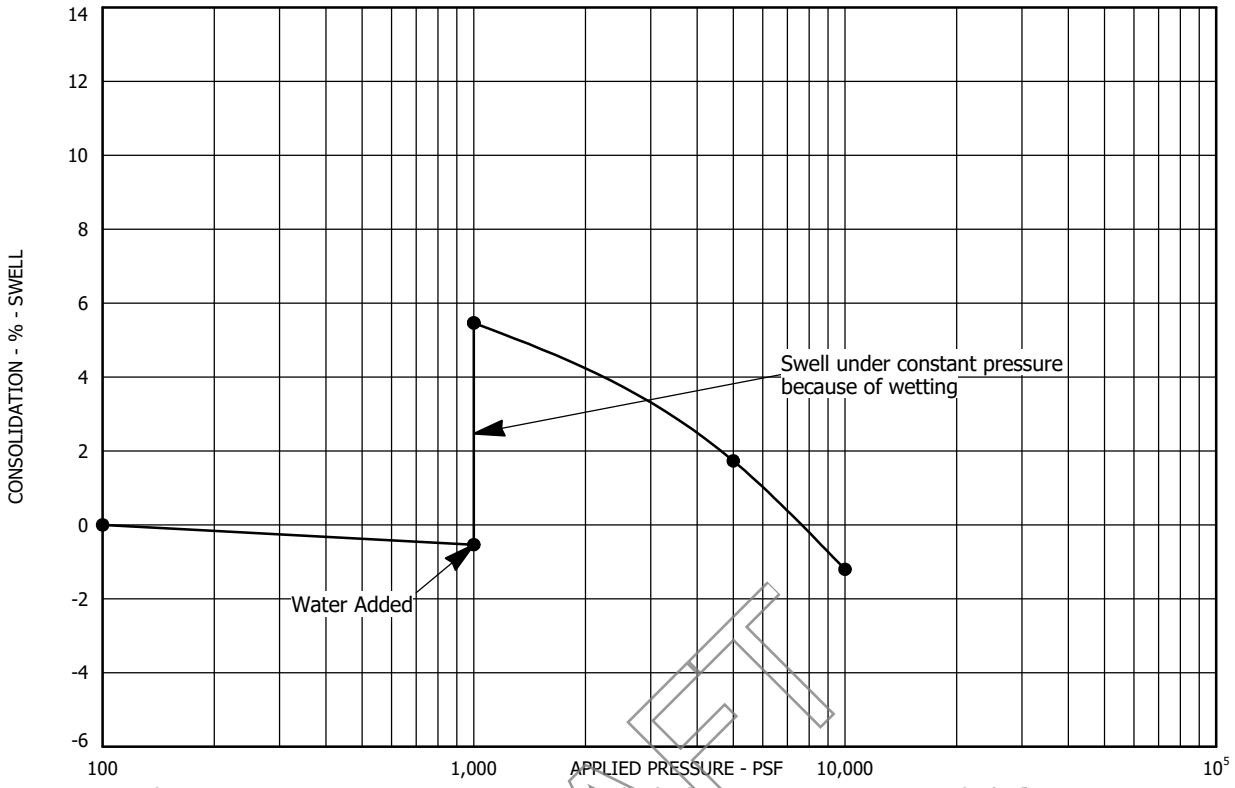
DRAFT



Sample Location: Test Boring No. 3 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 13

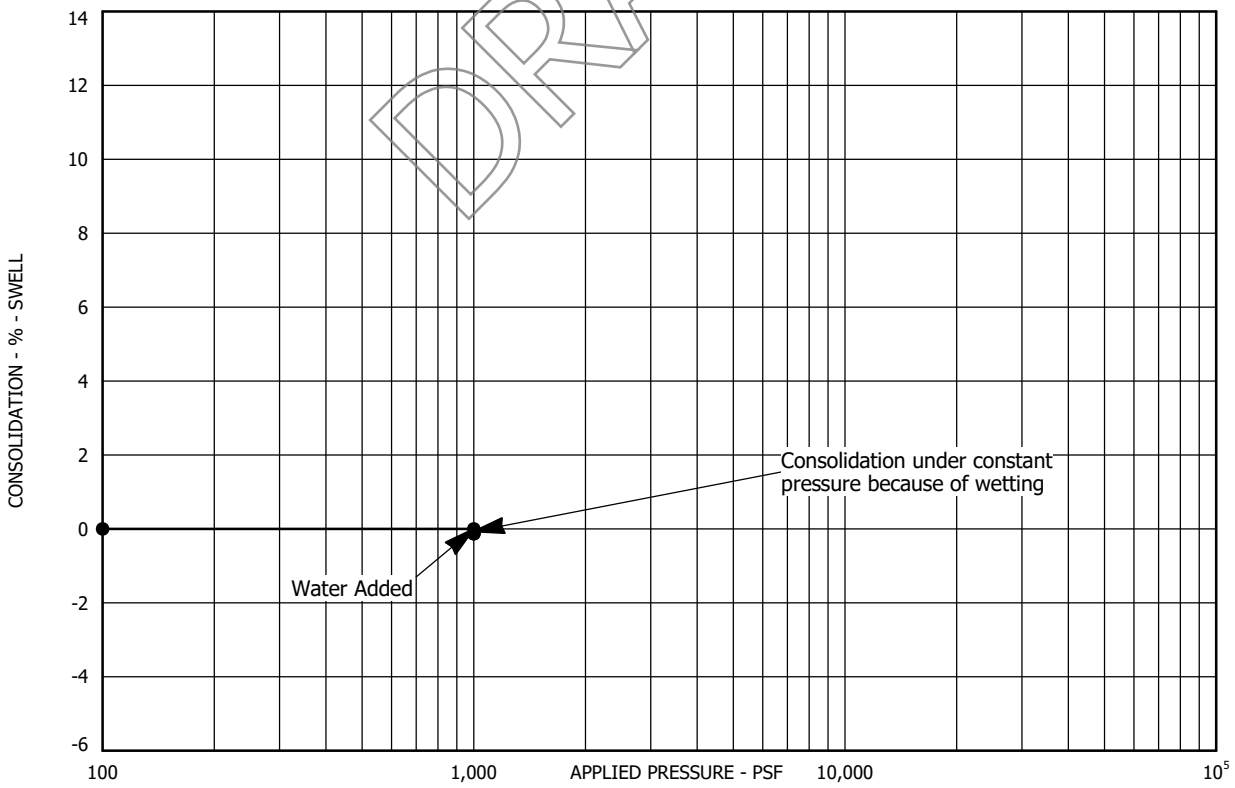
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-3
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 3 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 20

DRAFT



Sample Location: Test Boring No. 3 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 12

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-4
PROJECT NO. 223122

AGW
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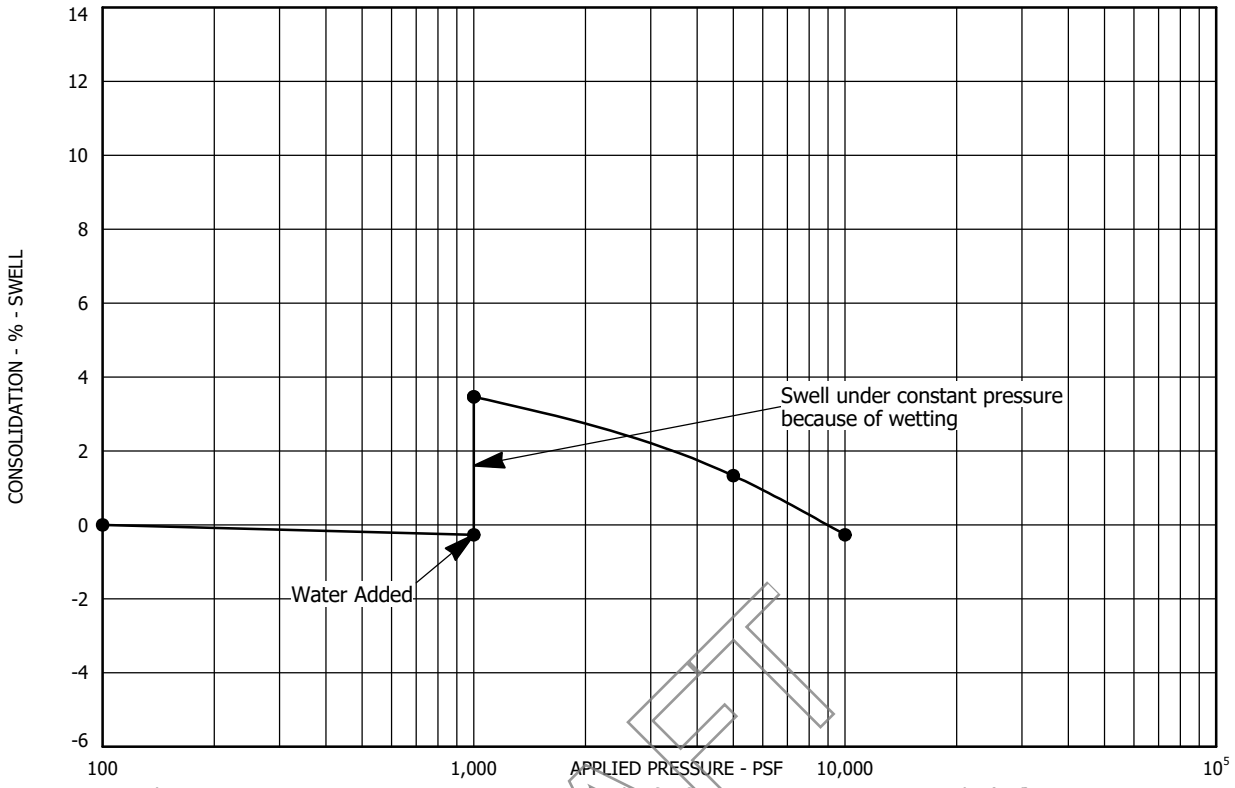
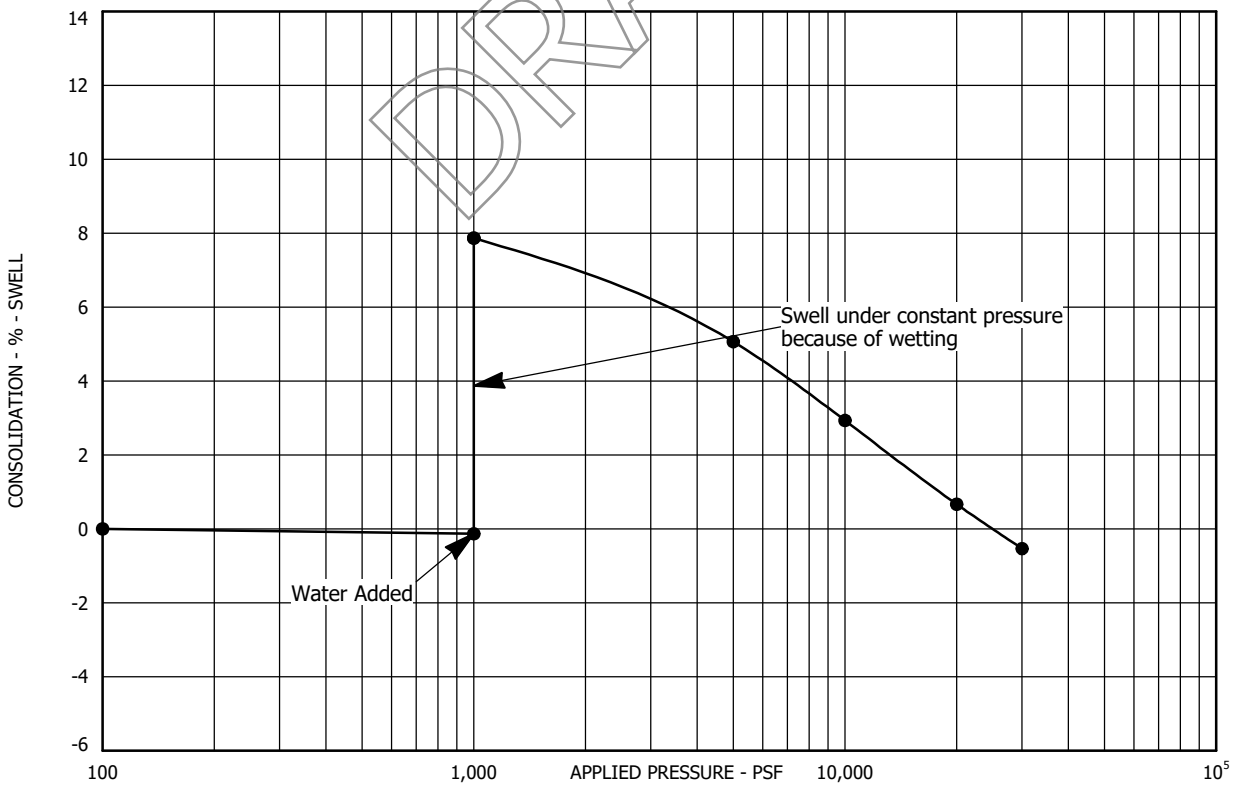


Sample Location: Test Boring No. 4 at a depth of 9 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 124
Moisture Content (%): 11

DRAFT



Sample Location: Test Boring No. 4 at a depth of 19 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 116
Moisture Content (%): 16

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-5
PROJECT NO. 223122

AGW
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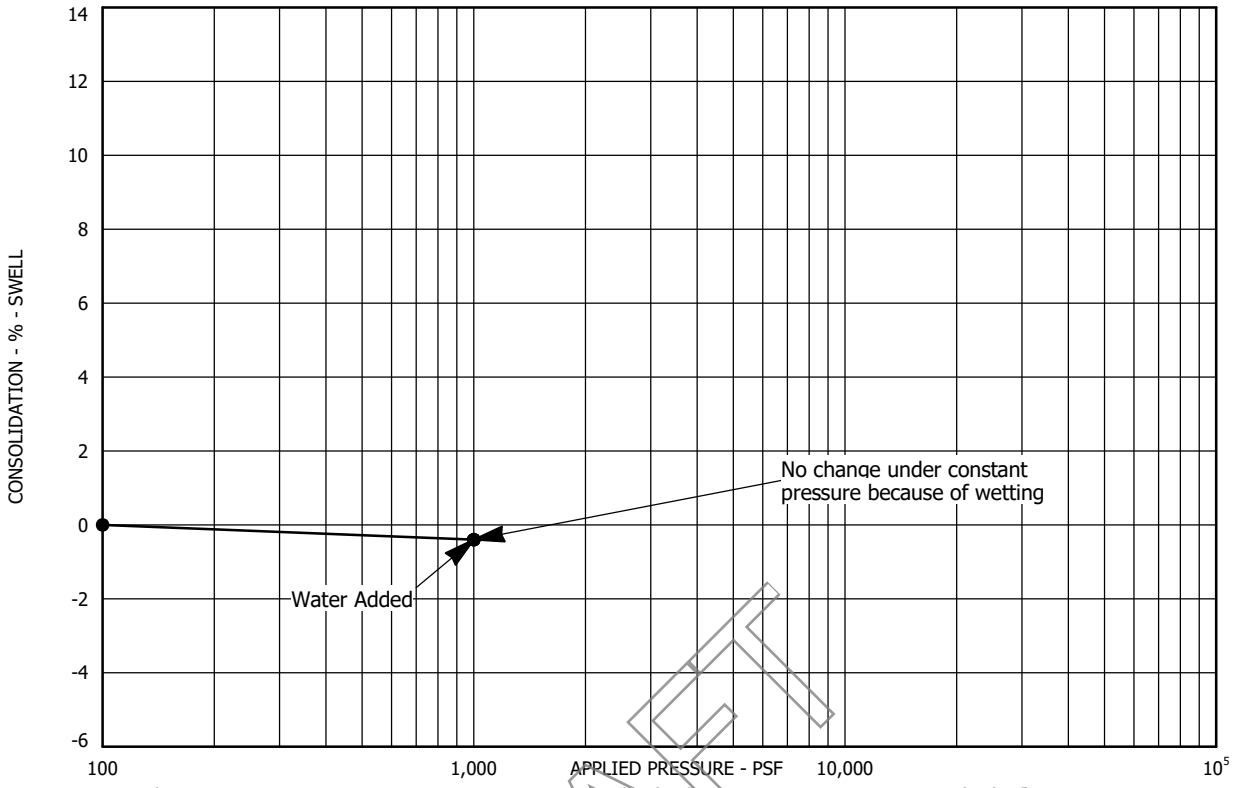
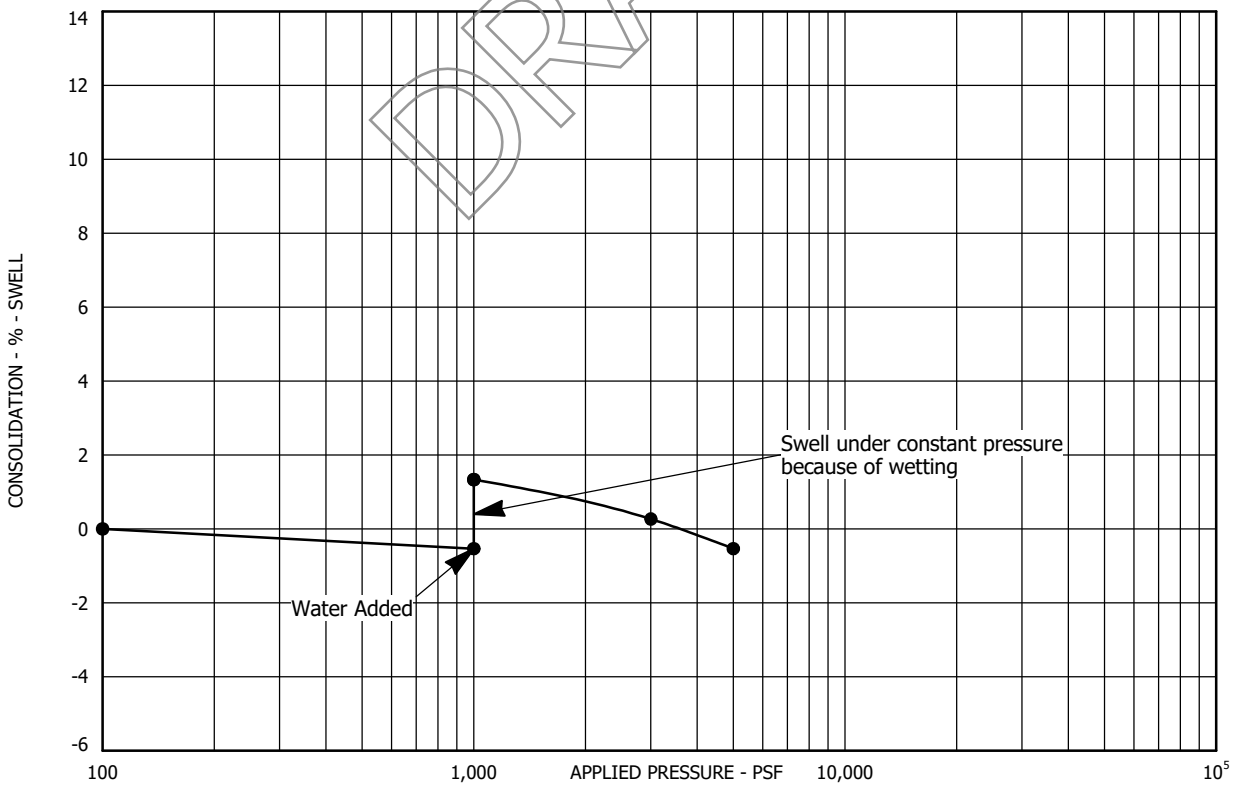


Sample Location: Test Boring No. 5 at a depth of 4 feet
Sample Description: Clay, sandy, trace gravel
Dry Unit Weight (pcf): 114
Moisture Content (%): 19

DRAFT



Sample Location: Test Boring No. 5 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 15

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-6
PROJECT NO. 223122

AGW
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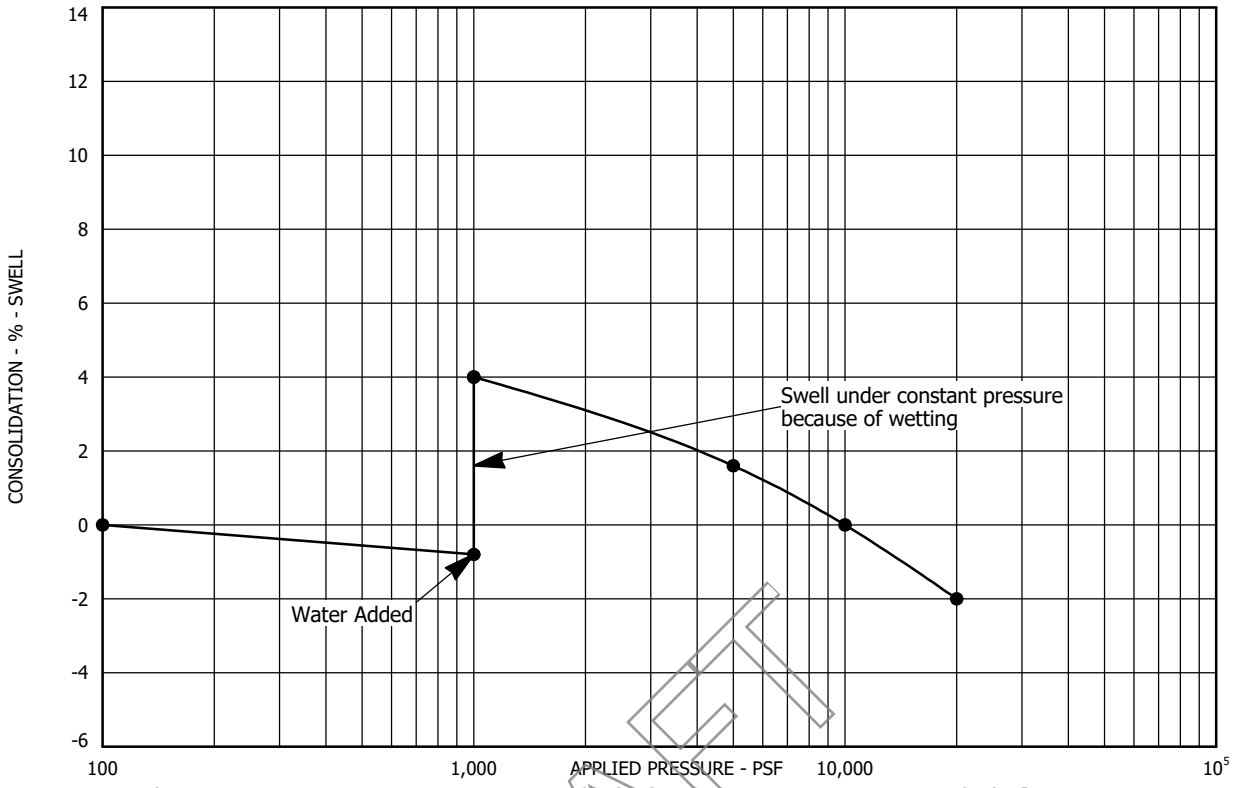
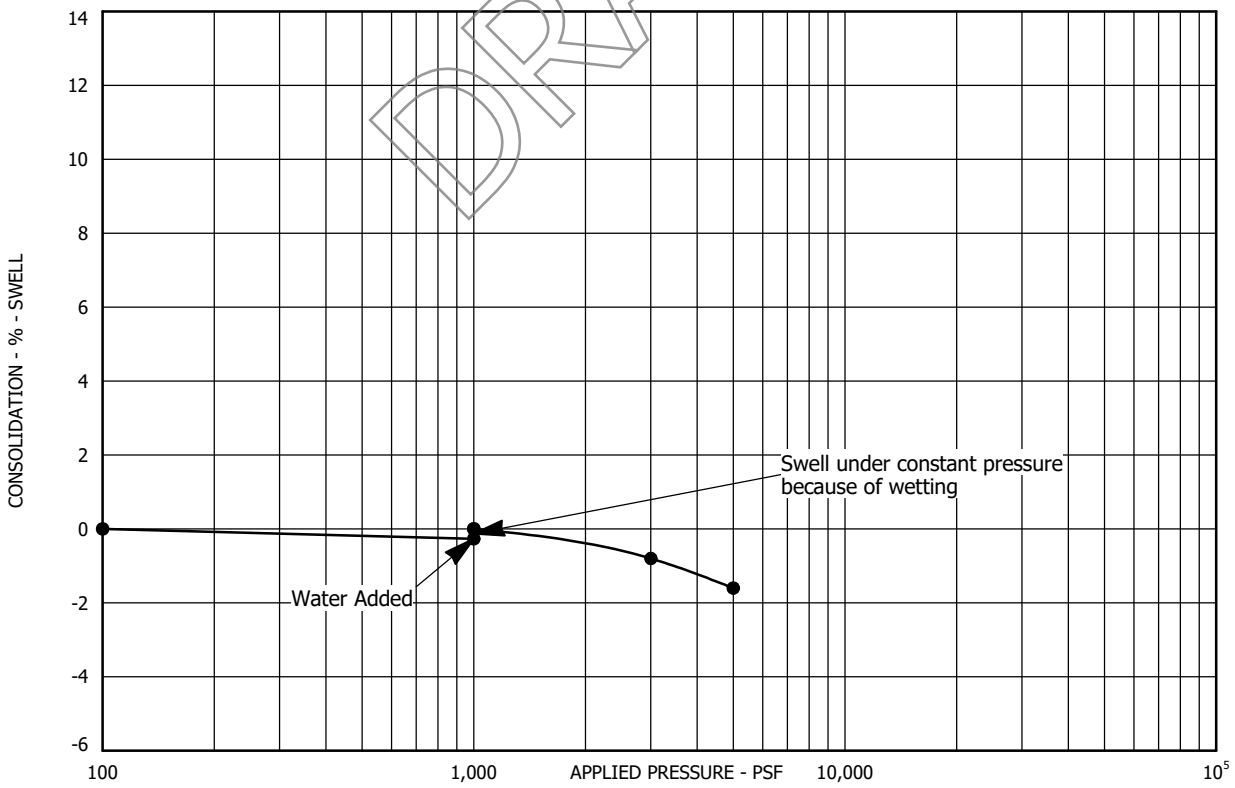


Sample Location: Test Boring No. 5 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 15

DRAFT



Sample Location: Test Boring No. 6 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 19

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-7
PROJECT NO. 223122

AGW
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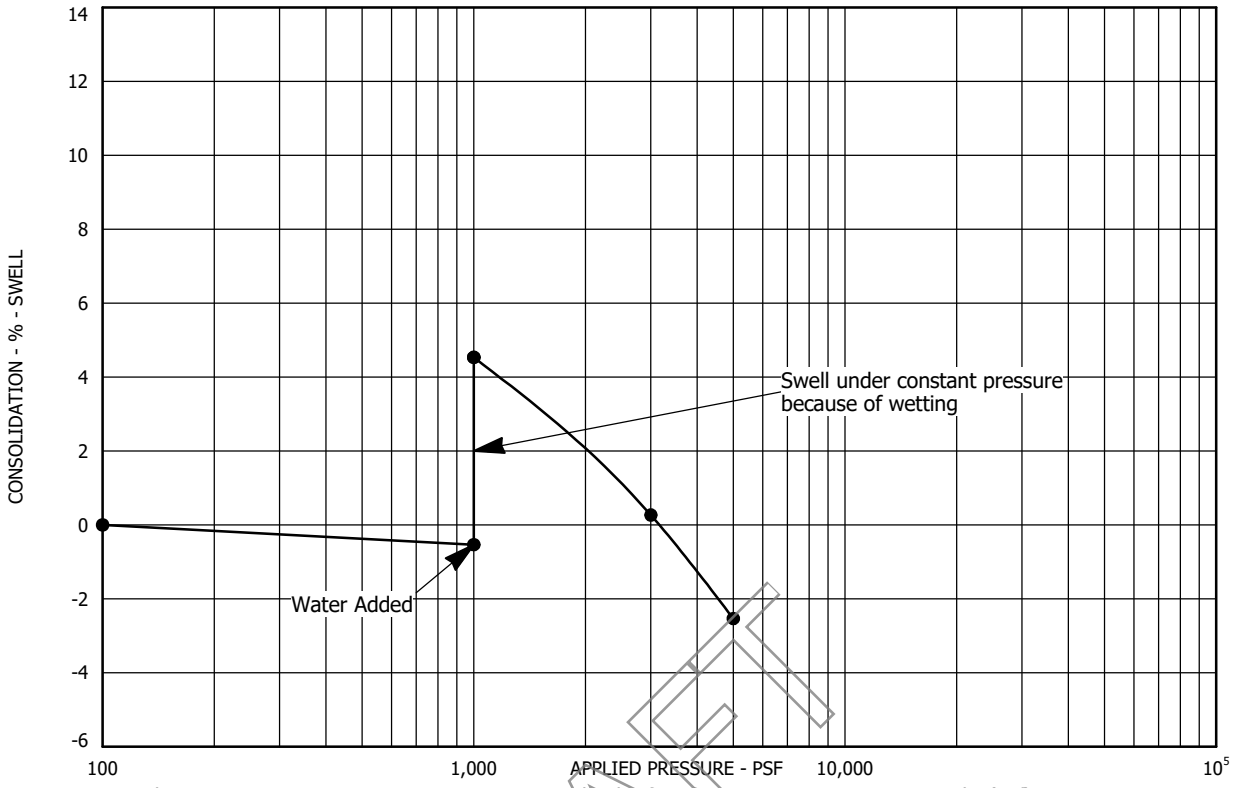
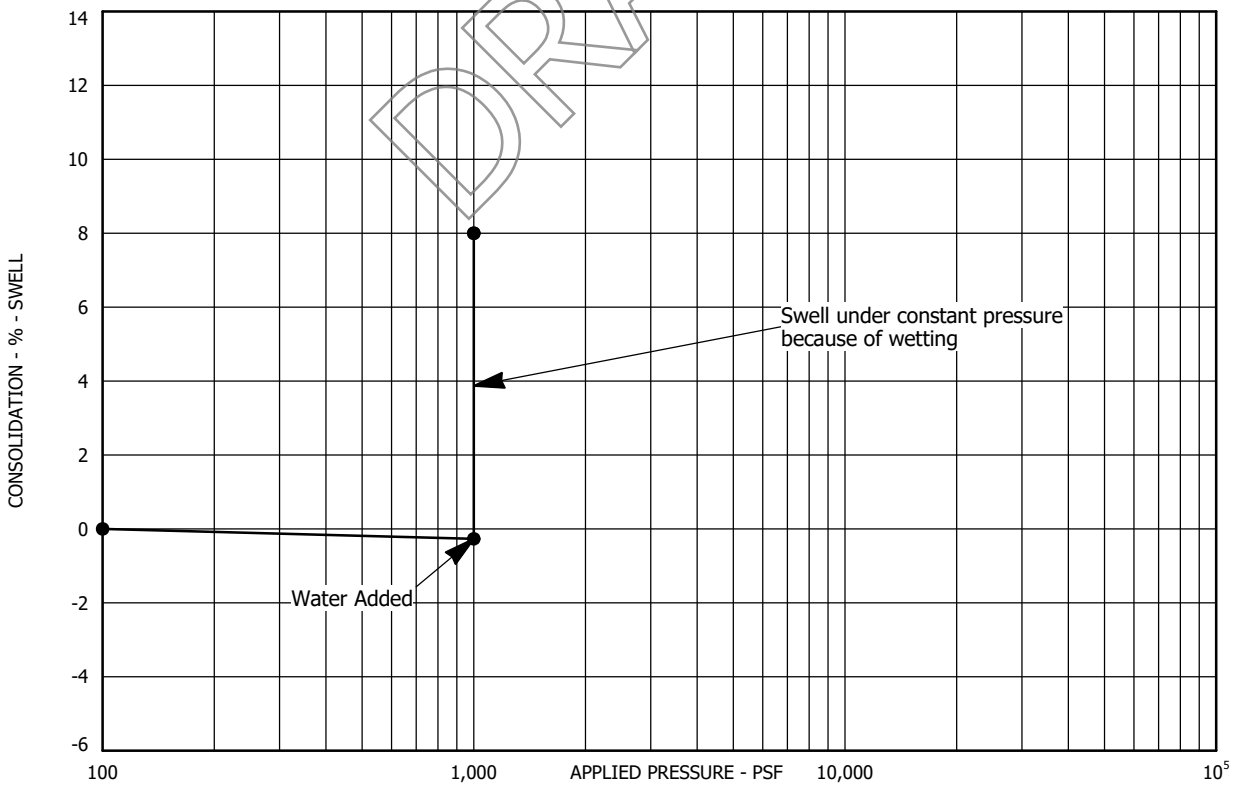


Sample Location: Test Boring No. 6 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 21

DRAFT



Sample Location: Test Boring No. 6 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 18

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-8
PROJECT NO. 223122

AGW
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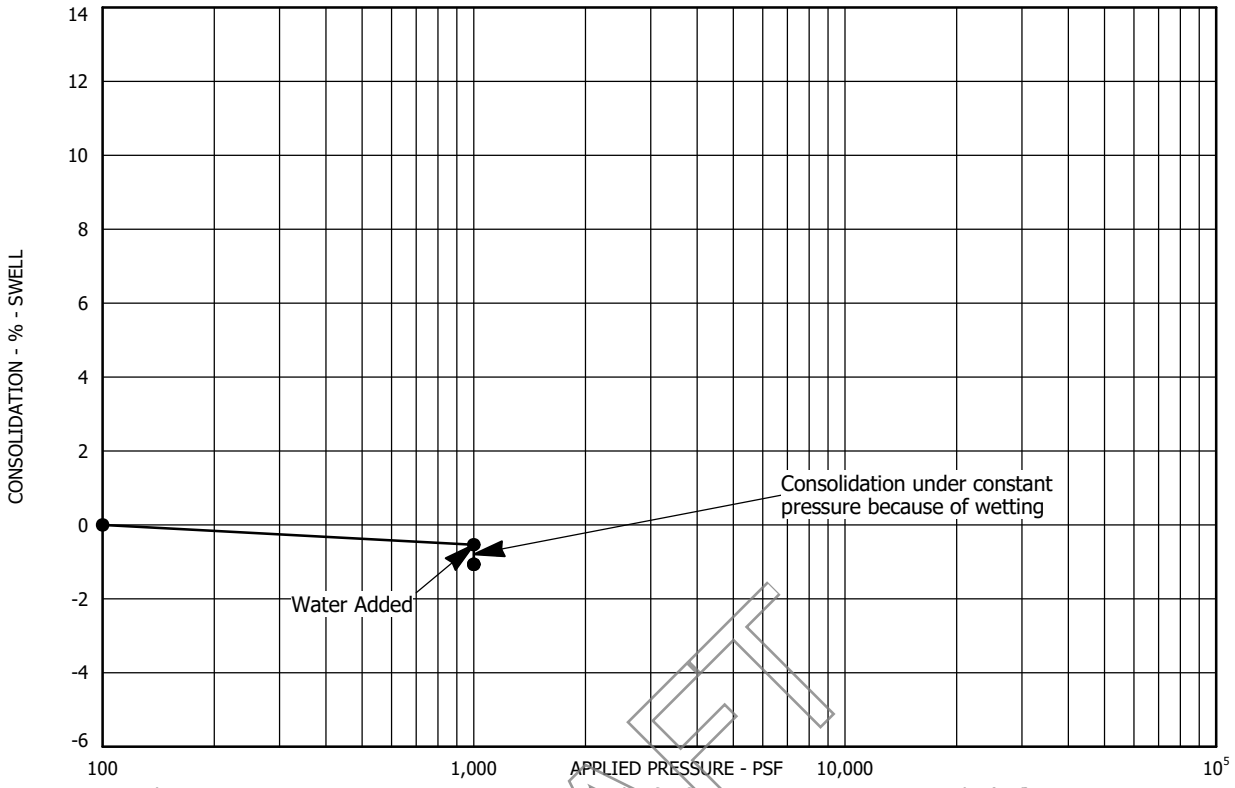
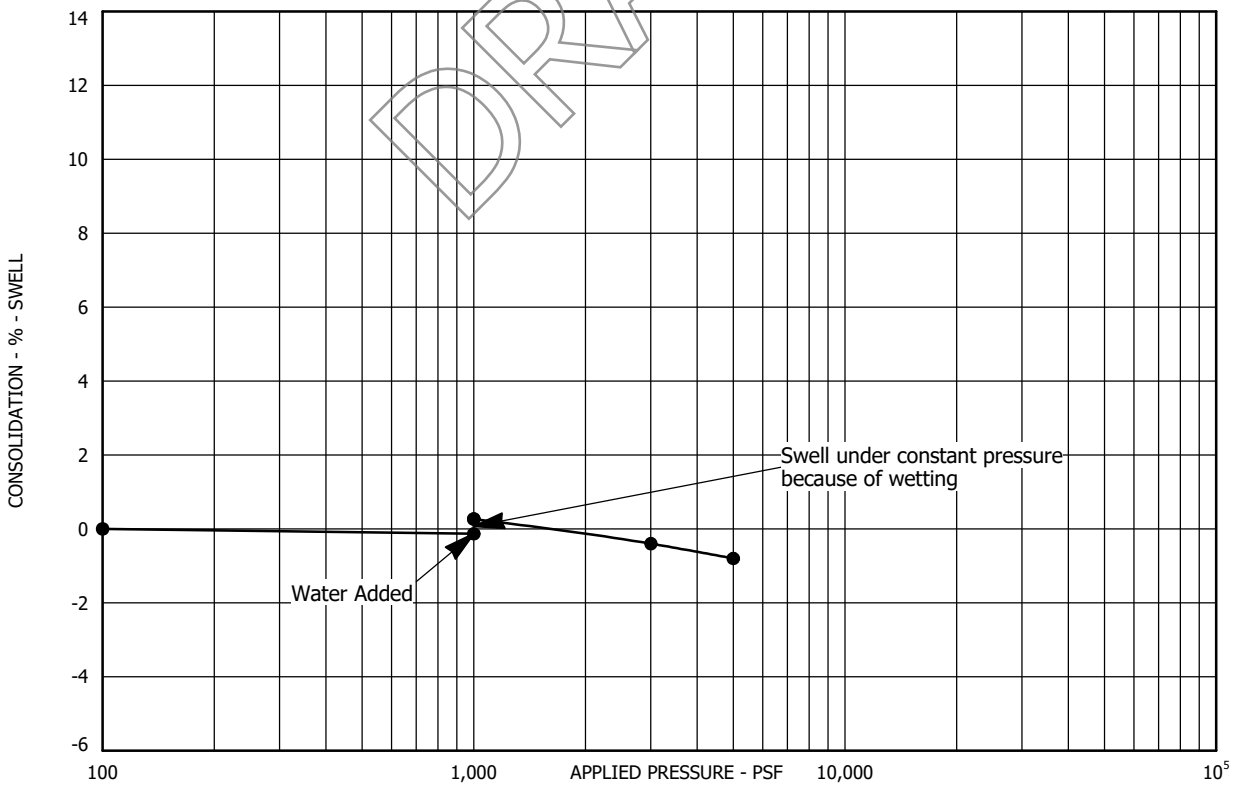


Sample Location: Test Boring No. 7 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 14

DRAFT



Sample Location: Test Boring No. 7 at a depth of 29 feet
Sample Description: Siltstone, clayey, trace sand
Dry Unit Weight (pcf): 120
Moisture Content (%): 12

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-9
PROJECT NO. 223122

AGW
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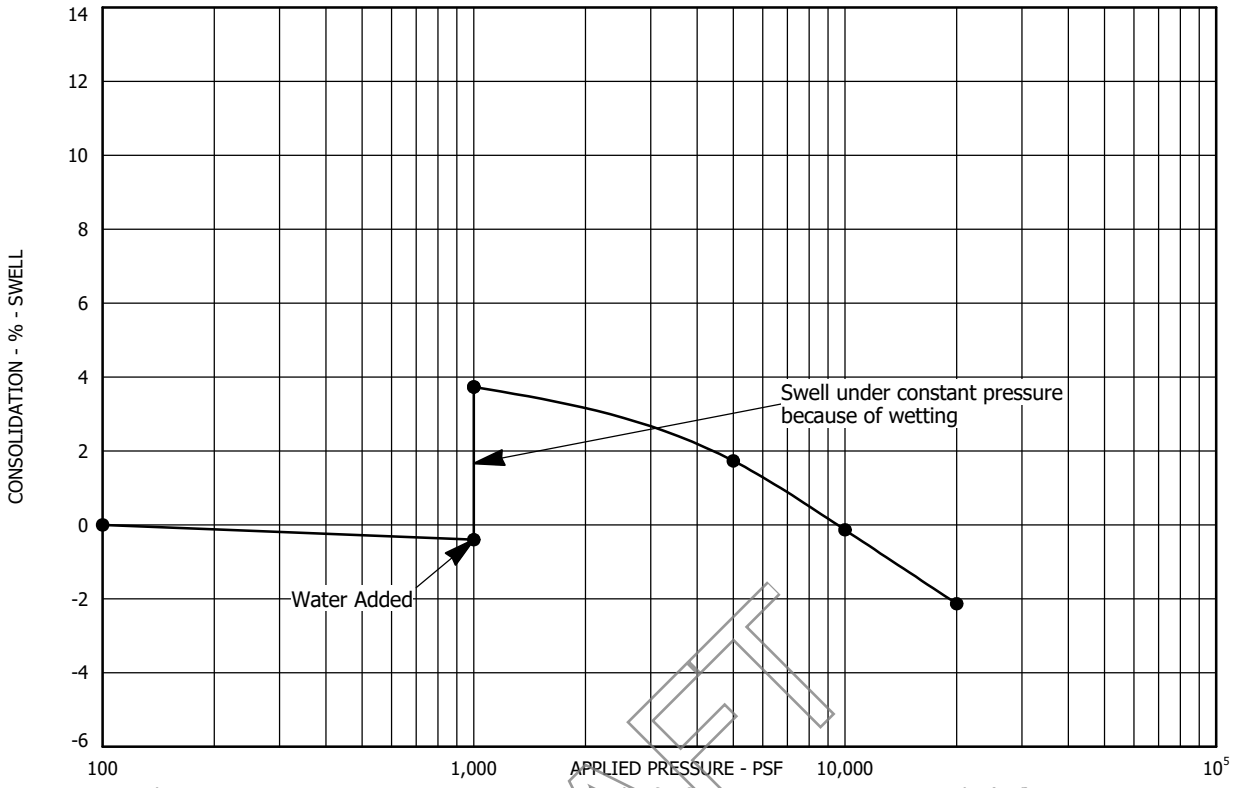

Sample Location: Test Boring No. 8 at a depth of 2 feet
Sample Description: Clay, sandy, trace gravel
Dry Unit Weight (pcf): 118
Moisture Content (%): 11

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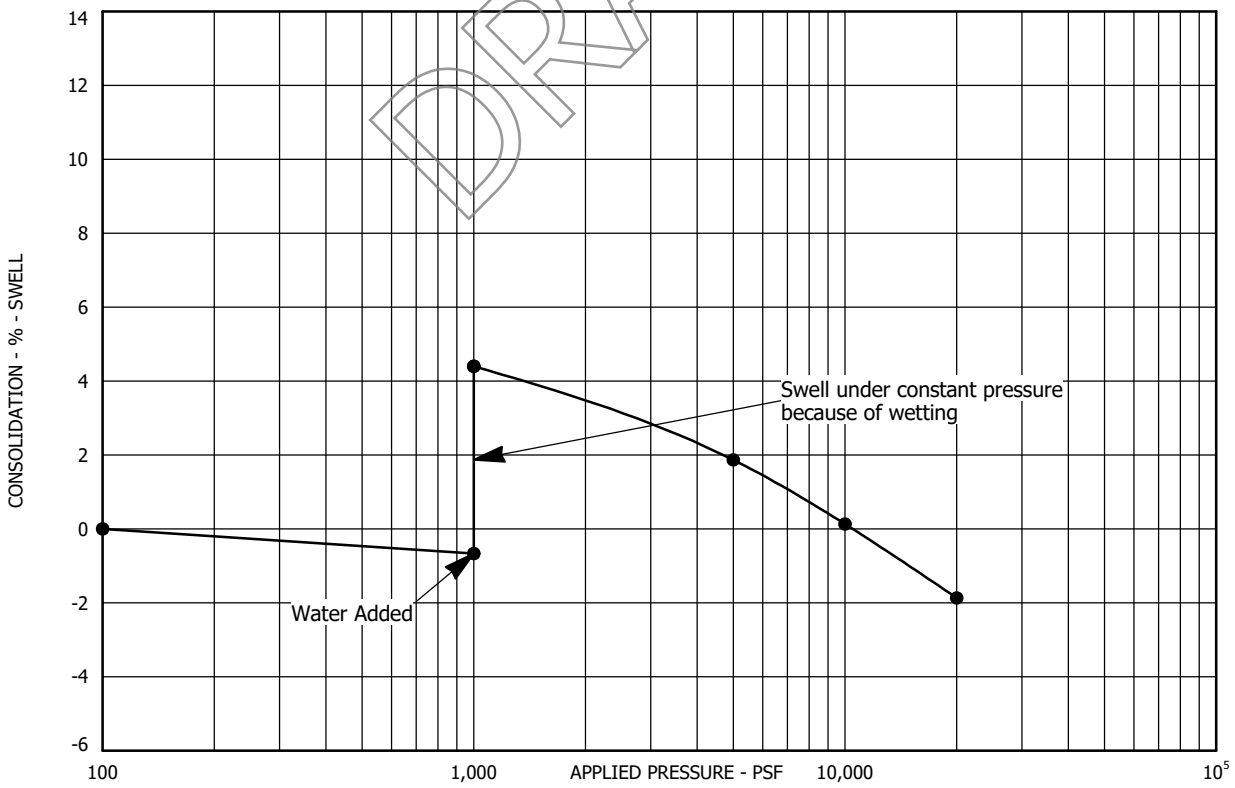
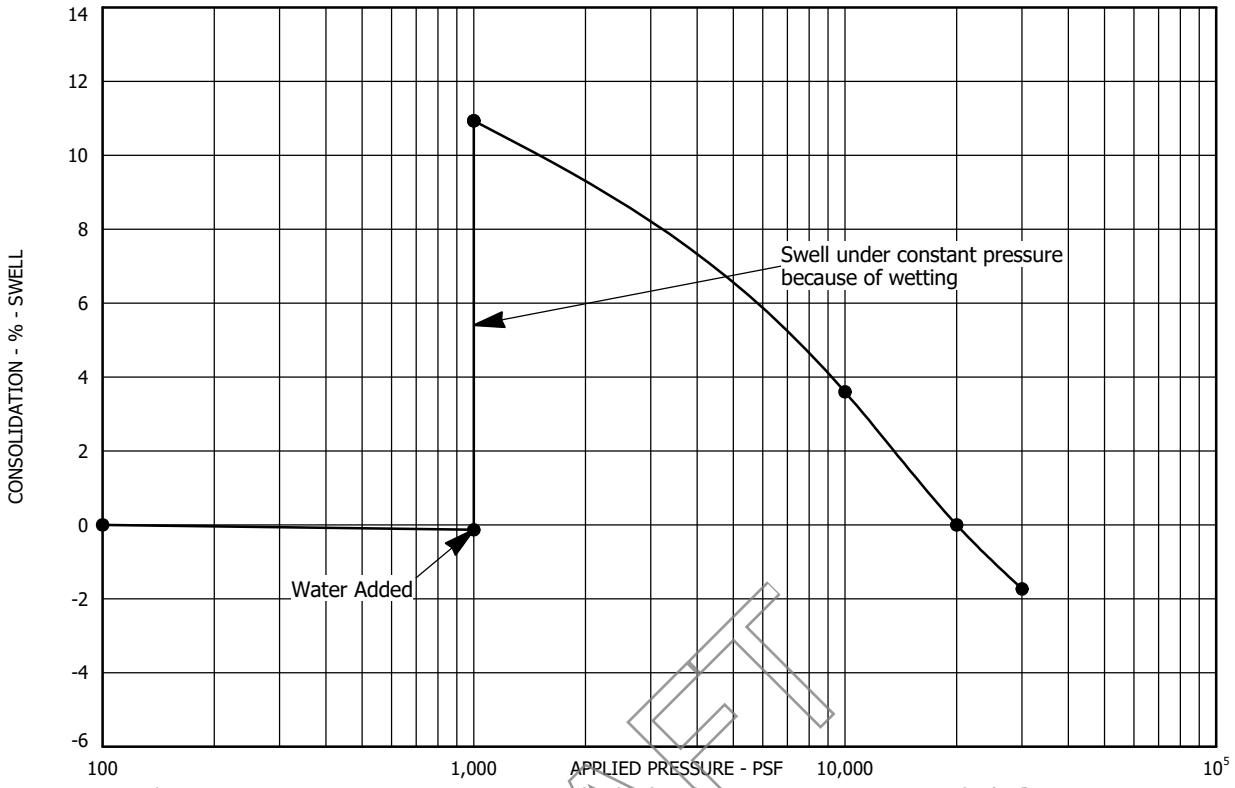


Sample Location: Test Boring No. 8 at a depth of 7 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 13

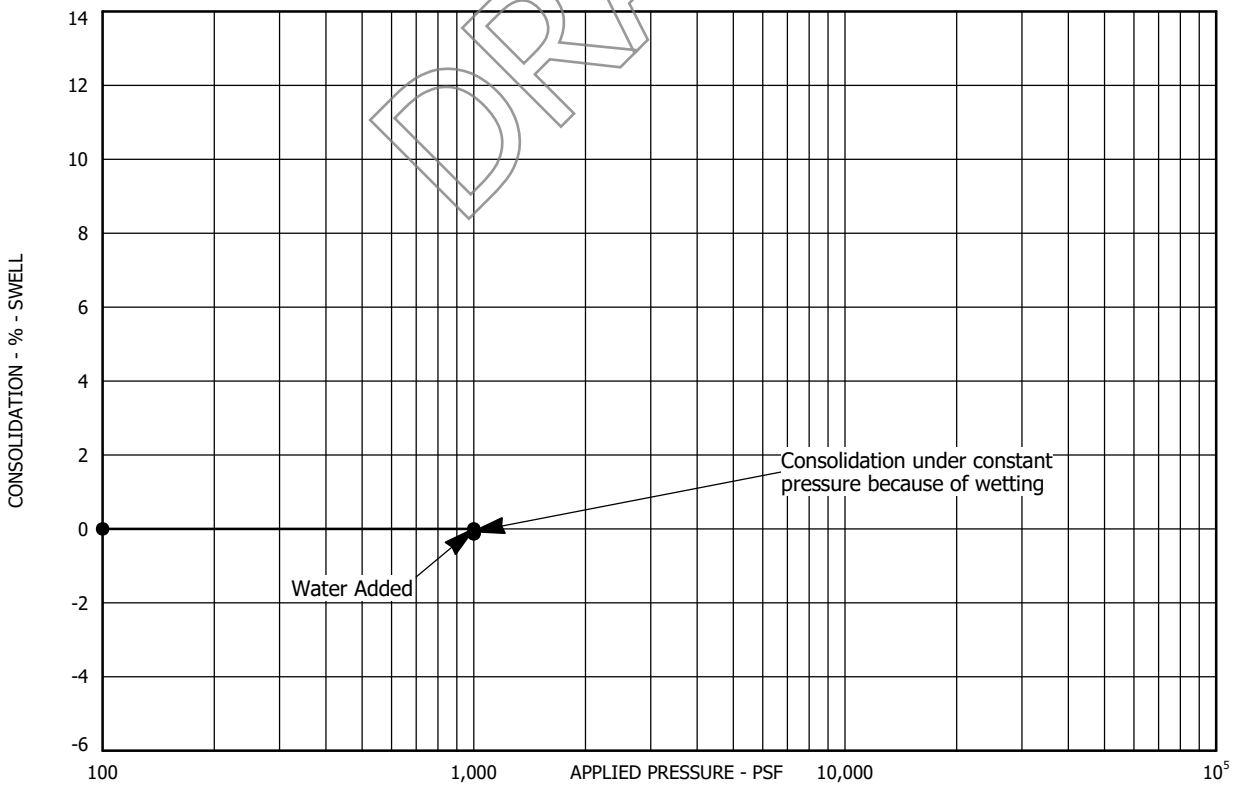
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-10
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 8 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

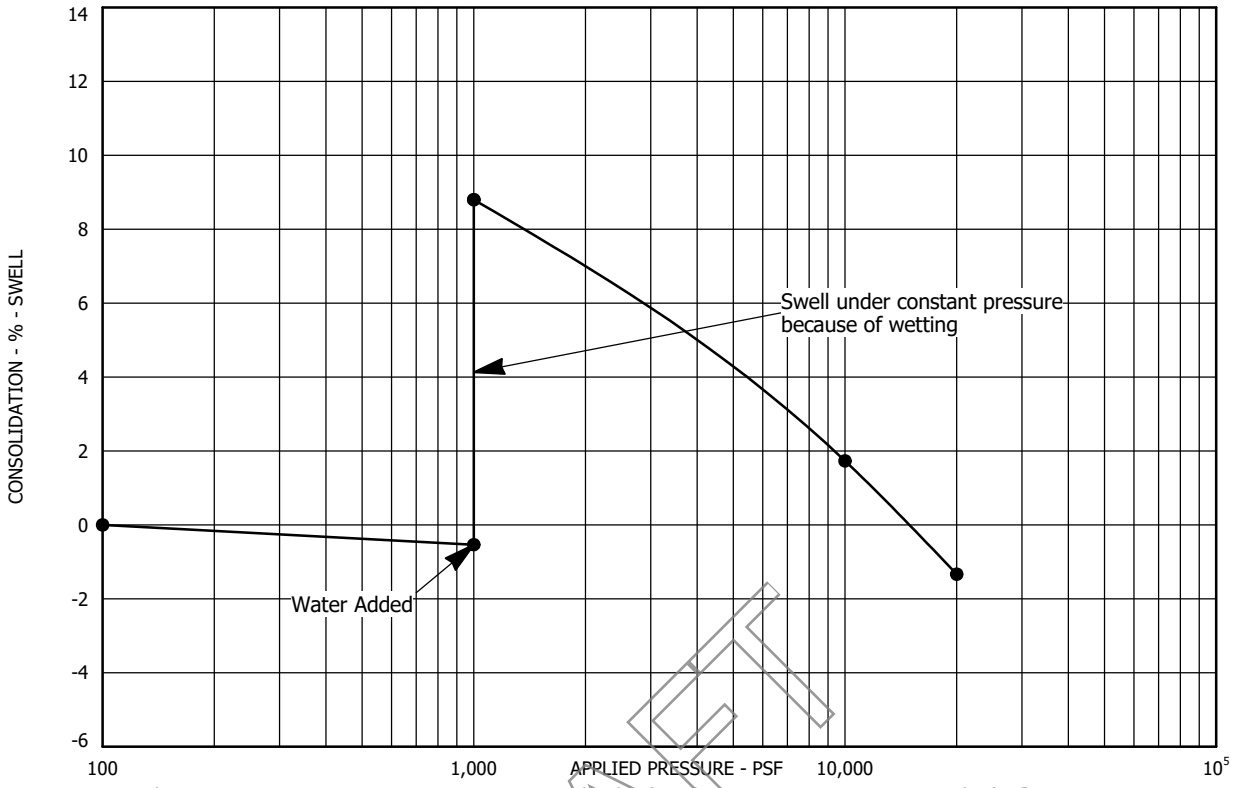
DRAFT



Sample Location: Test Boring No. 9 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 12

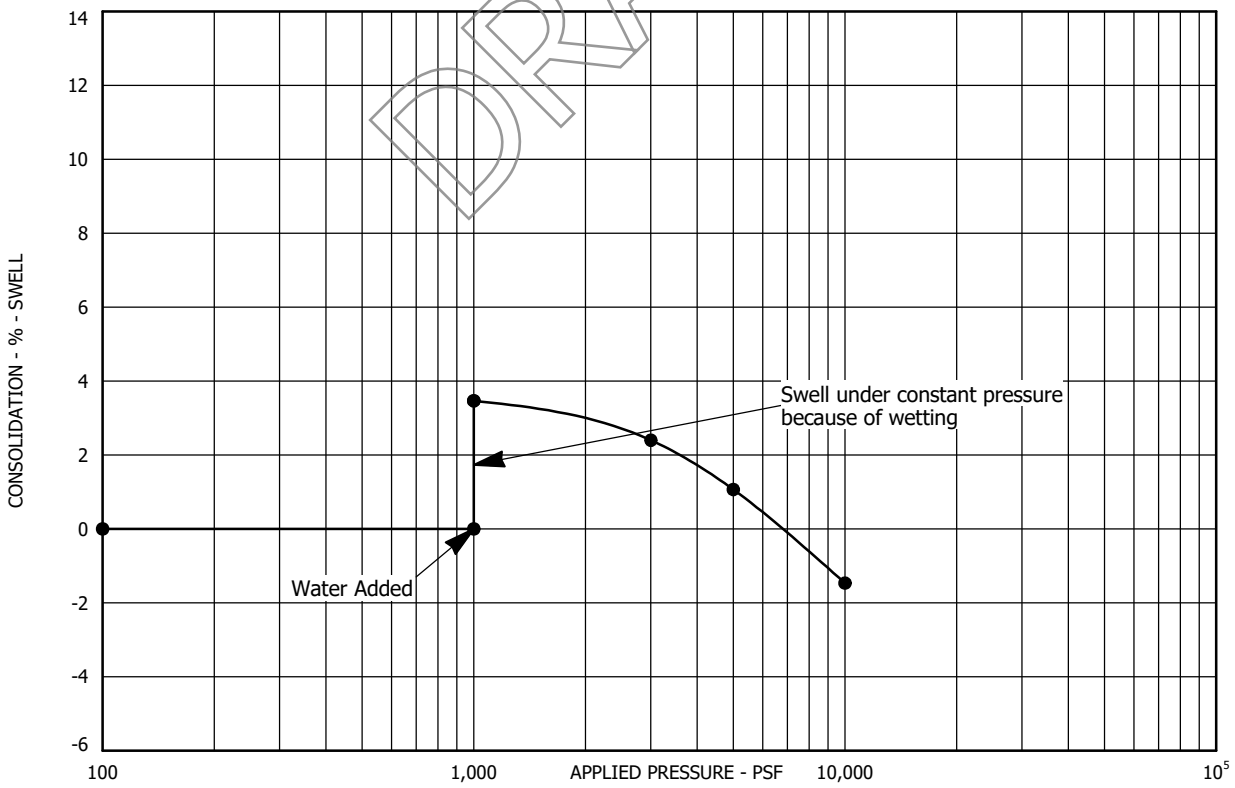
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-11
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 9 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 16

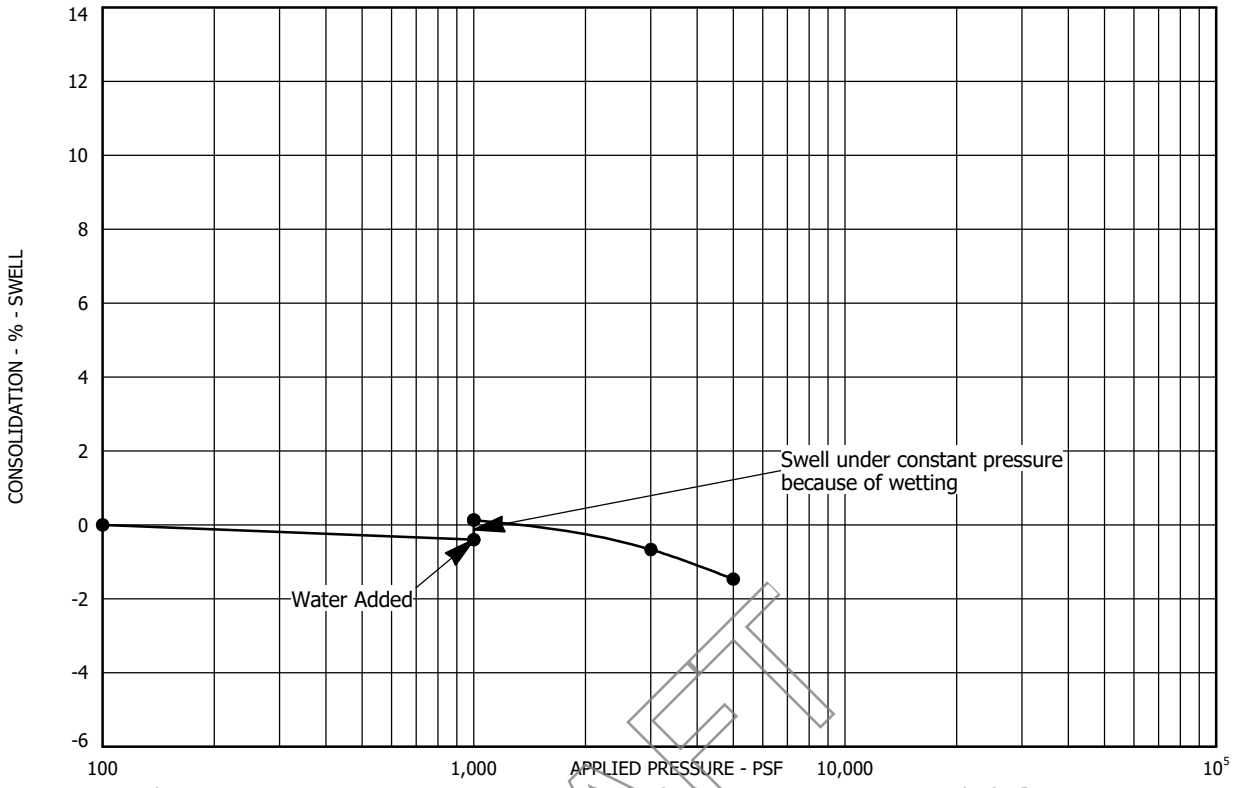
DRAFT



Sample Location: Test Boring No. 10 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 13

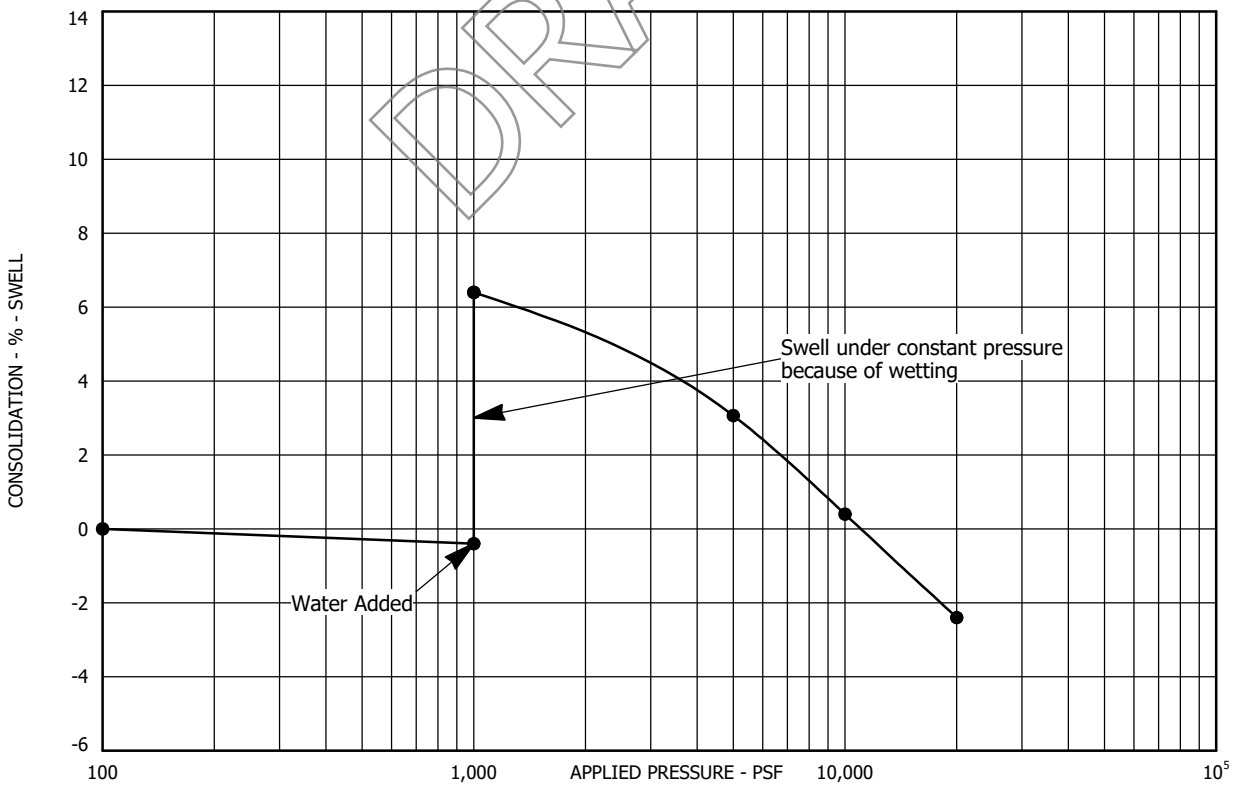
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-12
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 11 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 17

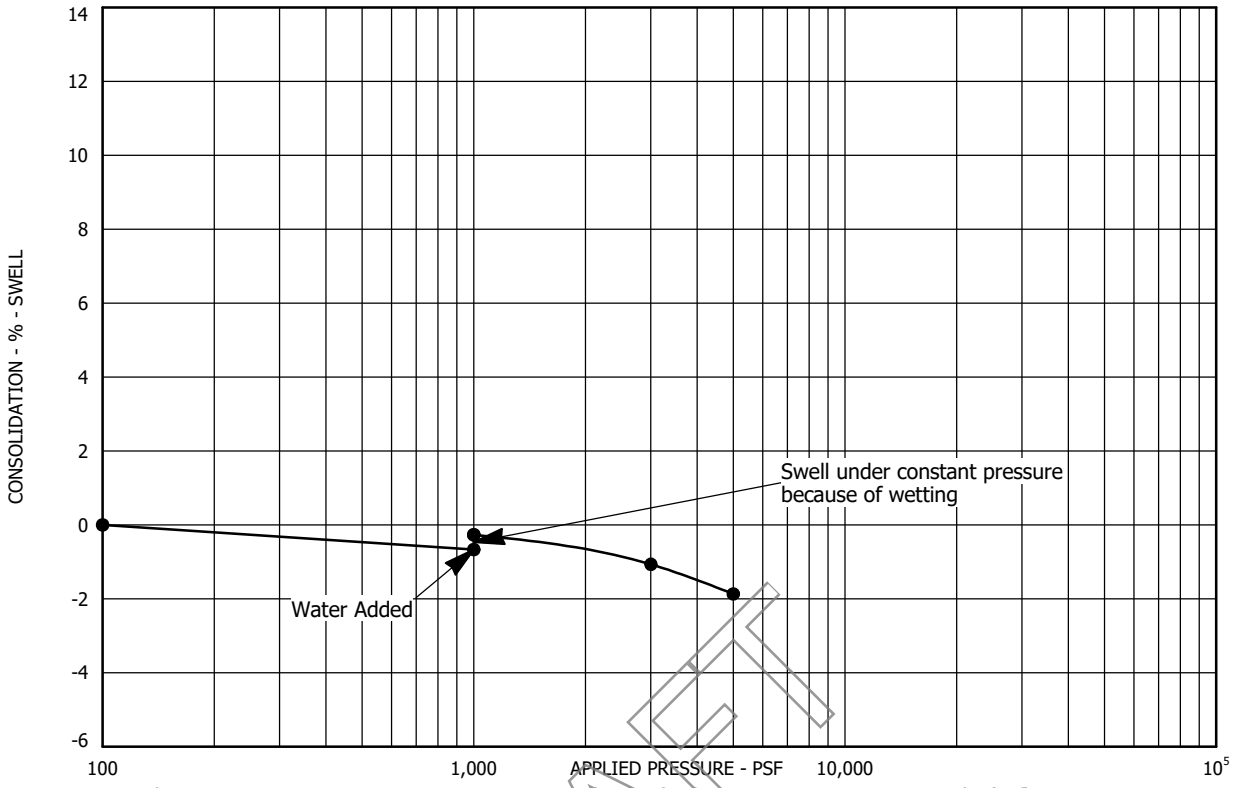
DRAFT



Sample Location: Test Boring No. 11 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 14

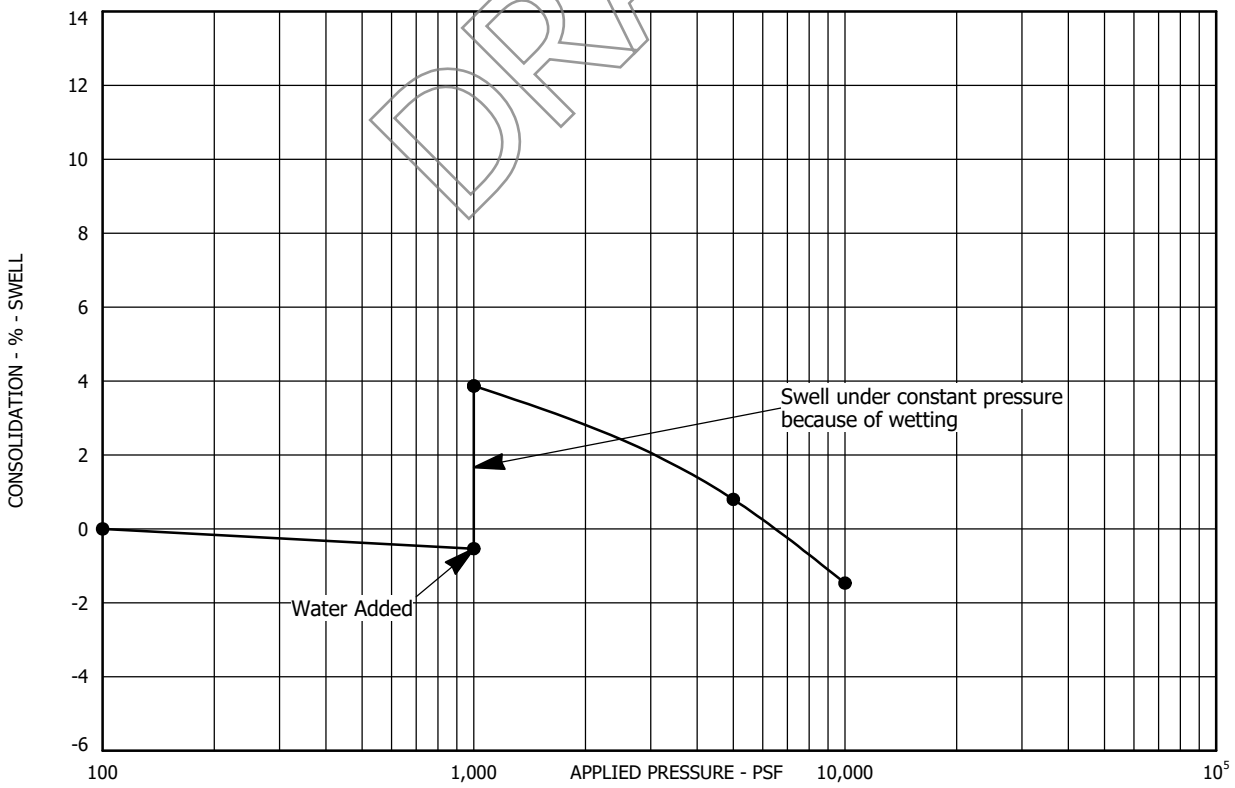
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-13
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 12 at a depth of 4 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 18

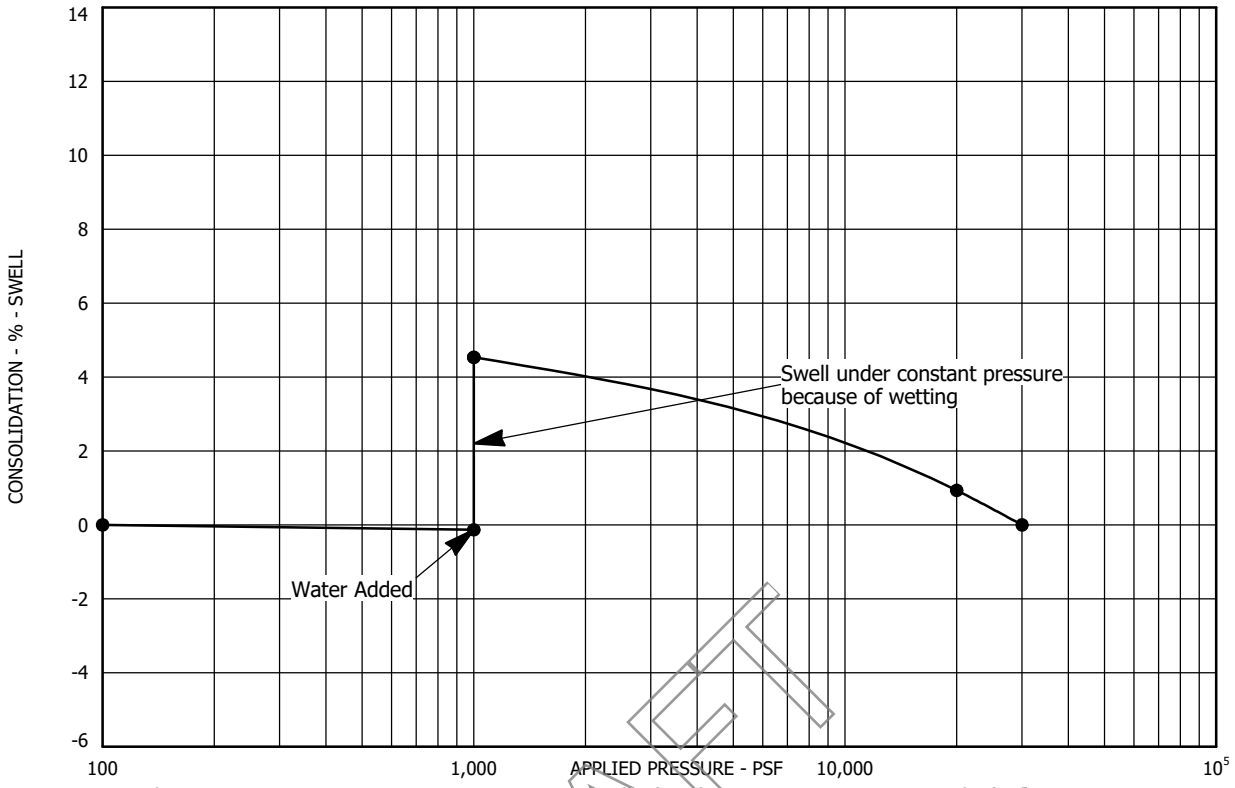
DRAFT



Sample Location: Test Boring No. 12 at a depth of 9 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 104
Moisture Content (%): 22

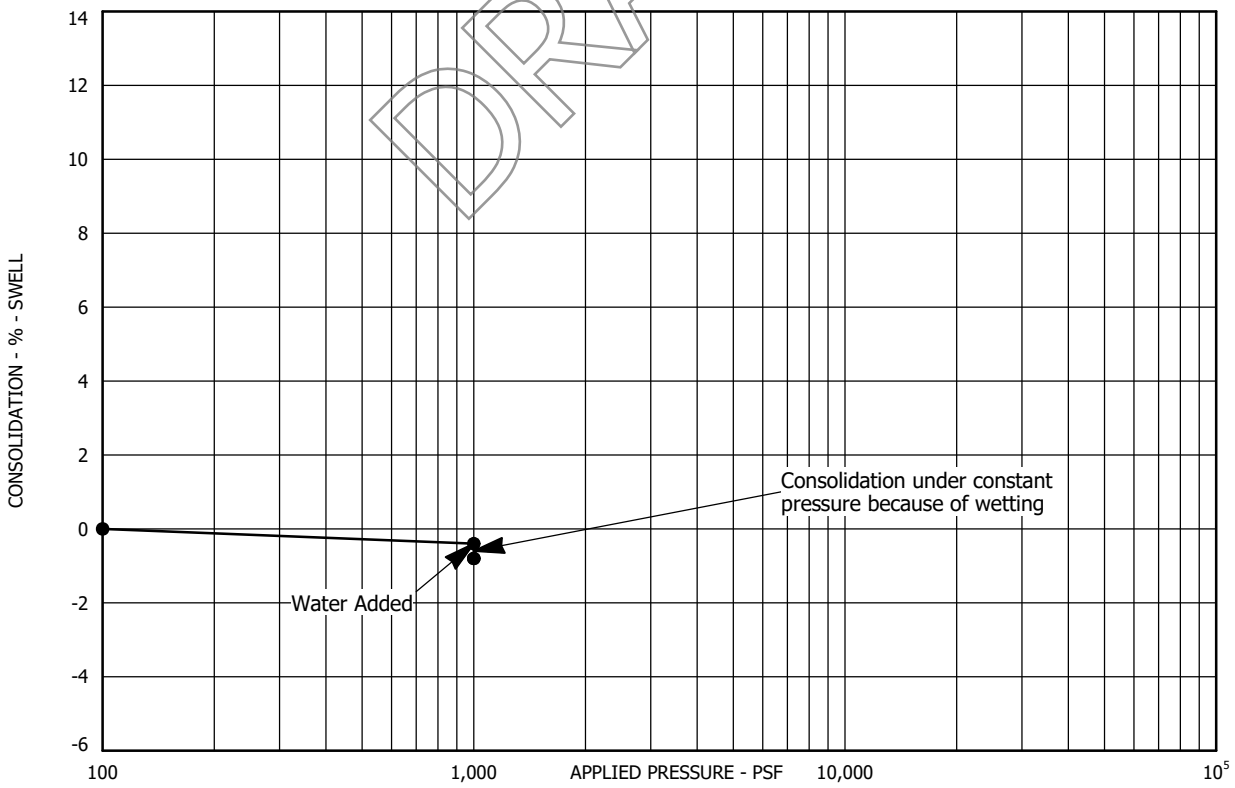
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-14
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 12 at a depth of 29 feet
Sample Description: Claystone, sandy (lens)
Dry Unit Weight (pcf): 123
Moisture Content (%): 12

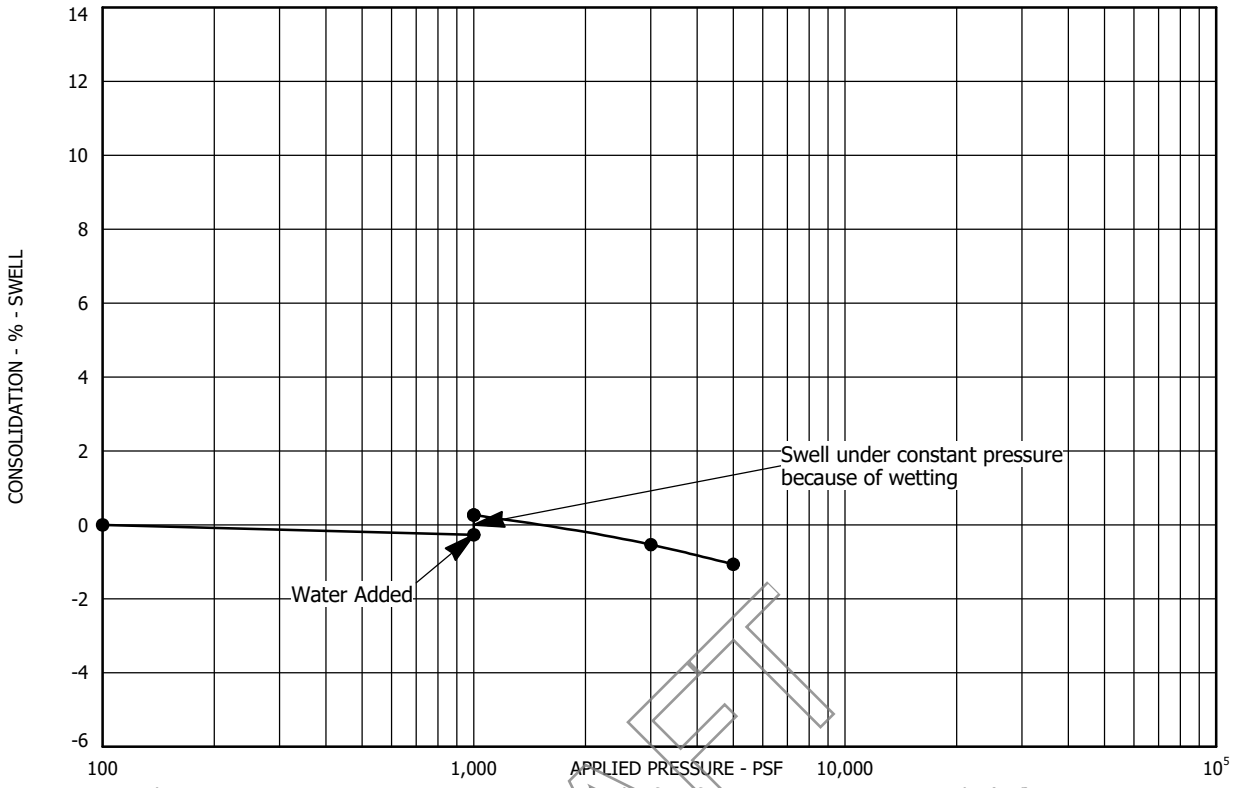
DRAFT



Sample Location: Test Boring No. 13 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 14

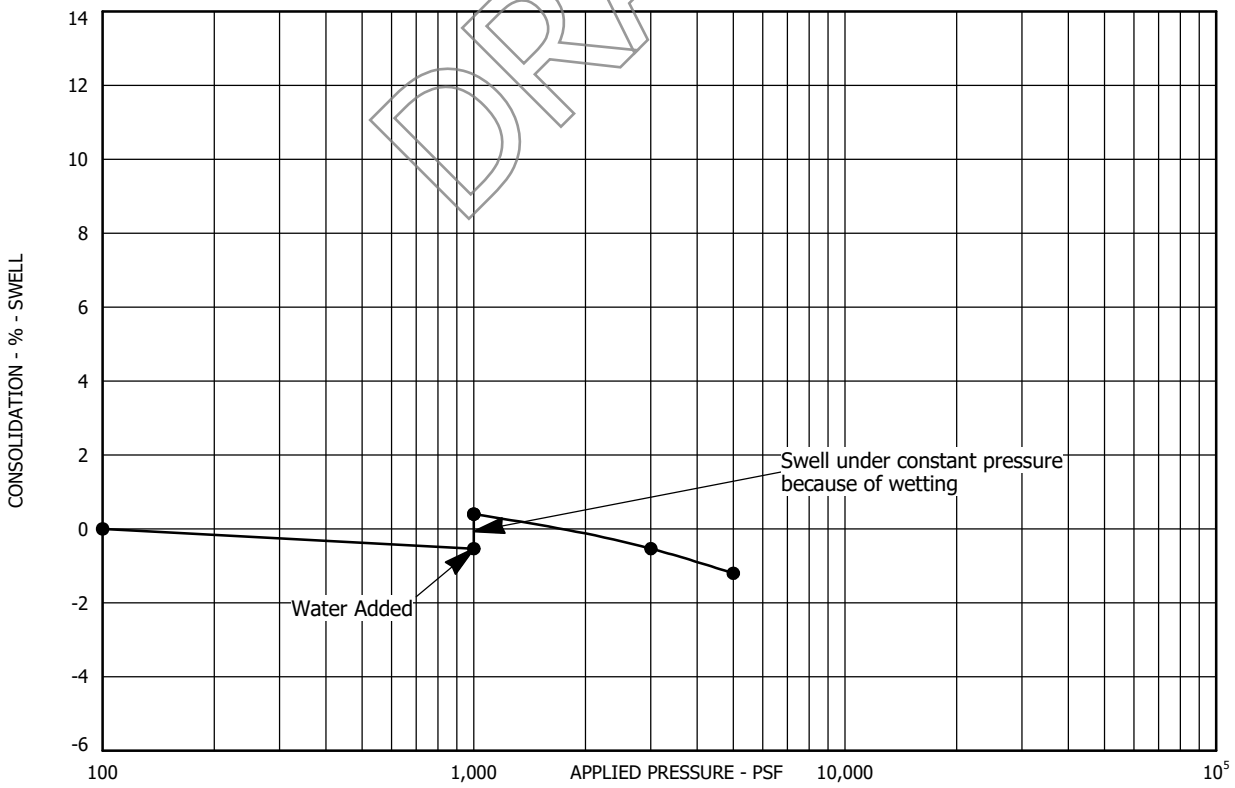
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-15
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 13 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 15

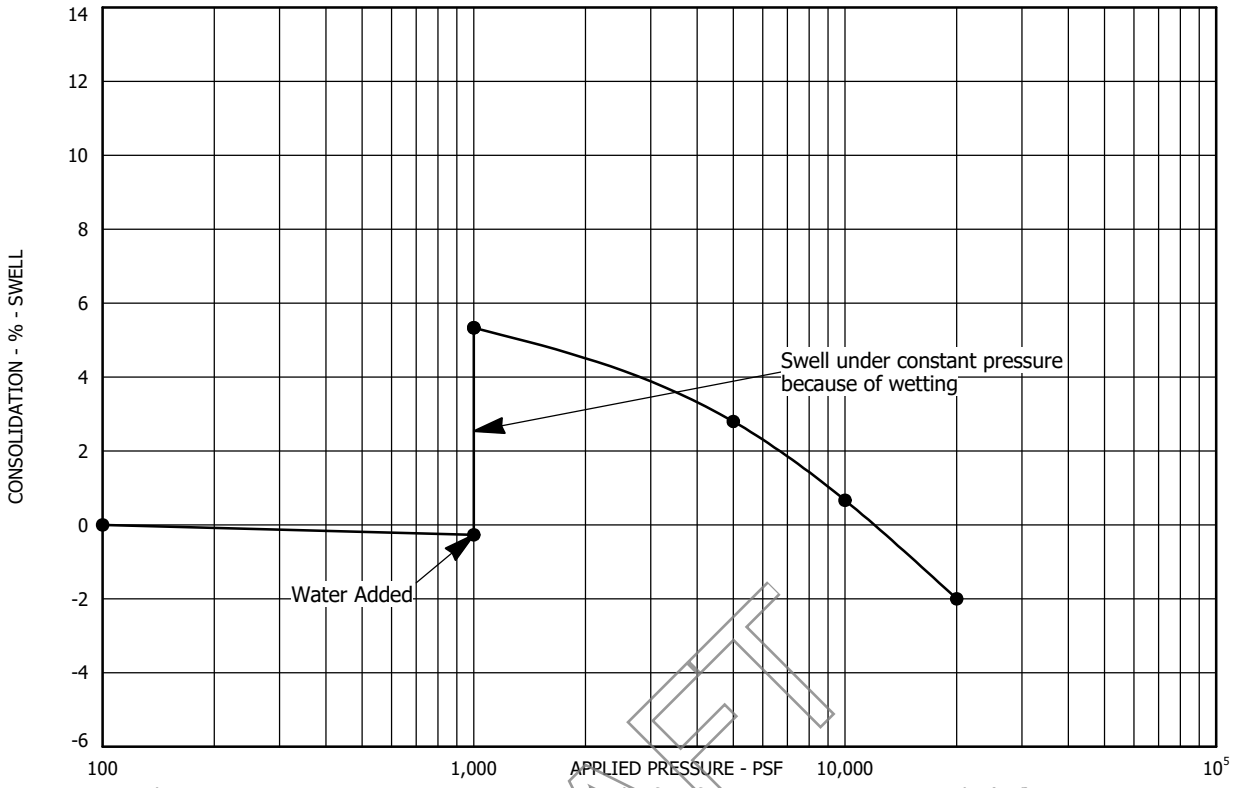
DRAFT



Sample Location: Test Boring No. 14 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 17

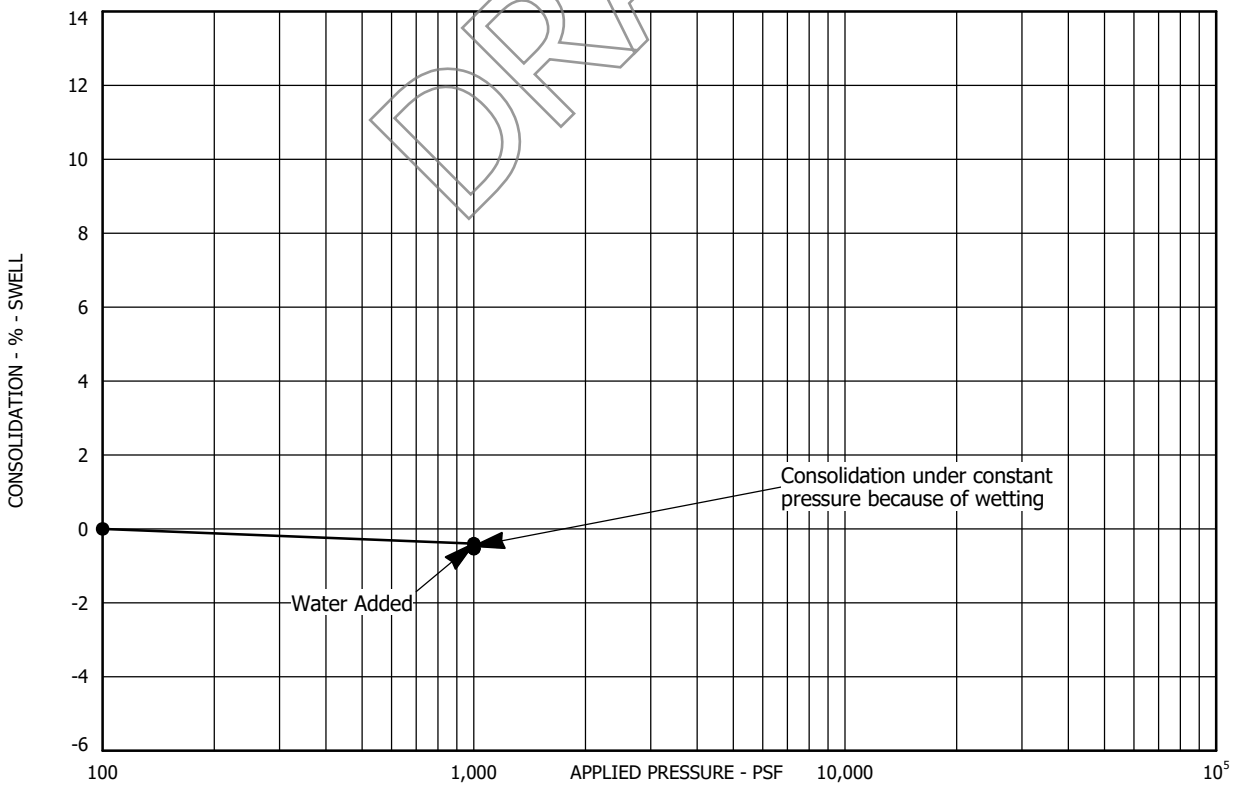
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-16
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 14 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 18

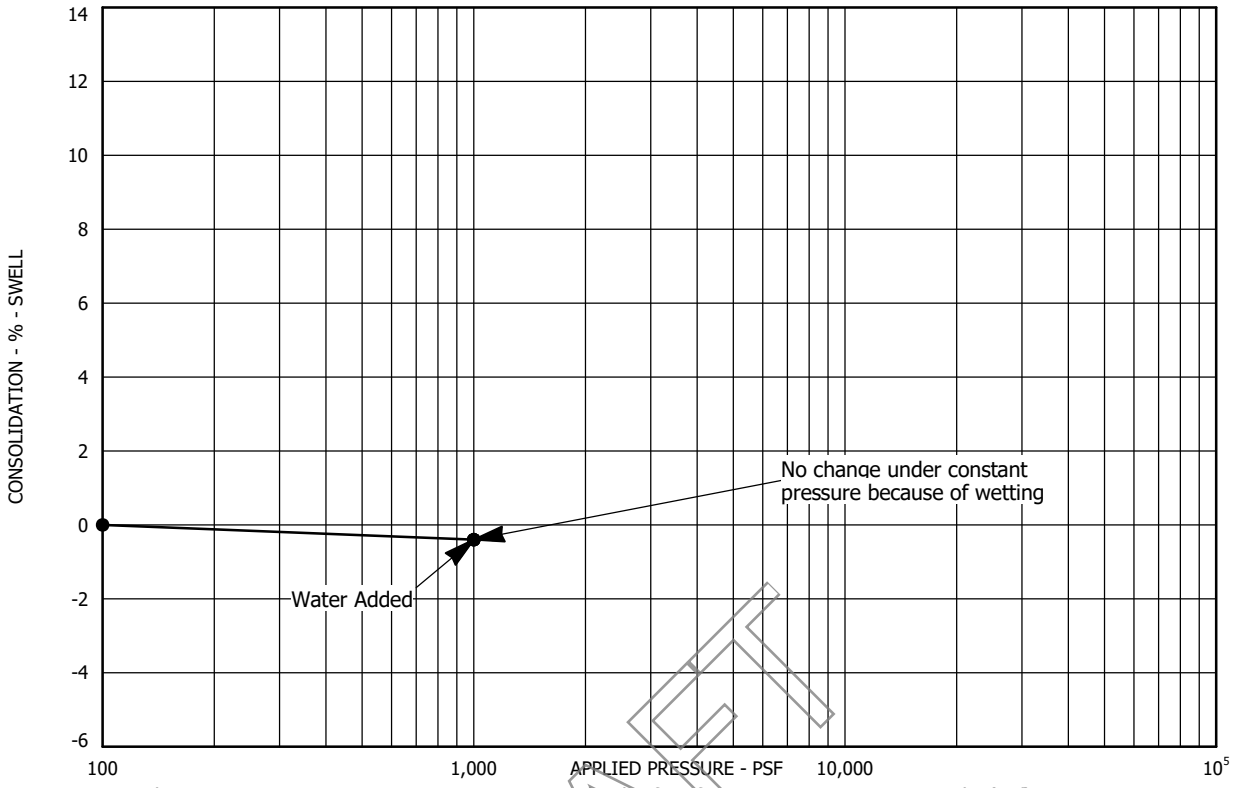
DRAFT



Sample Location: Test Boring No. 15 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 18

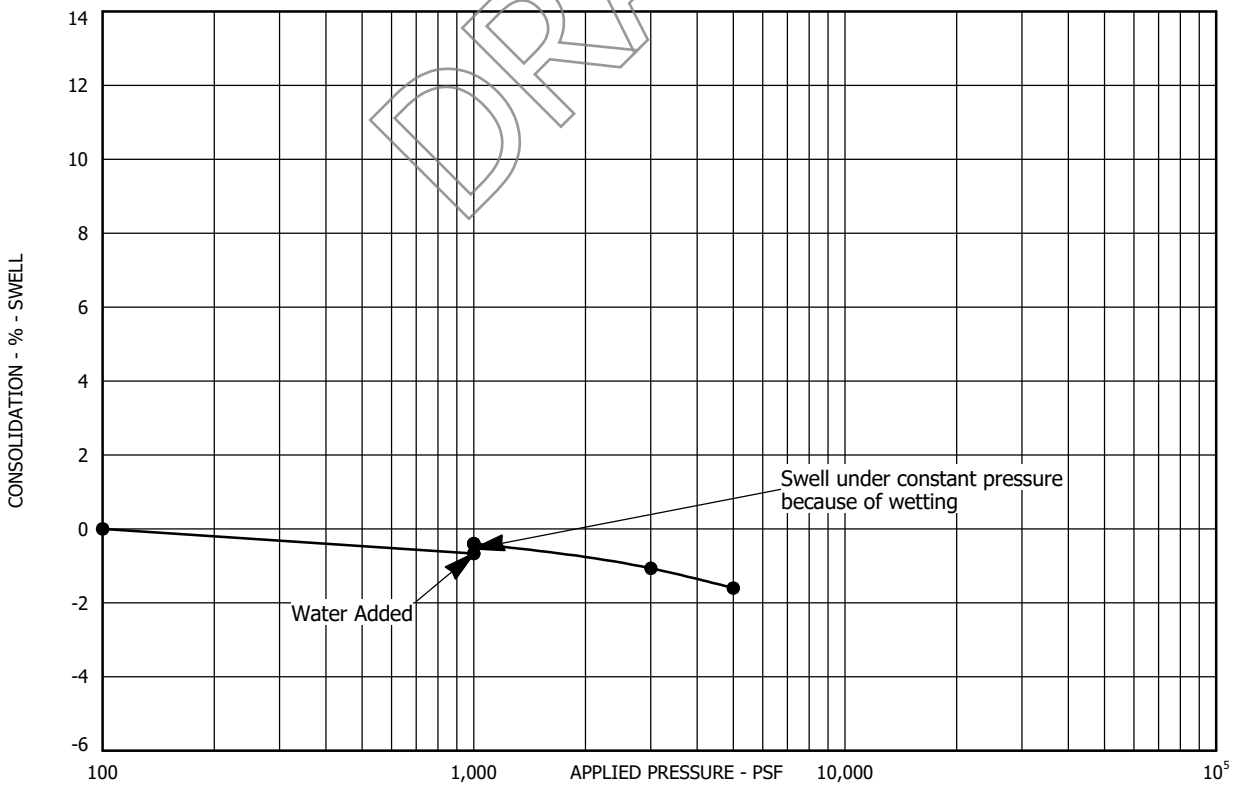
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-17
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 15 at a depth of 24 feet
Sample Description: Claystone, slightly sandy (lens)
Dry Unit Weight (pcf): 108
Moisture Content (%): 15

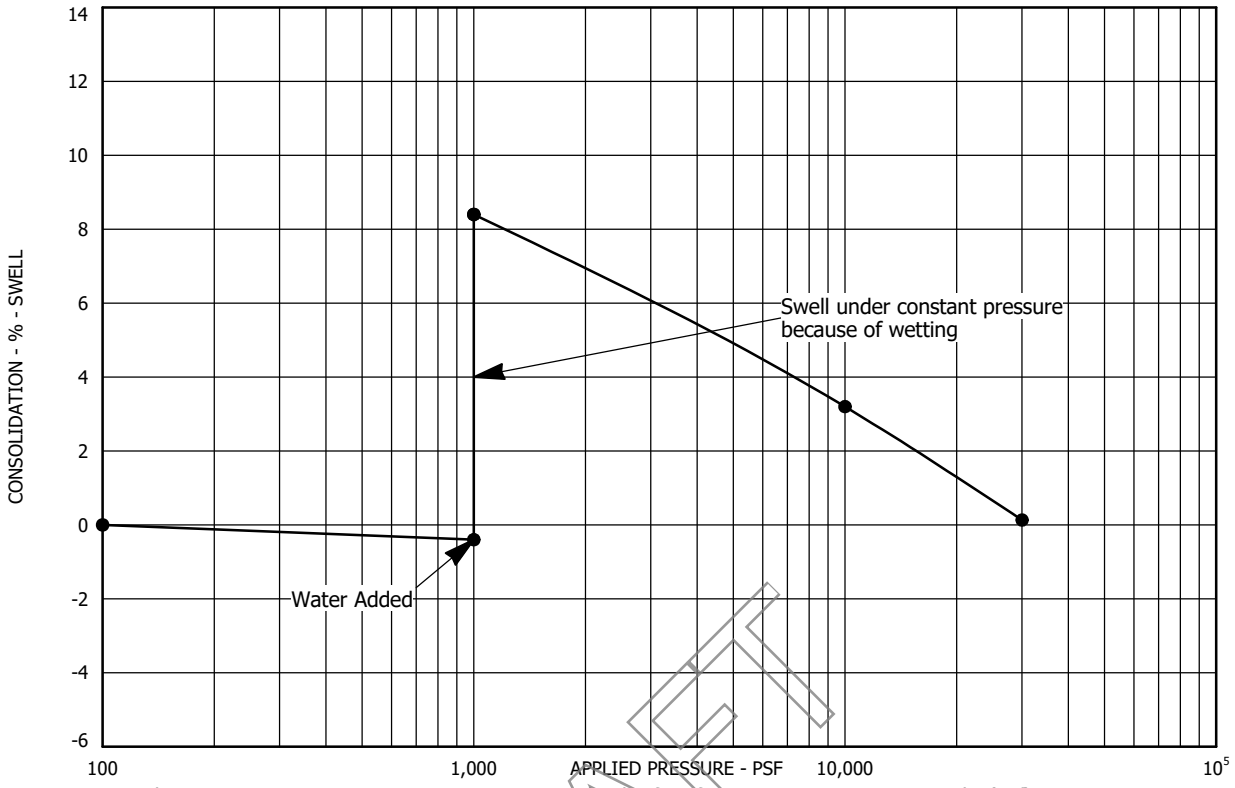
DRAFT



Sample Location: Test Boring No. 16 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 12

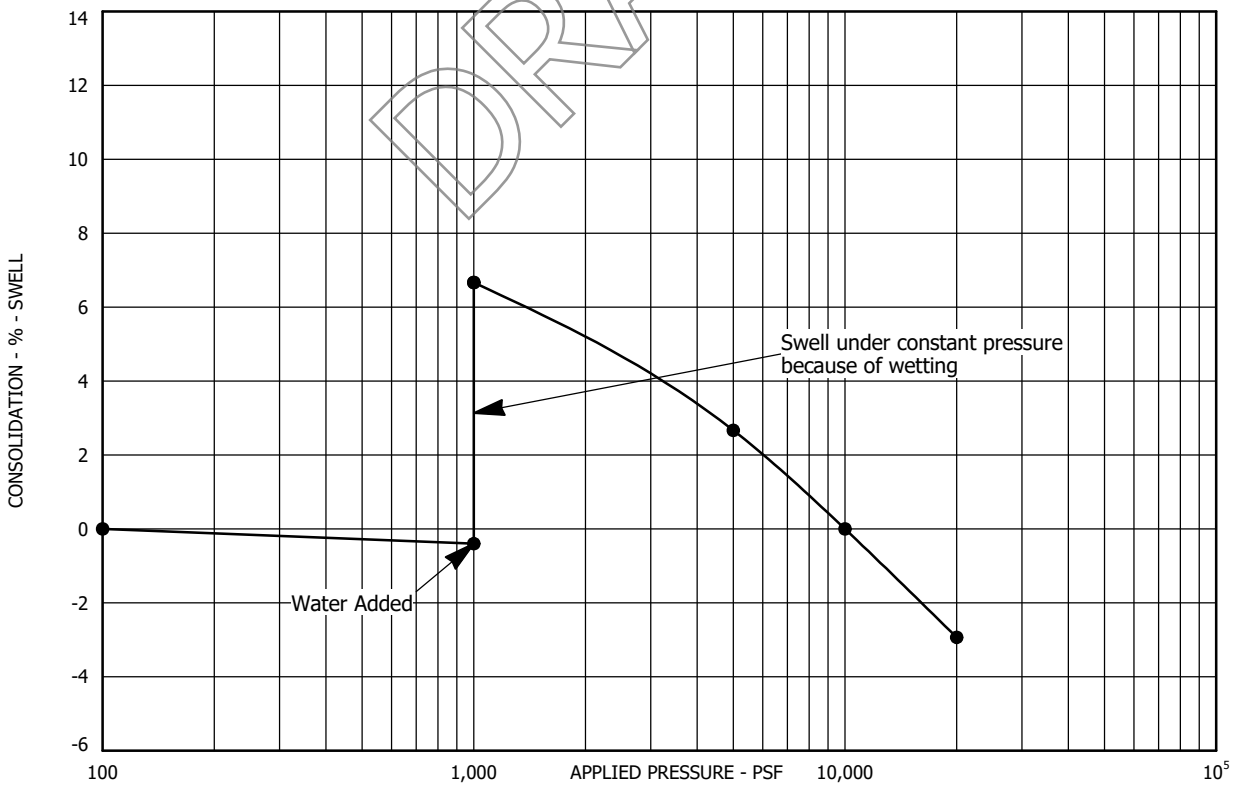
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-18
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 16 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 12

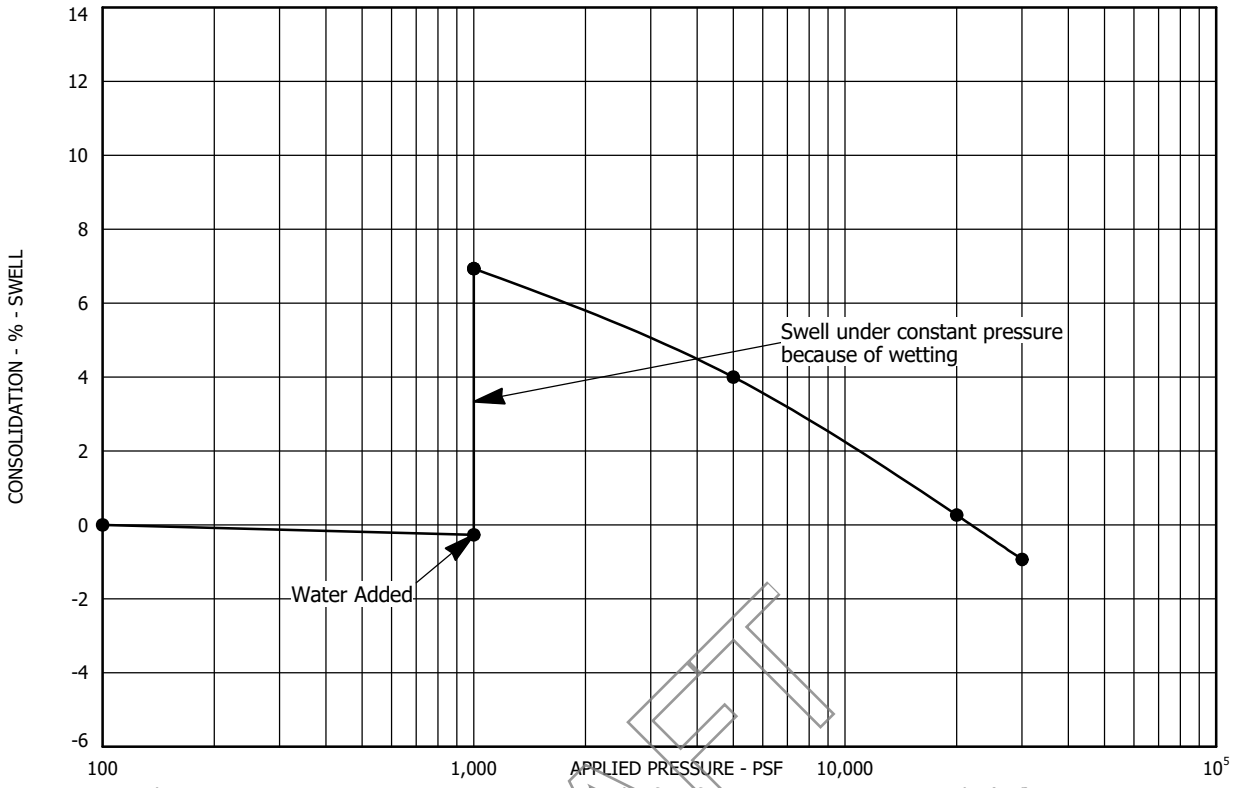
DRAFT



Sample Location: Test Boring No. 17 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 20

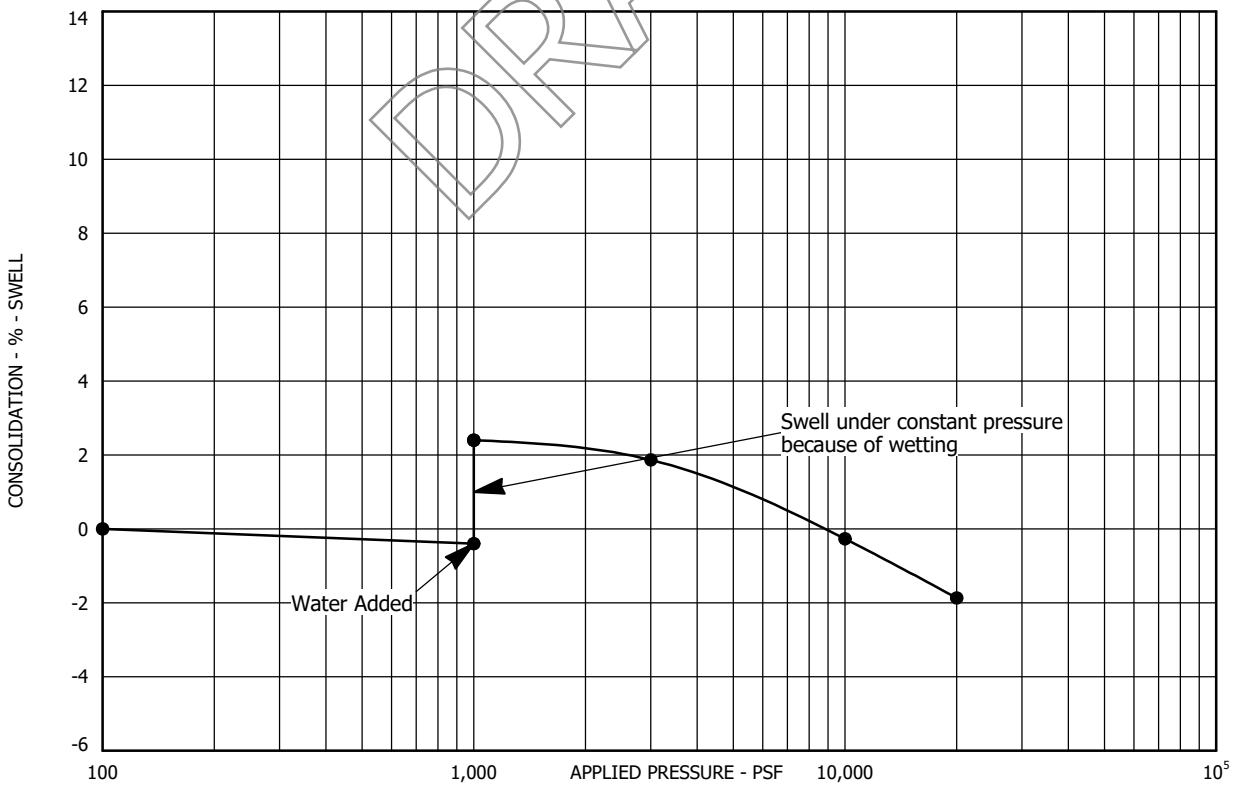
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-19
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 17 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 17

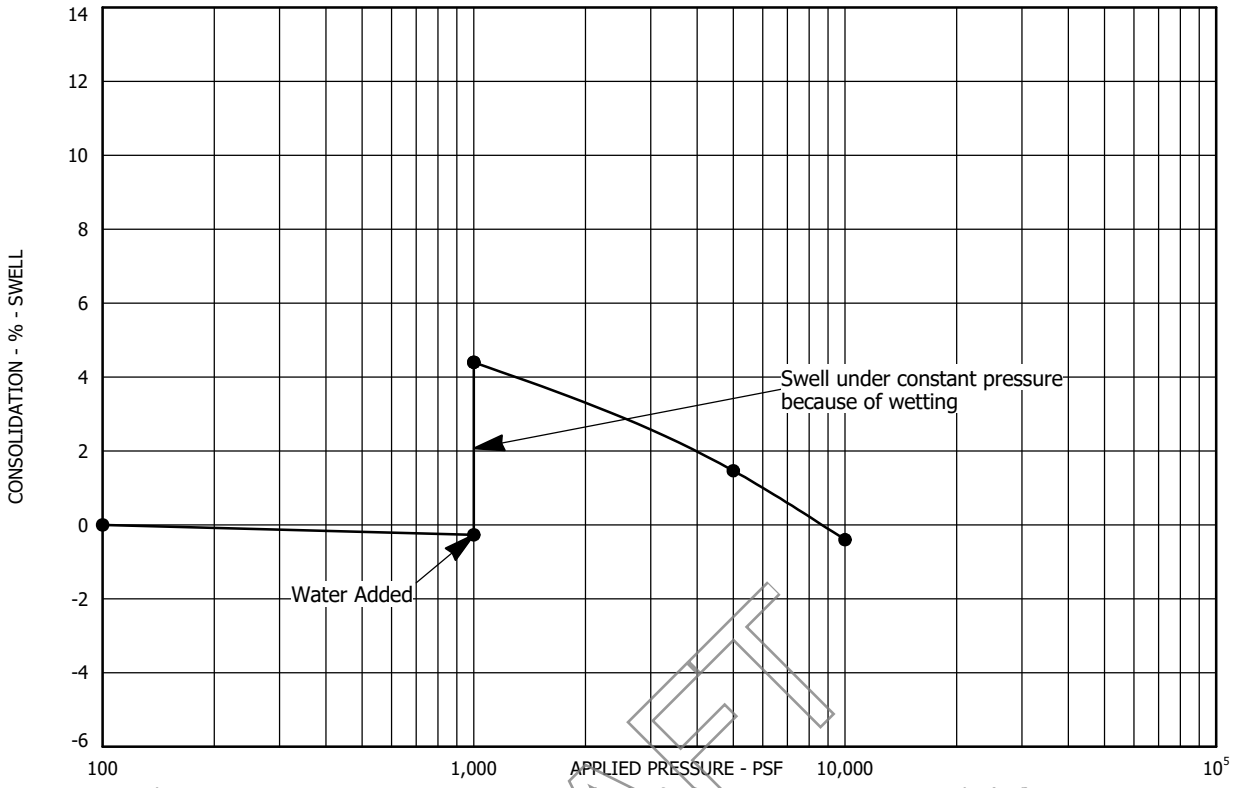
DRAFT



Sample Location: Test Boring No. 18 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 13

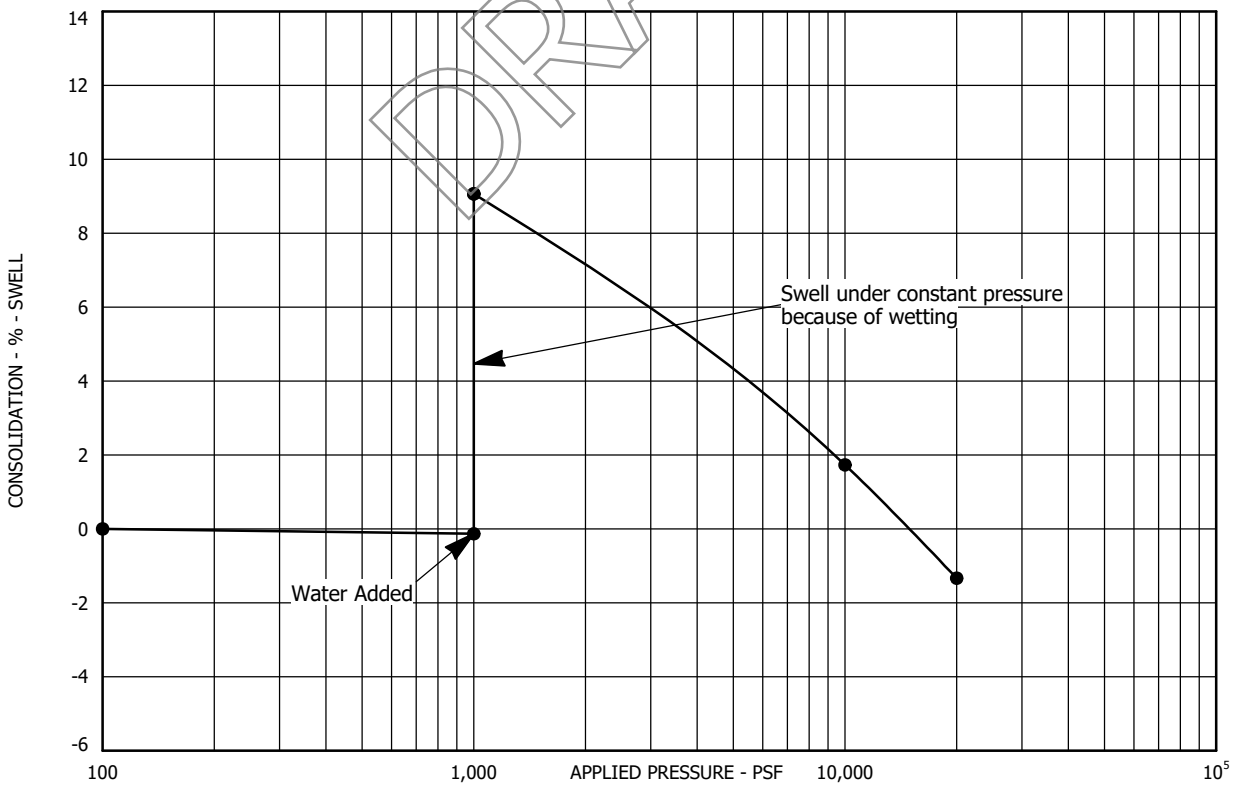
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-20
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 18 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 16

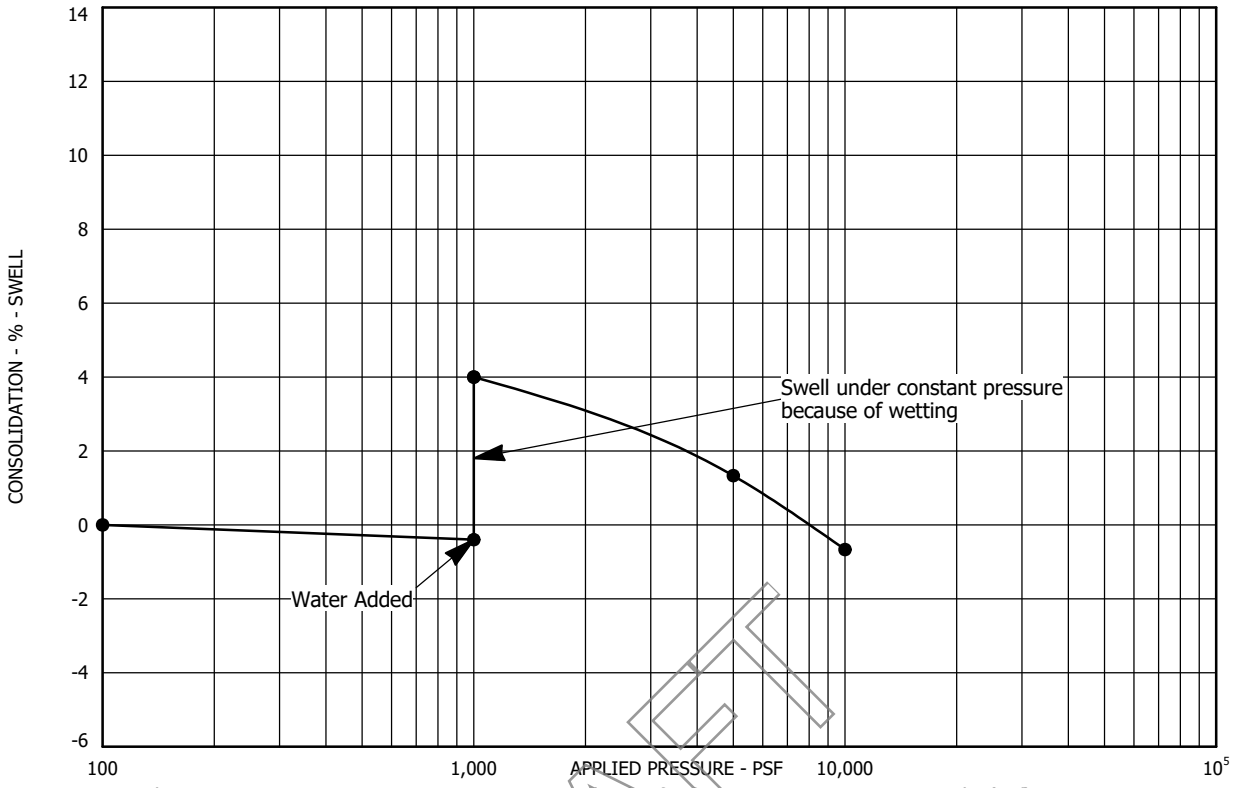
DRAFT



Sample Location: Test Boring No. 19 at a depth of 4 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 13

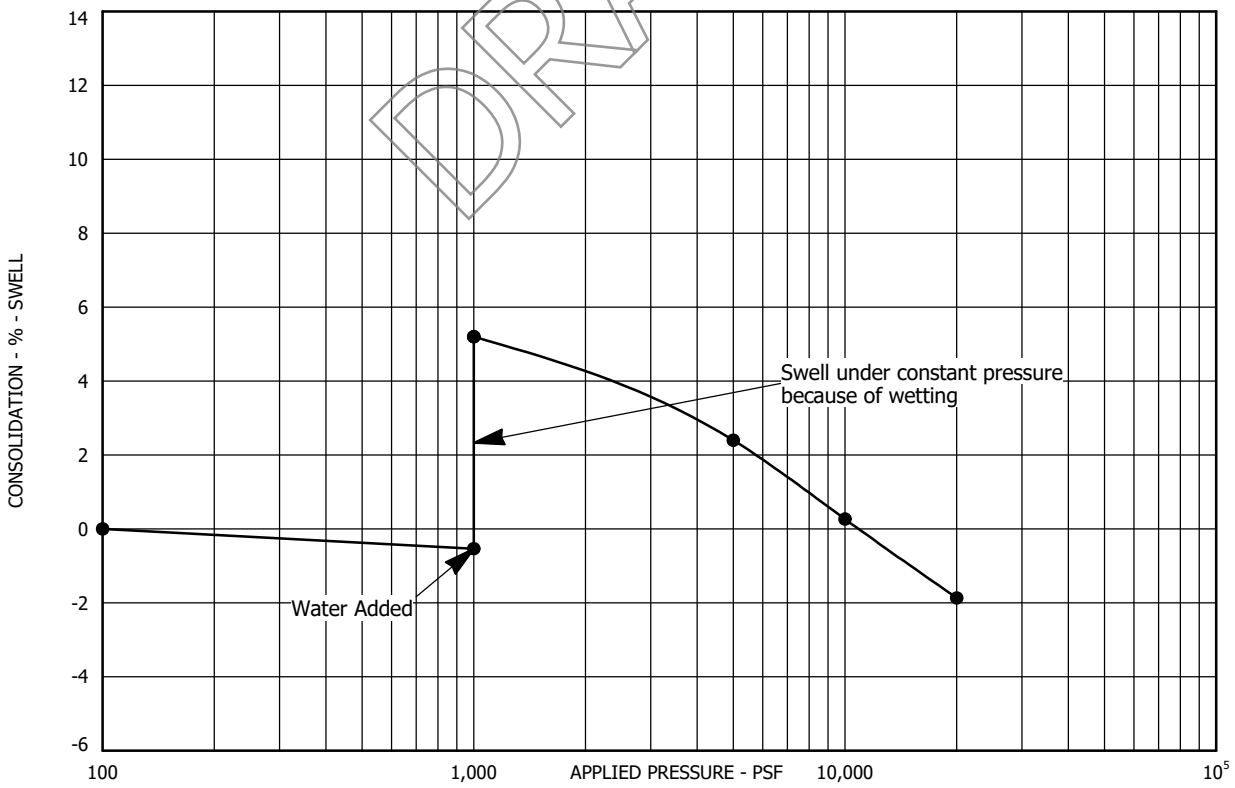
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-21
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 19 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 20

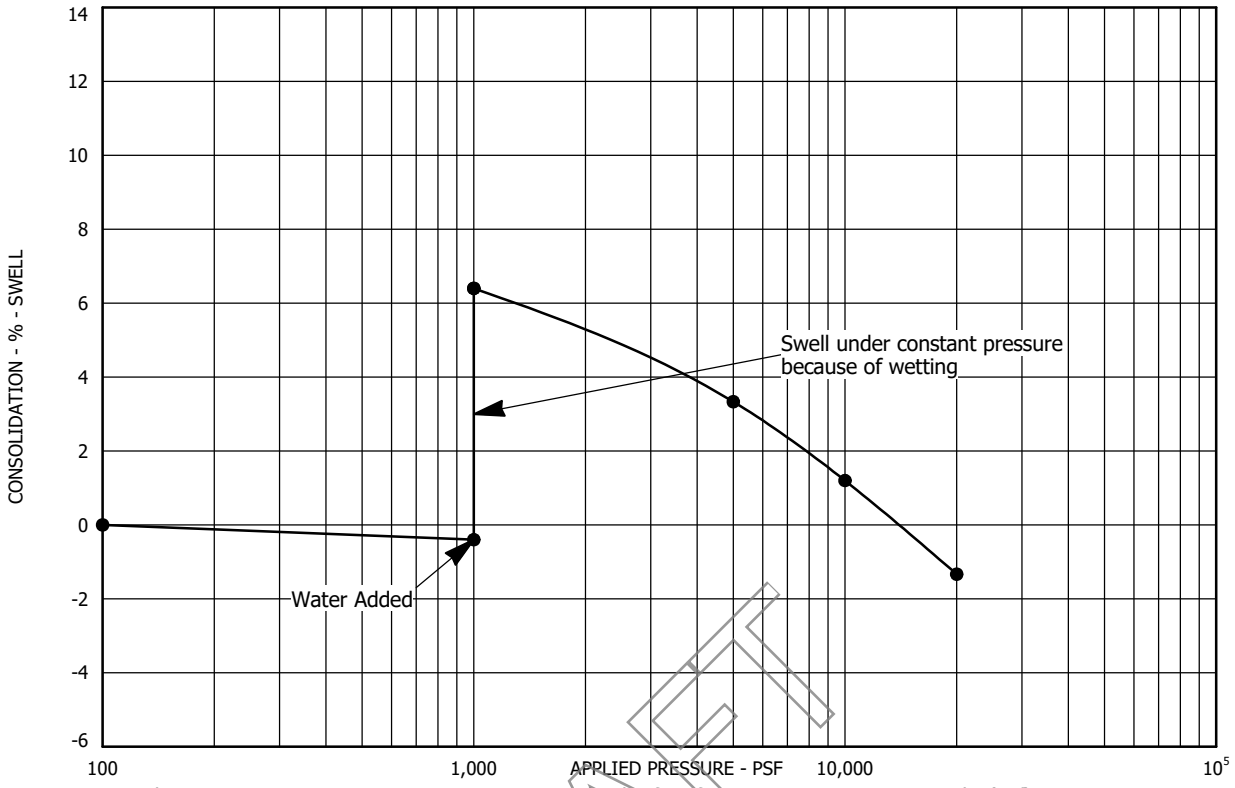
DRAFT



Sample Location: Test Boring No. 19 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 17

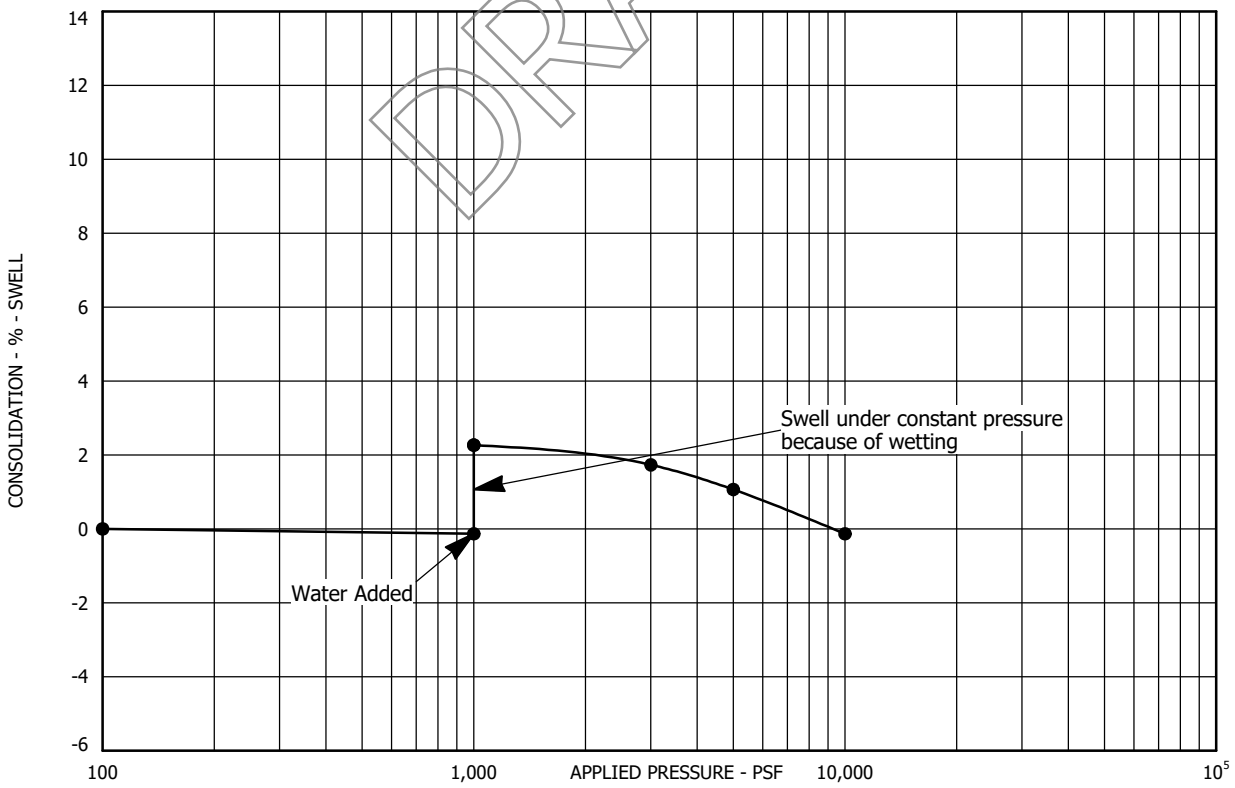
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-22
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 19 at a depth of 29 feet
Sample Description: Claystone, sandy (lens)
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

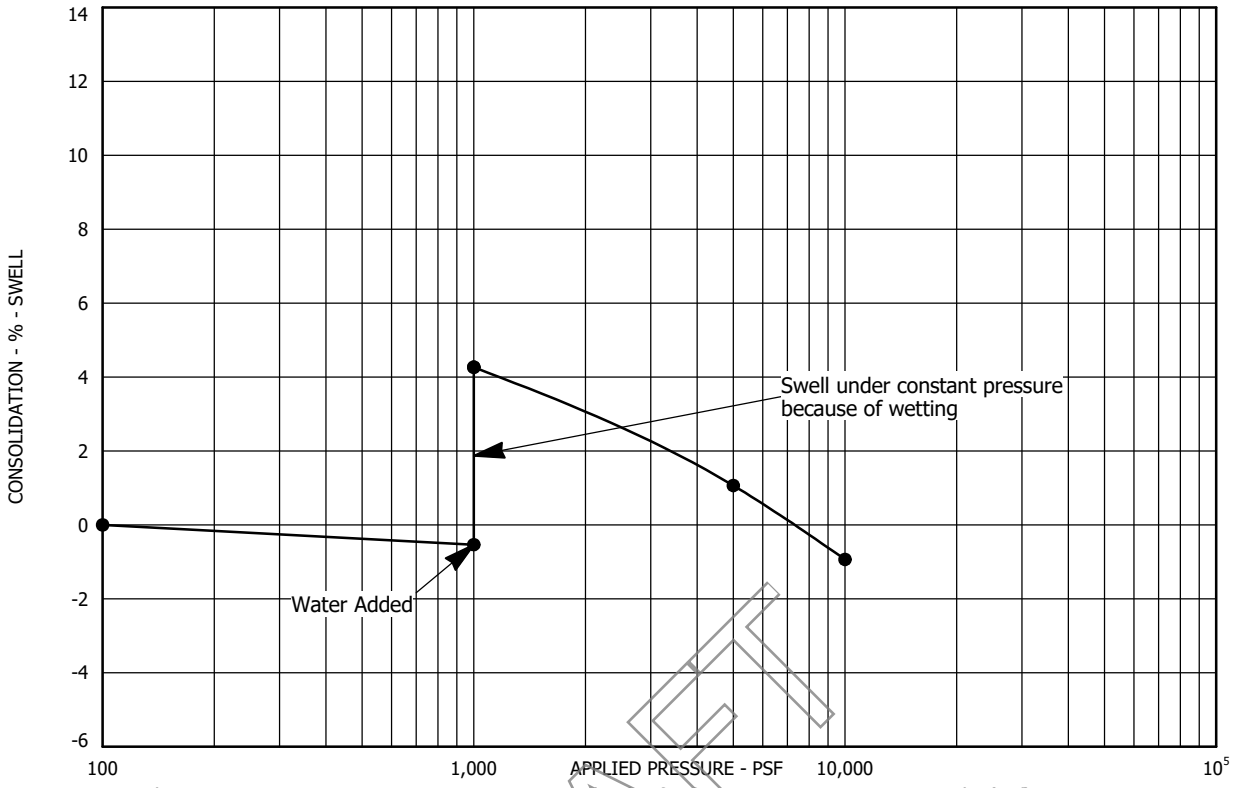
DRAFT



Sample Location: Test Boring No. 20 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 12

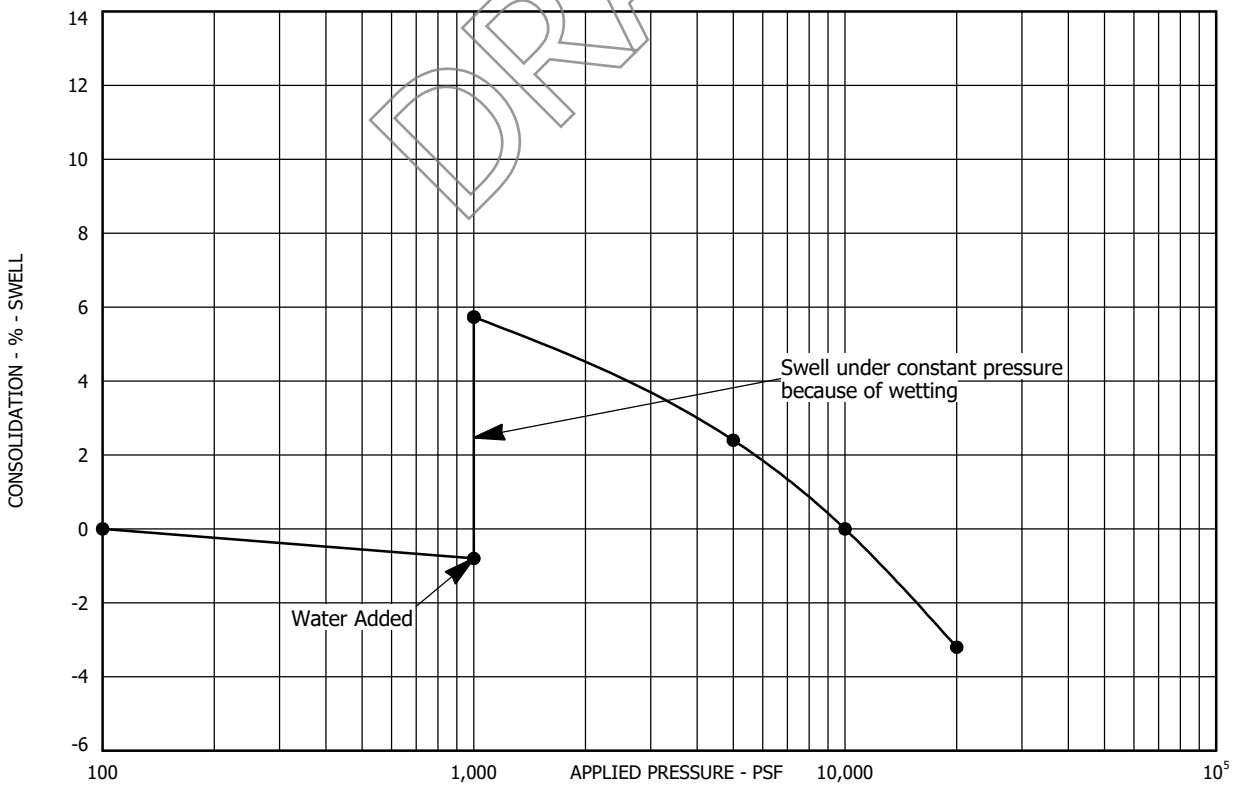
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-23
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 20 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 20

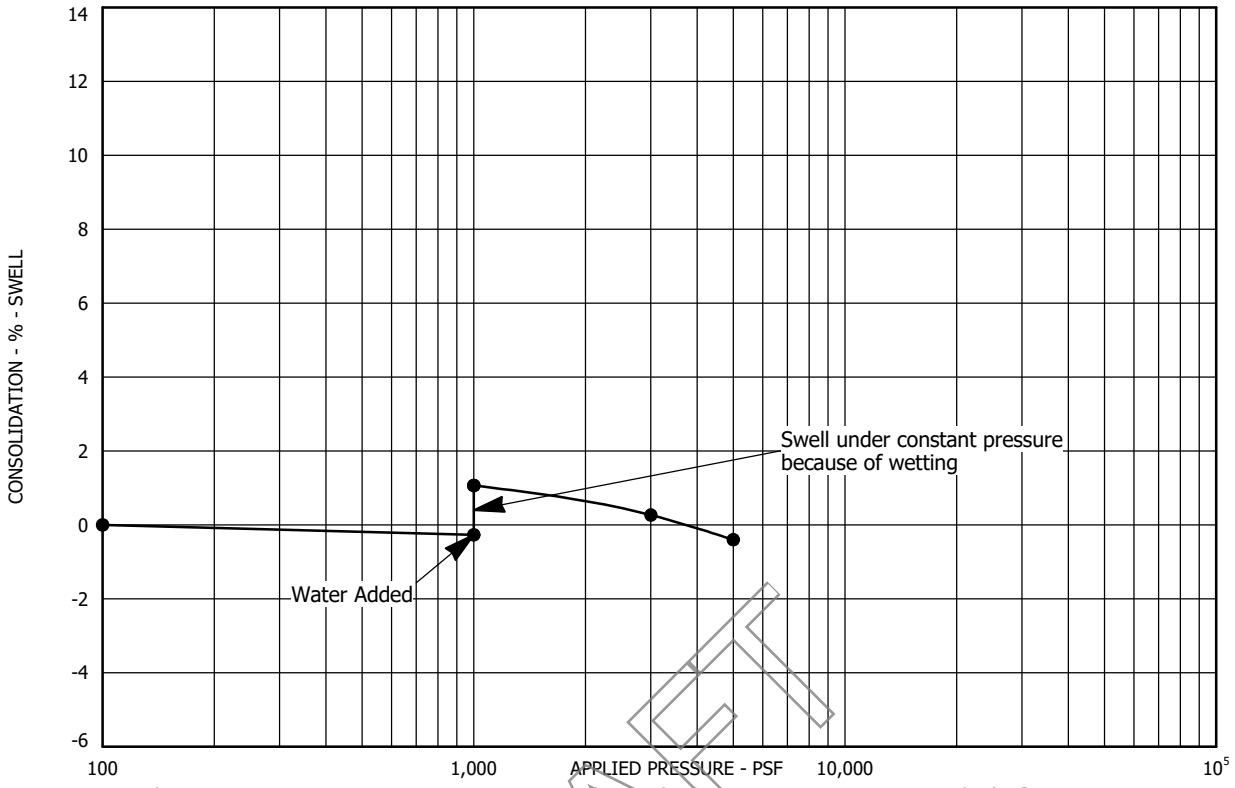
DRAFT



Sample Location: Test Boring No. 20 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 17

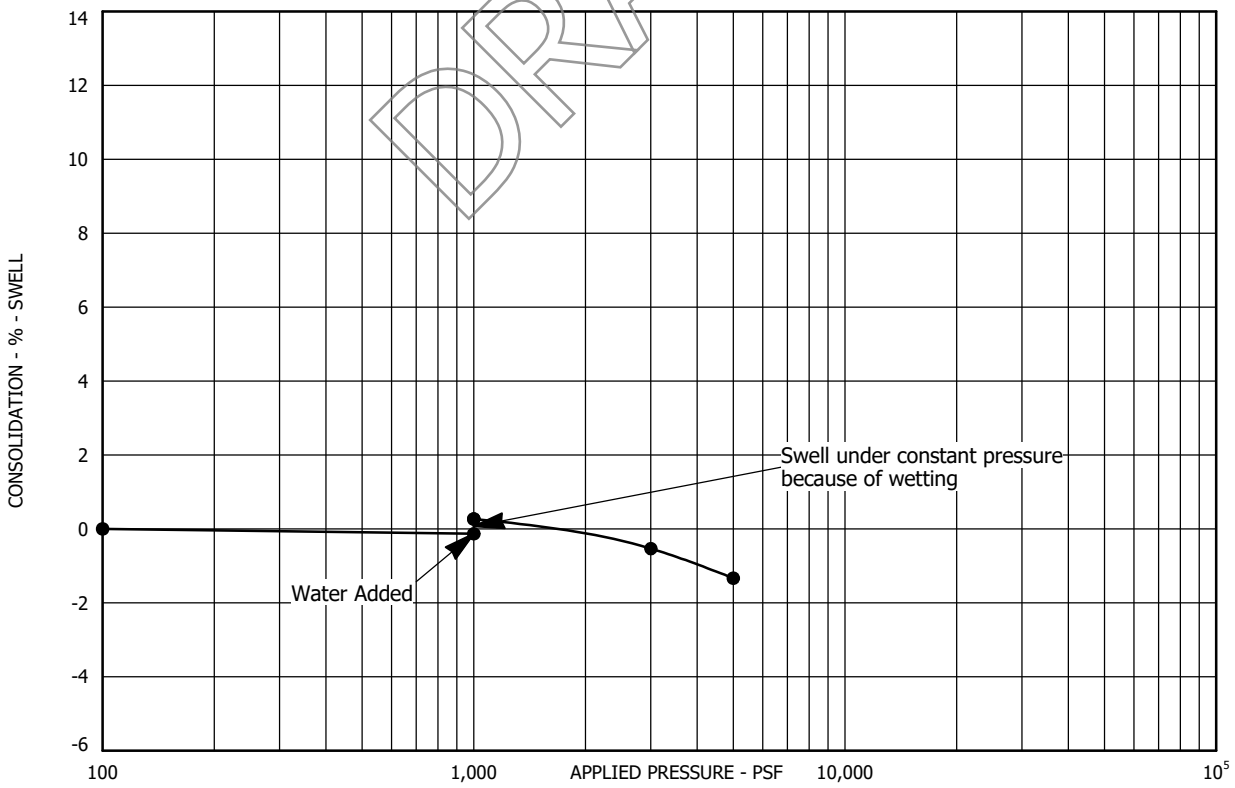
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-24
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 21 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 13

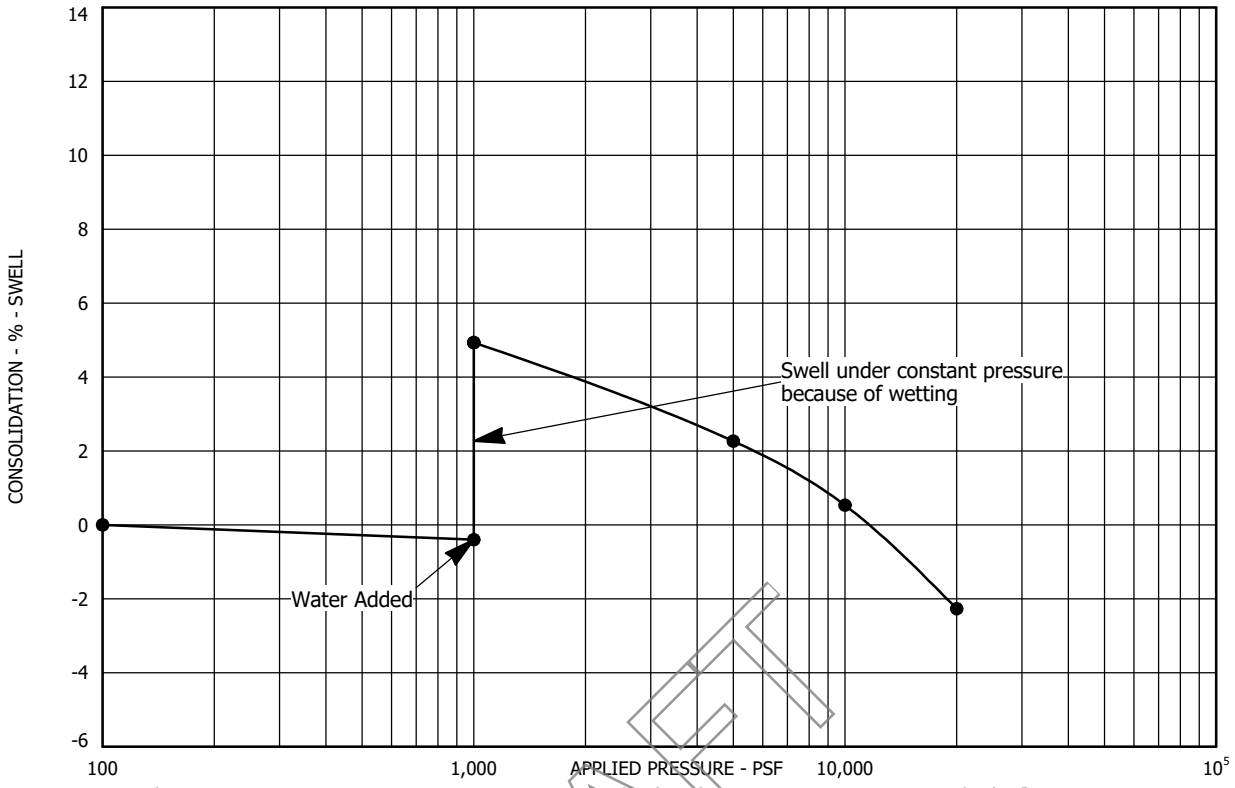
DRAFT



Sample Location: Test Boring No. 21 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 9

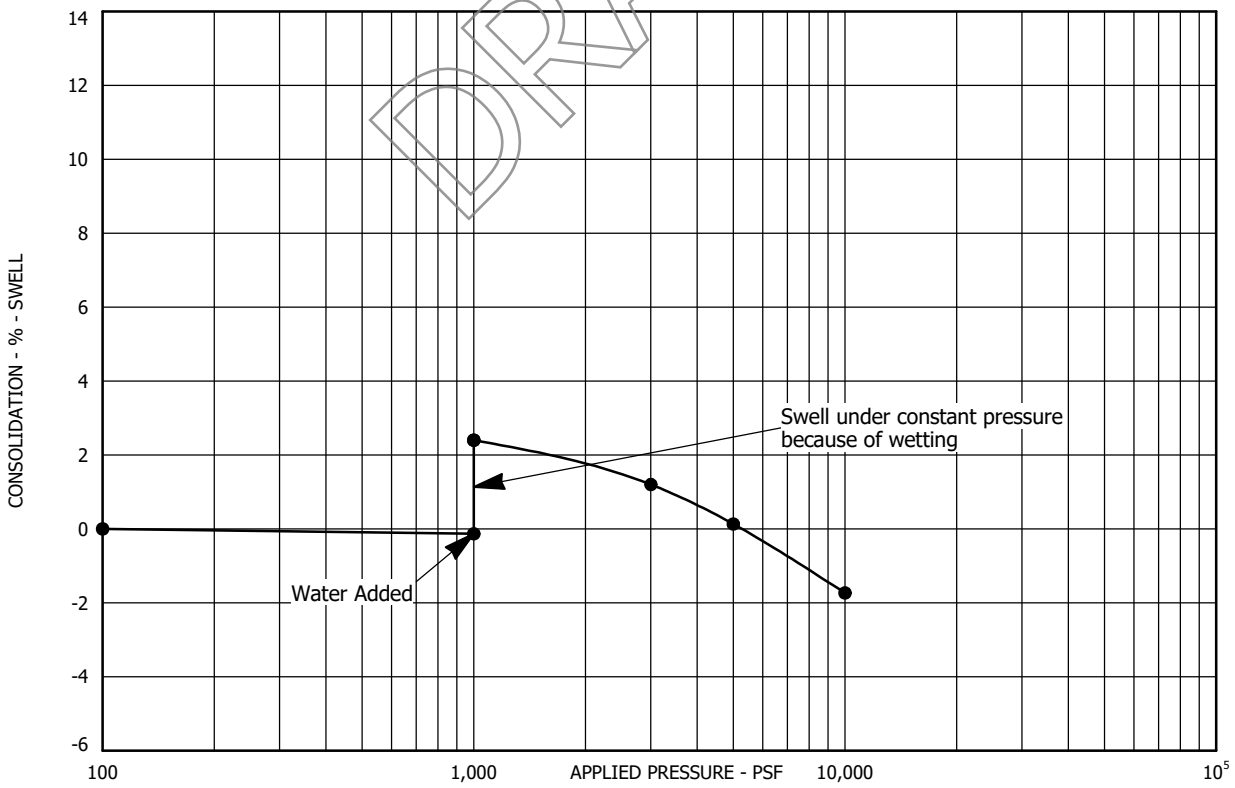
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-25
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 21 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 18

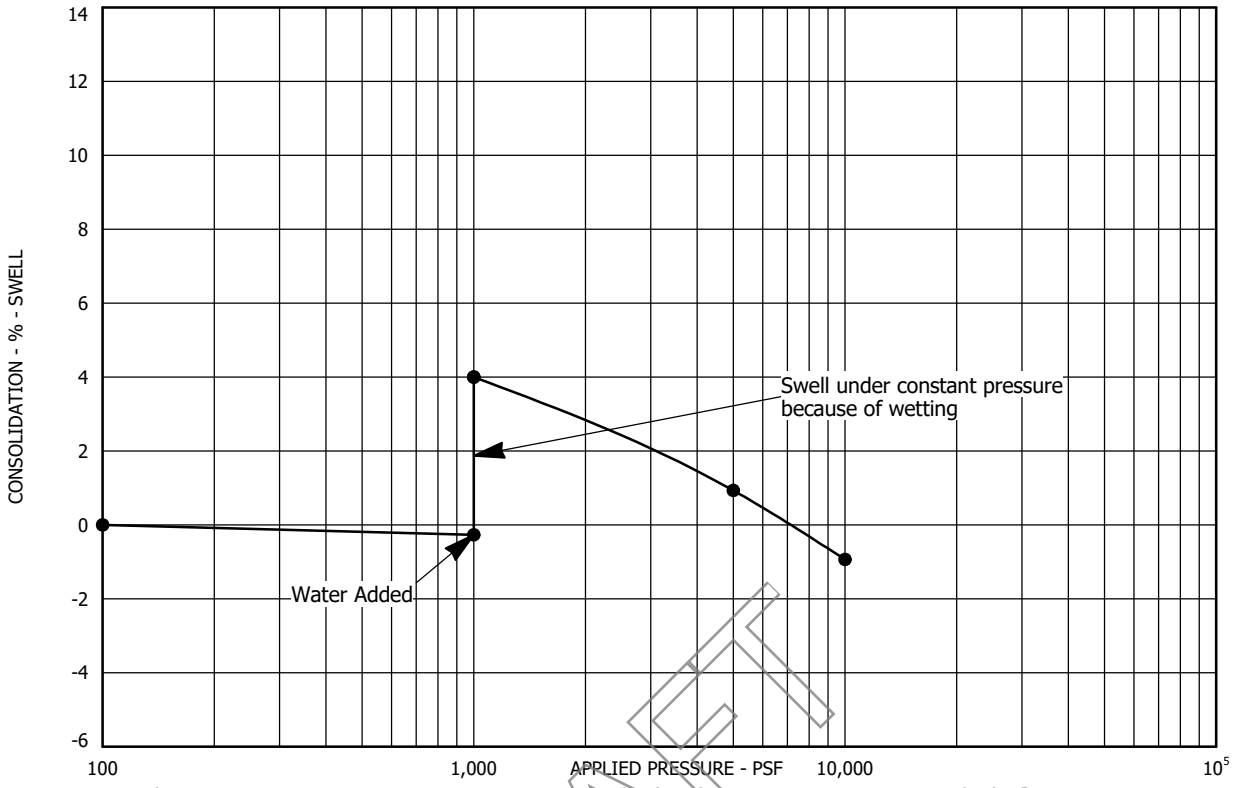
DRAFT



Sample Location: Test Boring No. 22 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 9

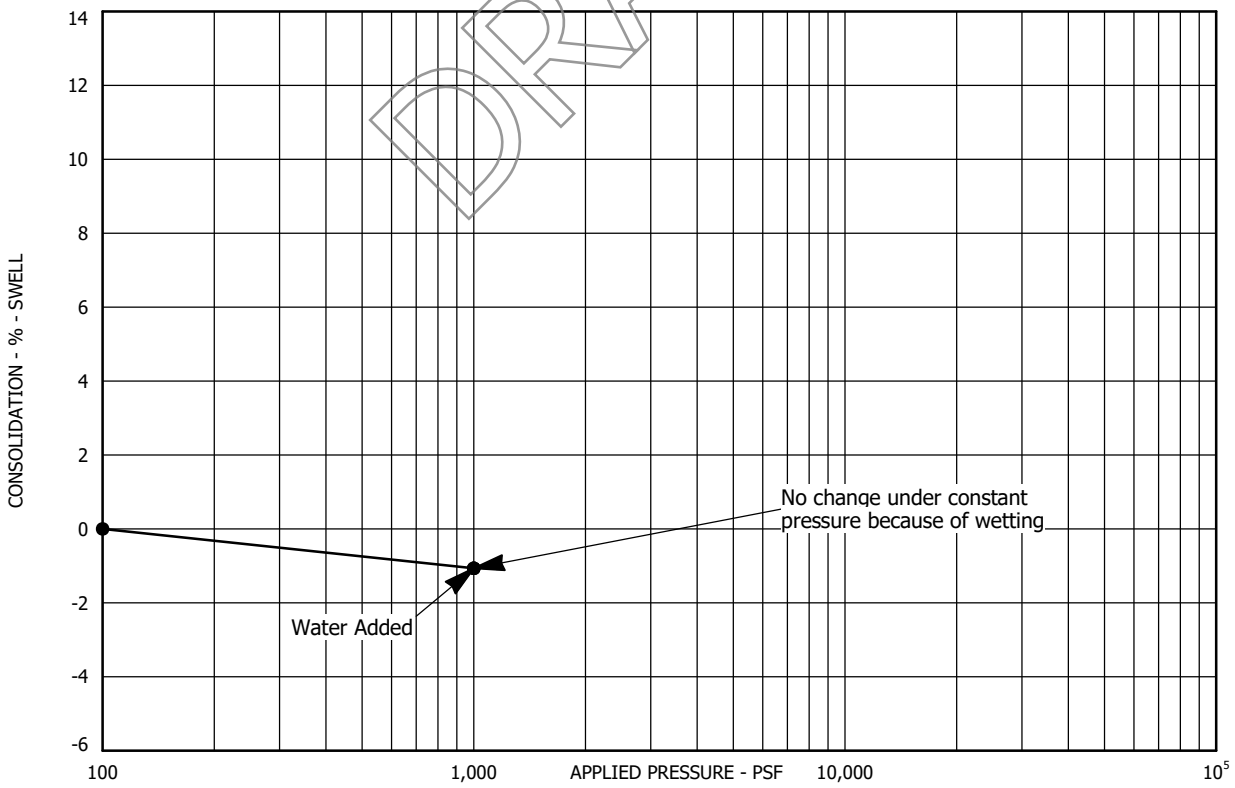
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-26
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 22 at a depth of 19 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 18

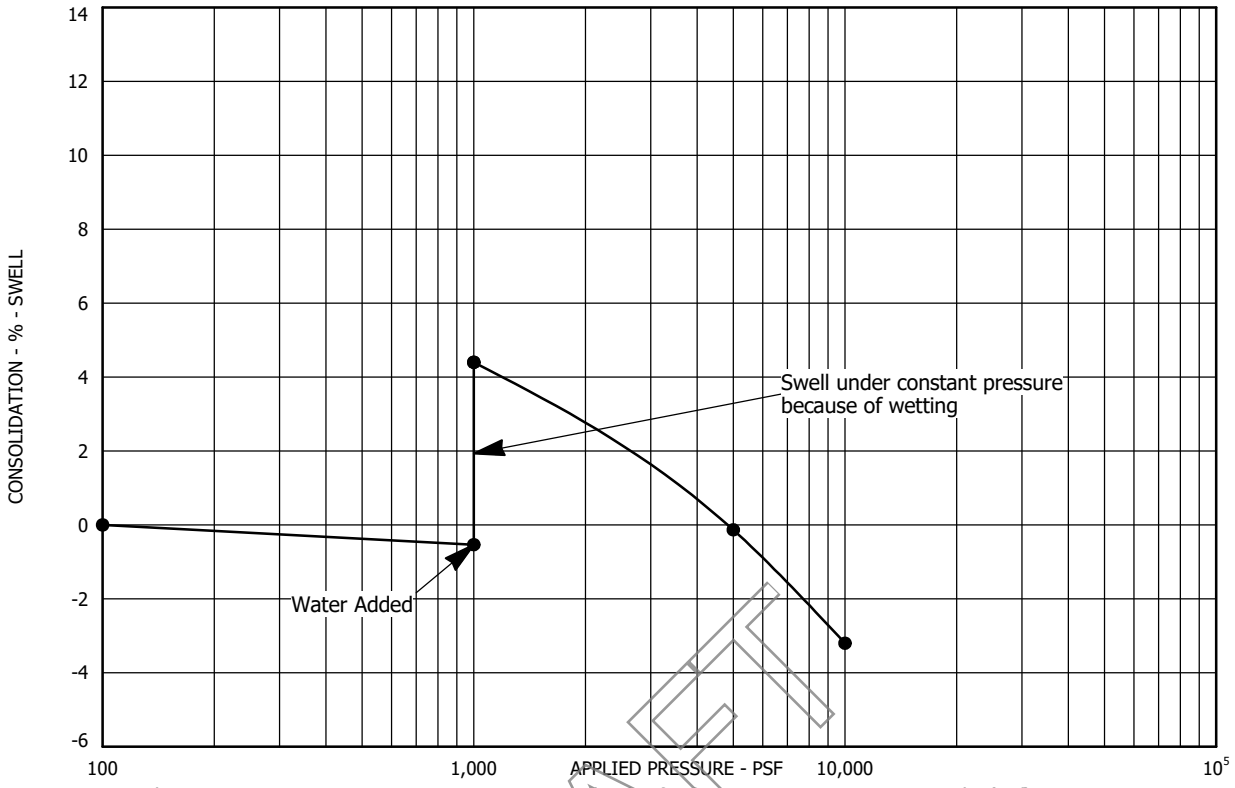
DRAFT



Sample Location: Test Boring No. 23 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 21

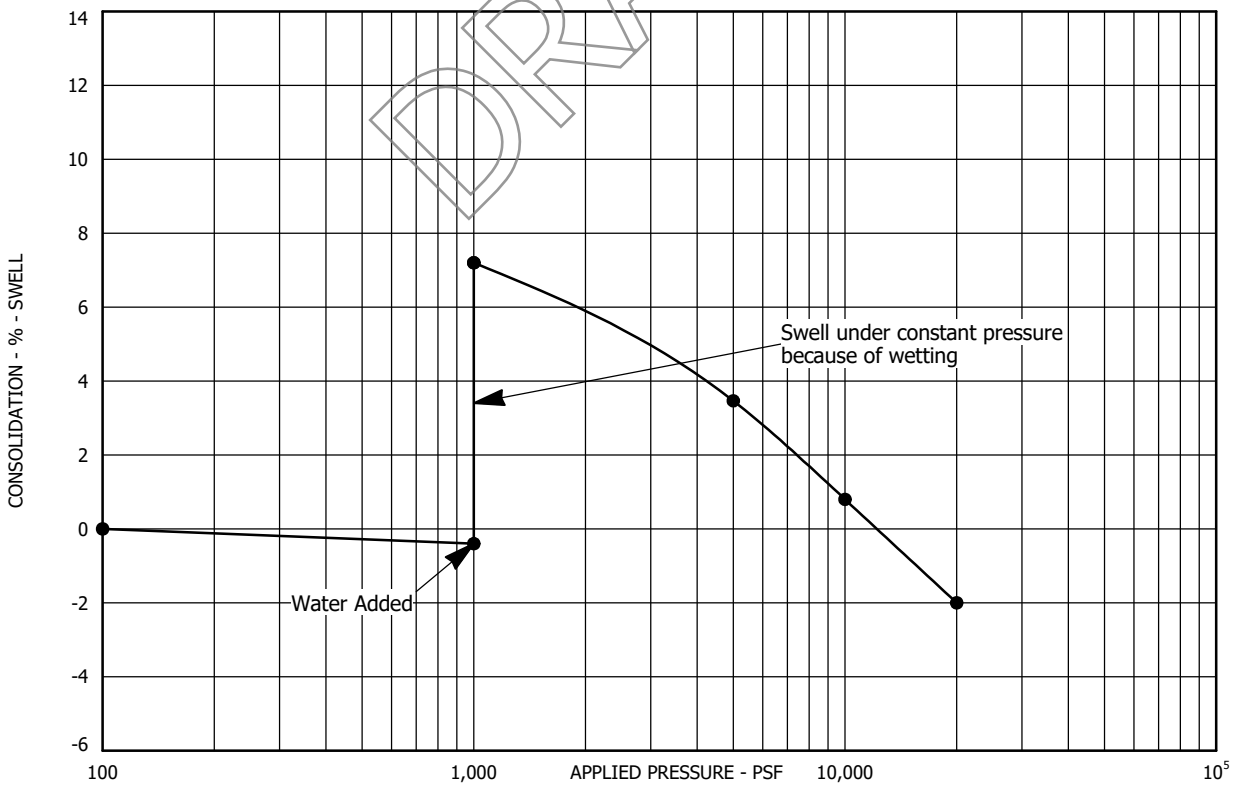
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-27
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 23 at a depth of 7 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 94
Moisture Content (%): 27

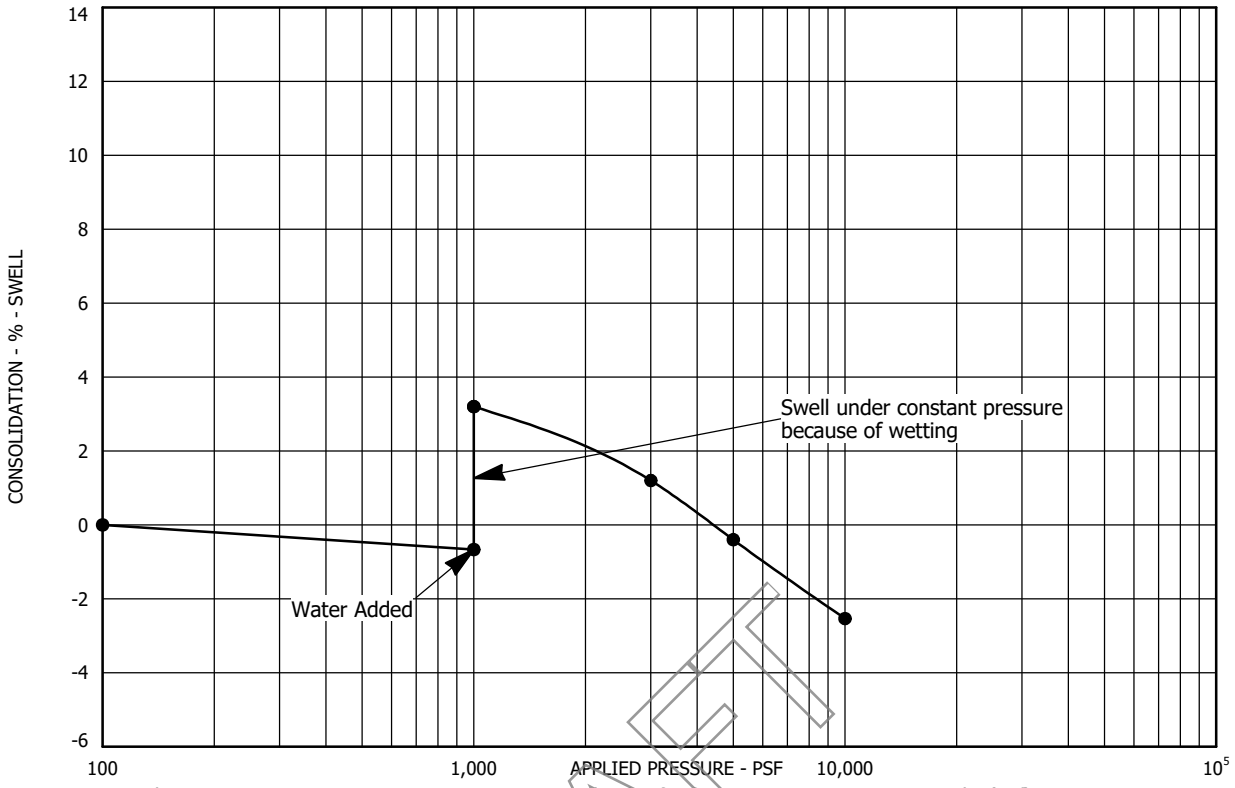
DRAFT



Sample Location: Test Boring No. 23 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 20

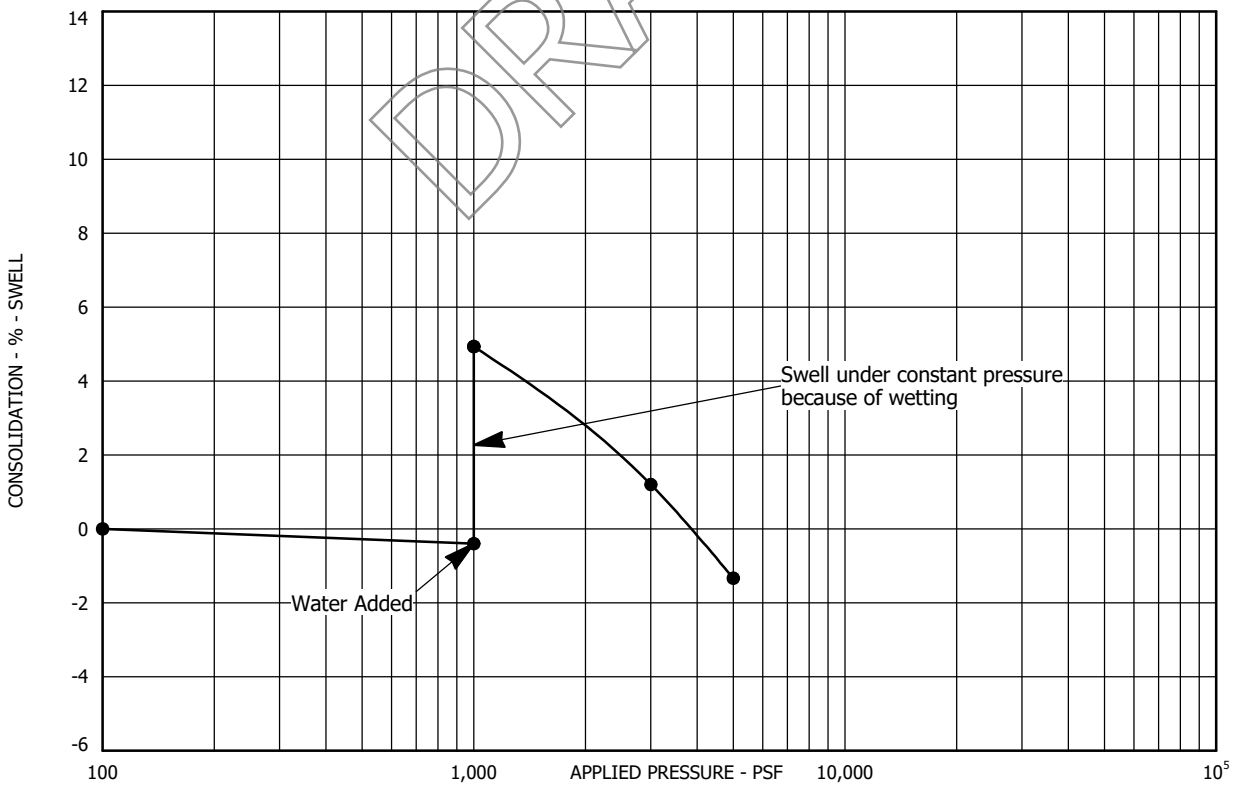
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-28
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 24 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 23

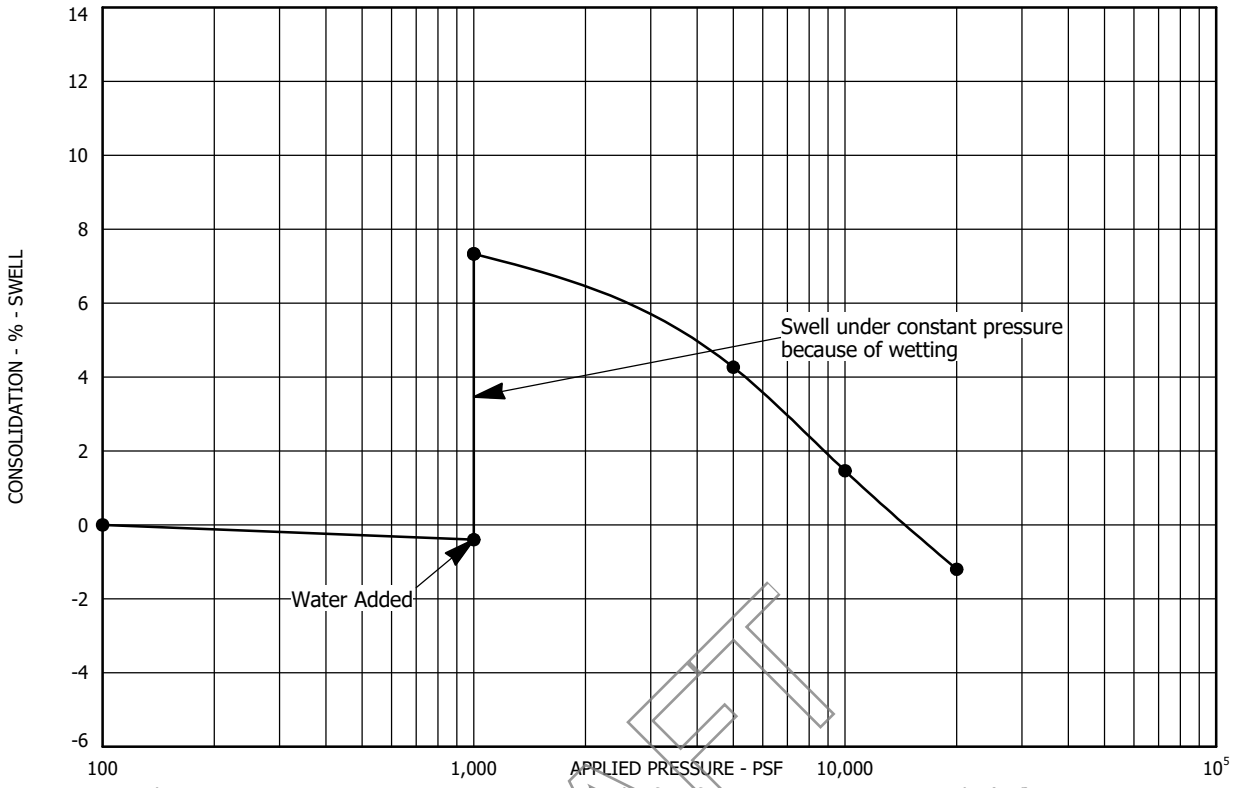
DRAFT



Sample Location: Test Boring No. 24 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 104
Moisture Content (%): 21

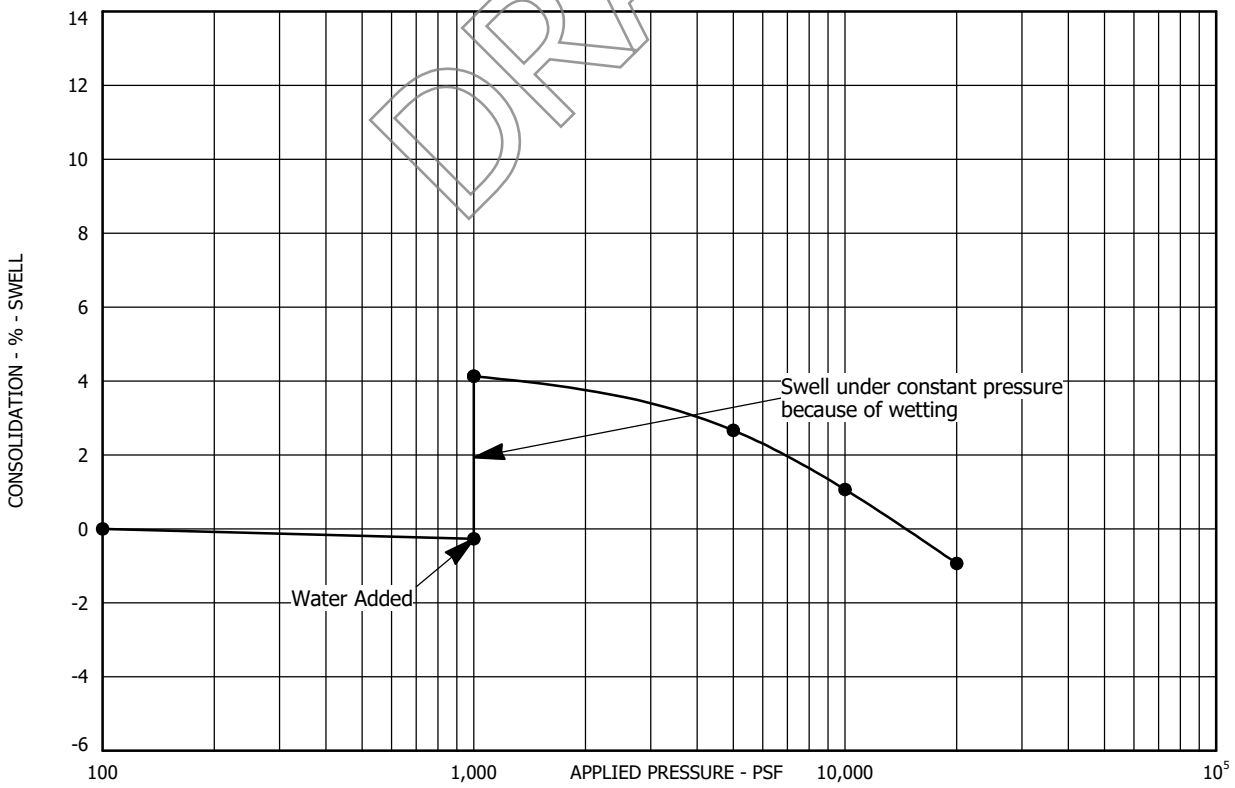
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-29
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 24 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 12

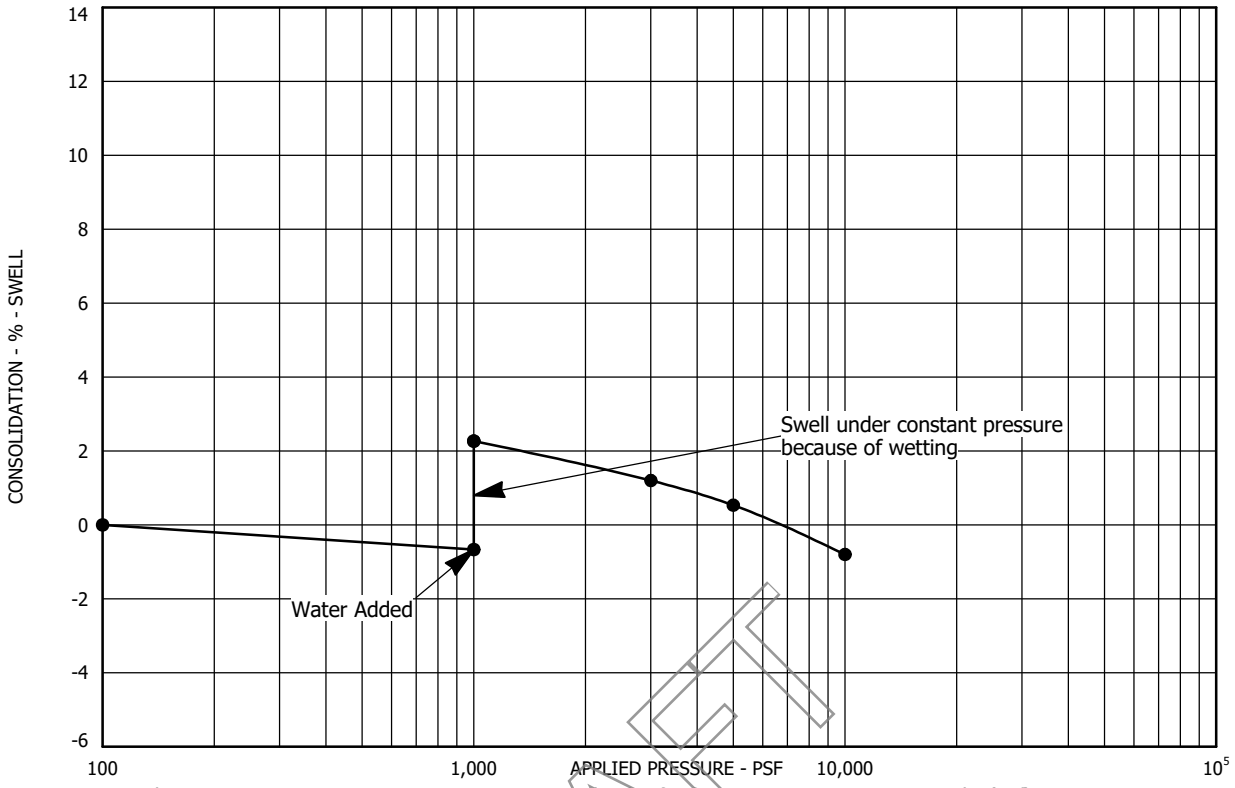
DRAFT



Sample Location: Test Boring No. 25 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 13

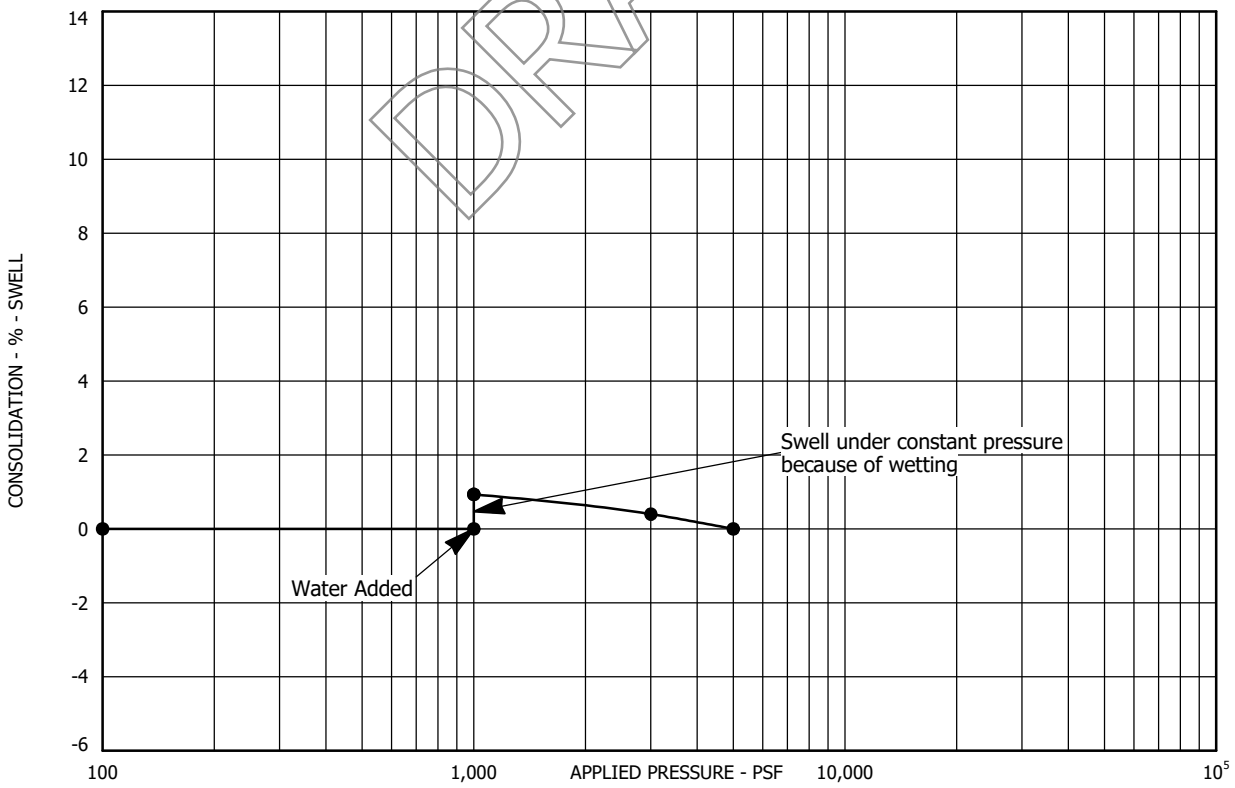
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-30
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 25 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

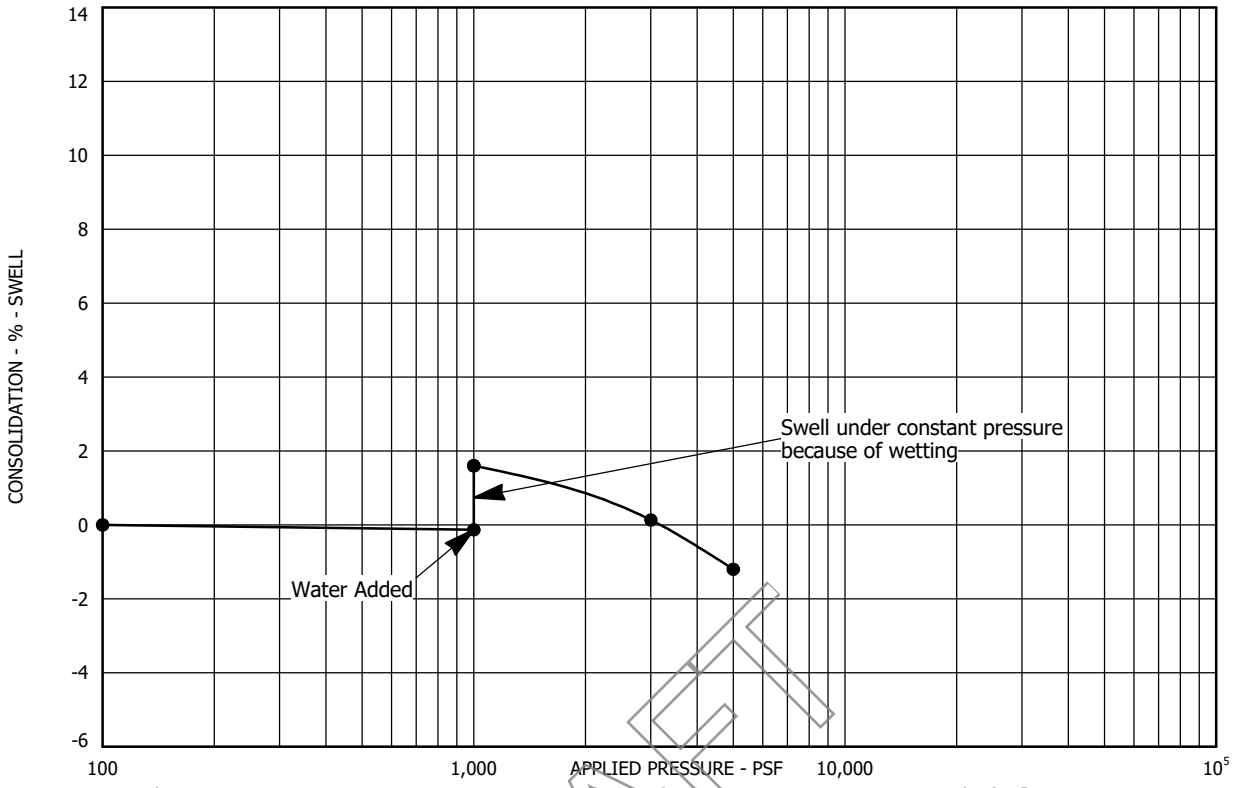
DRAFT



Sample Location: Test Boring No. 25 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 12

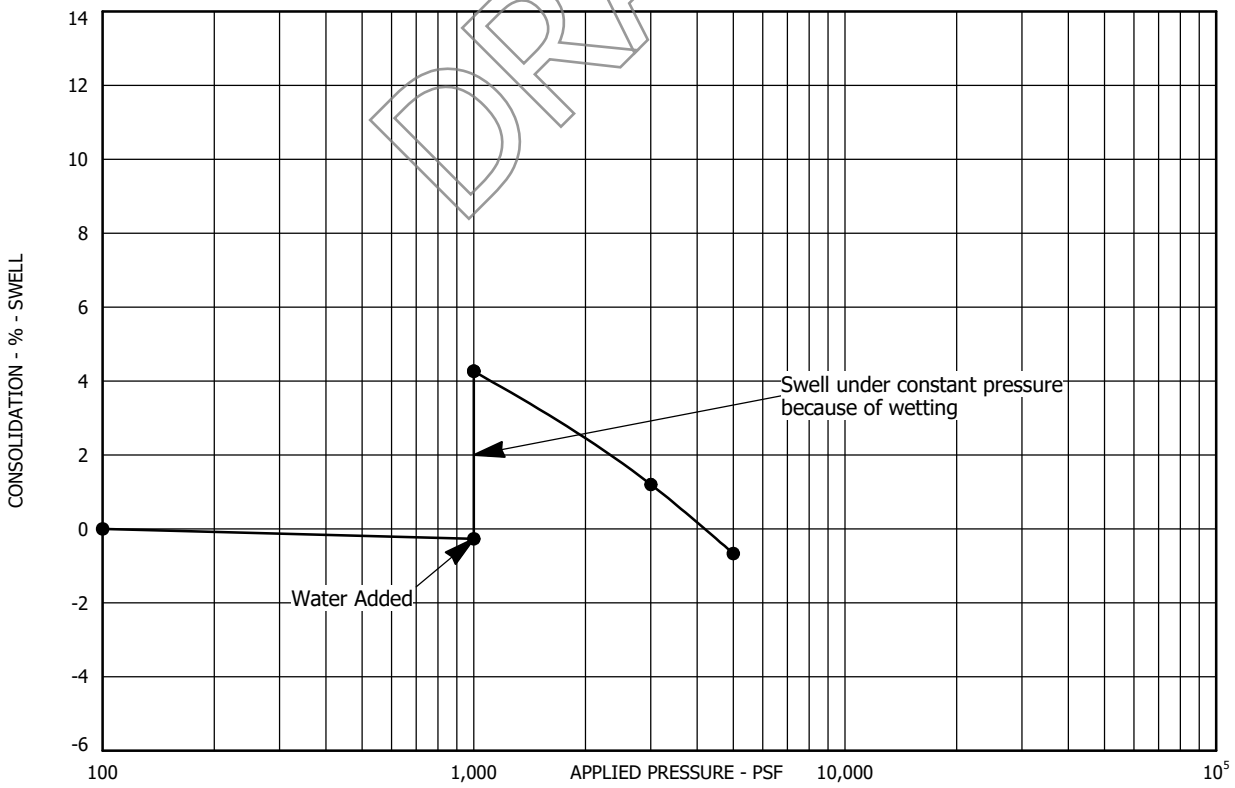
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-31
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 26 at a depth of 7 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 100
Moisture Content (%): 19

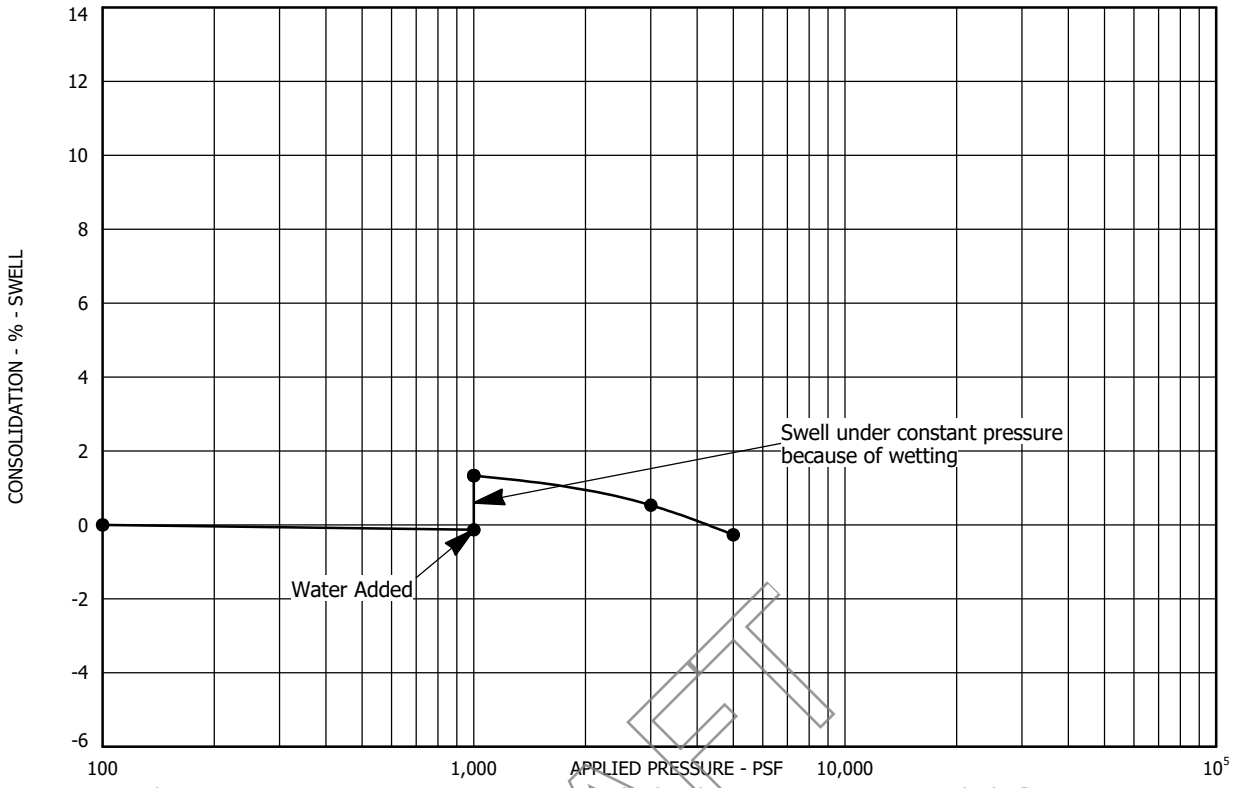
DRAFT



Sample Location: Test Boring No. 26 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 114
Moisture Content (%): 14

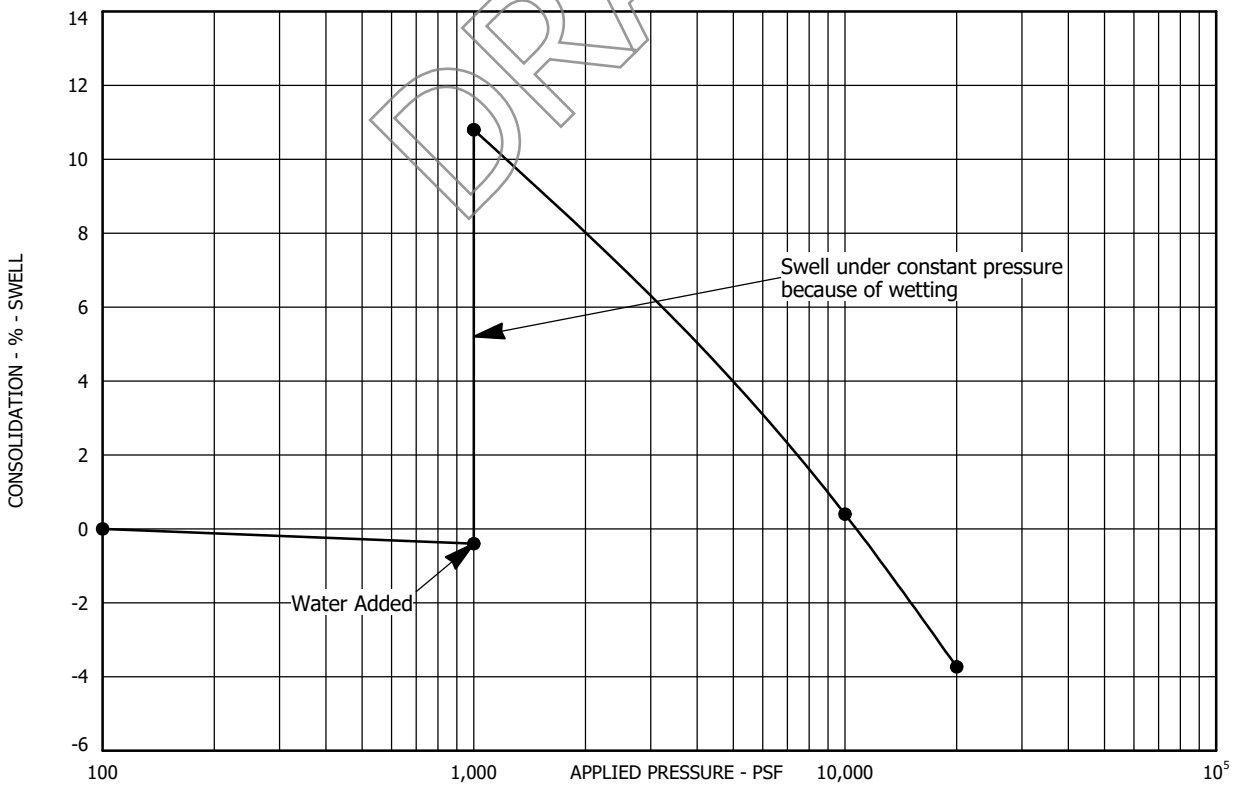
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-32
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 26 at a depth of 24 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 120
Moisture Content (%): 11

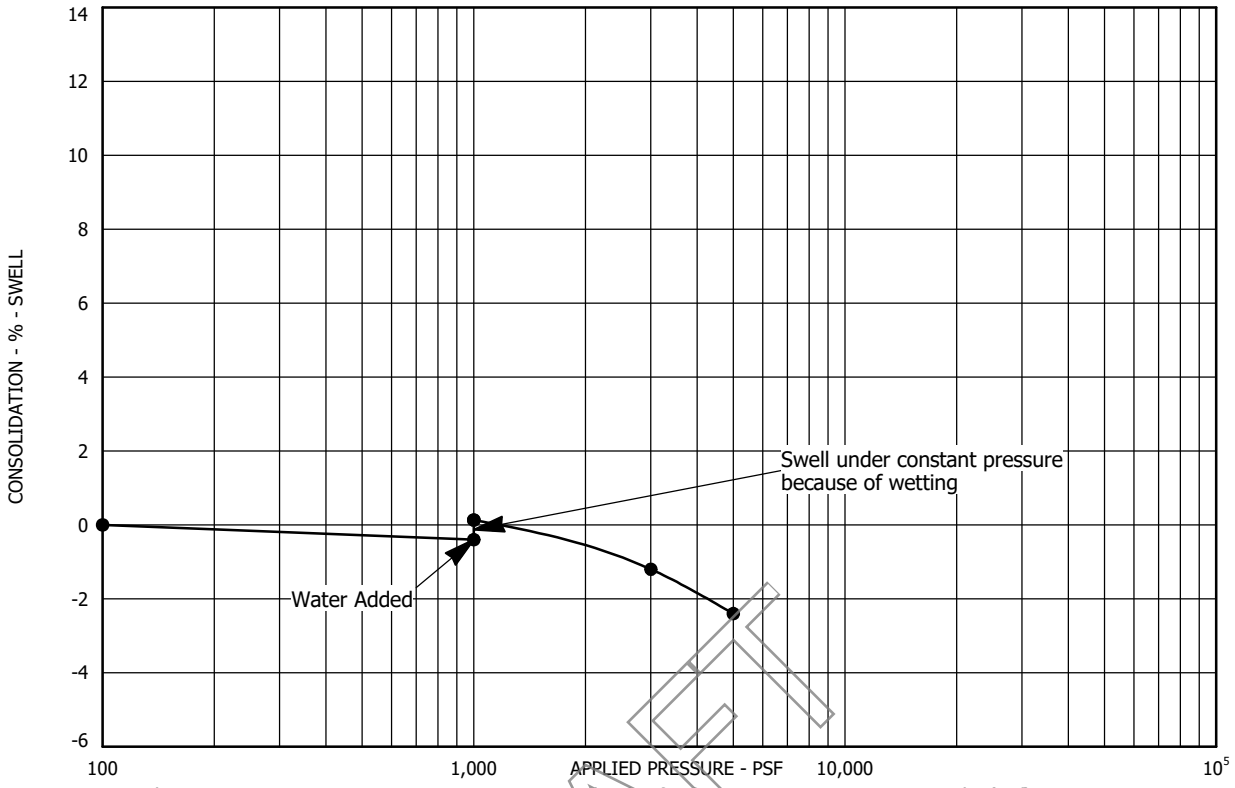
DRAFT



Sample Location: Test Boring No. 26 at a depth of 44 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 103
Moisture Content (%): 20

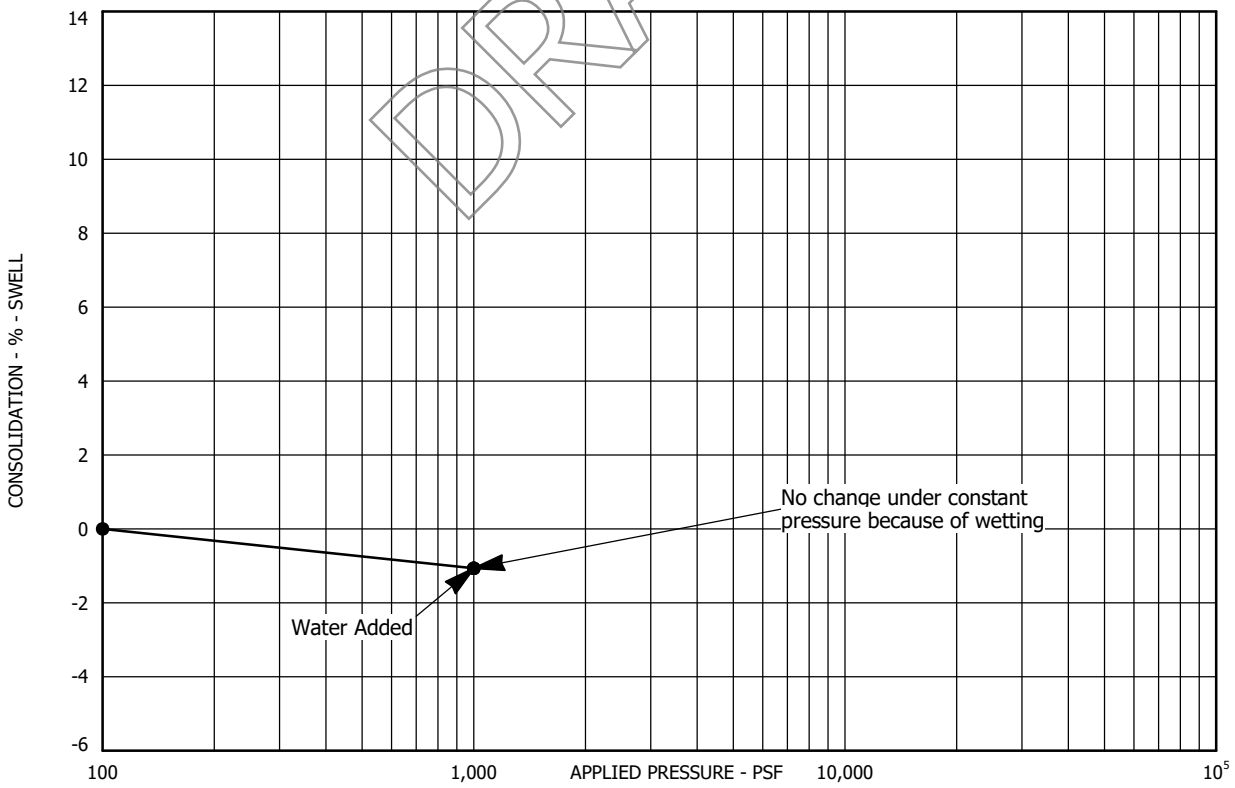
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-33
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 27 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 20

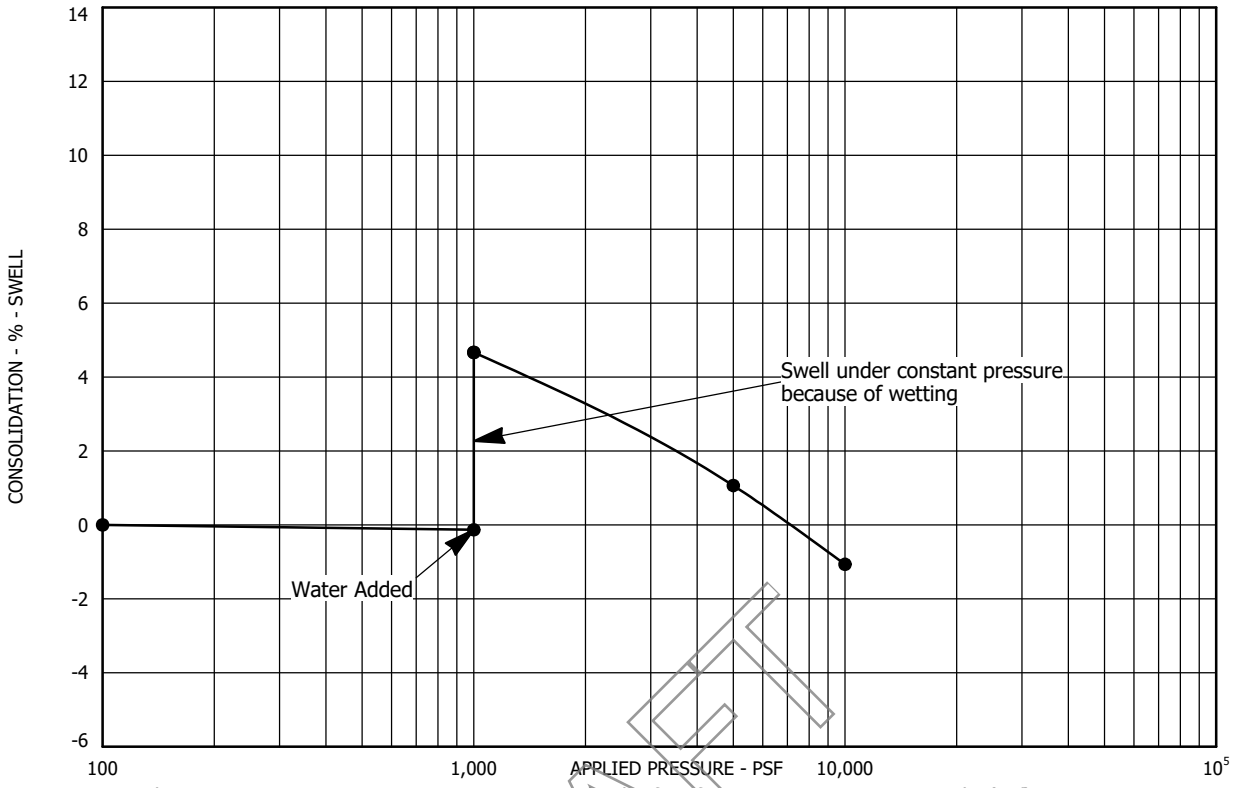
DRAFT



Sample Location: Test Boring No. 27 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 23

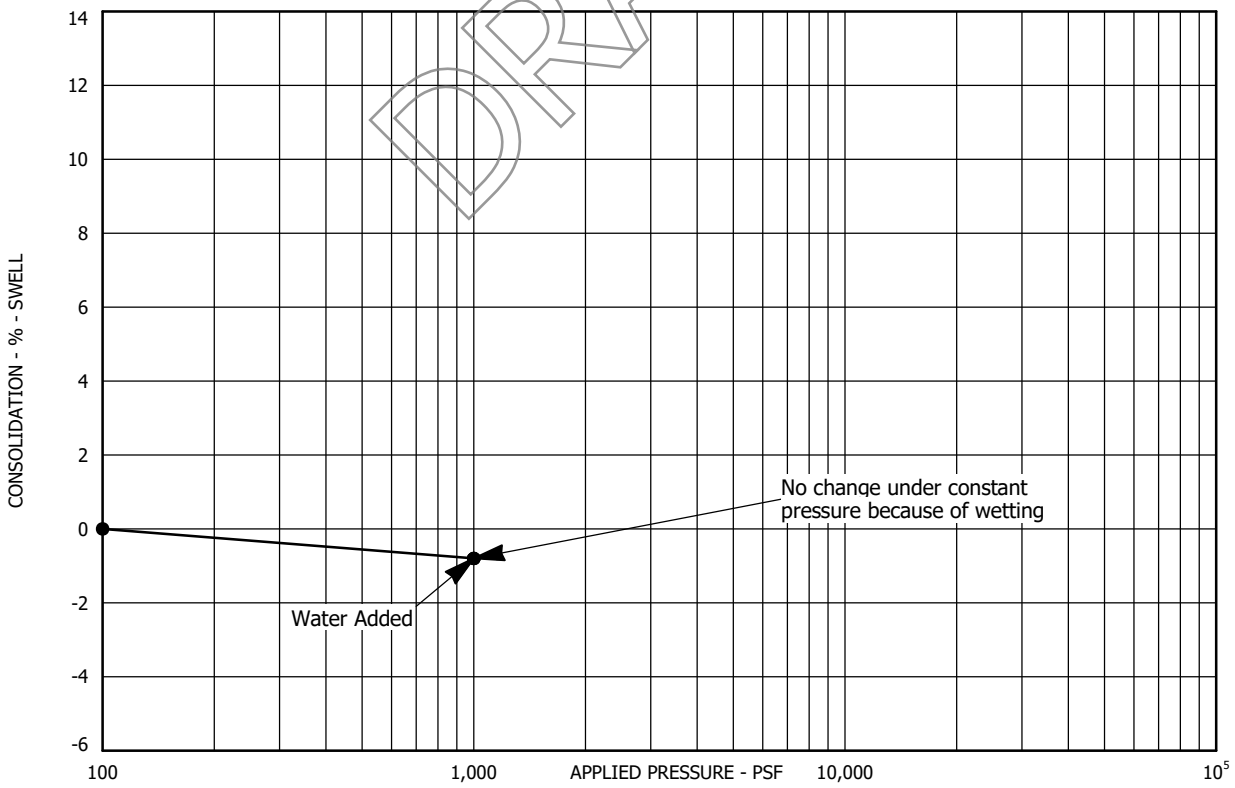
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-34
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 27 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 18

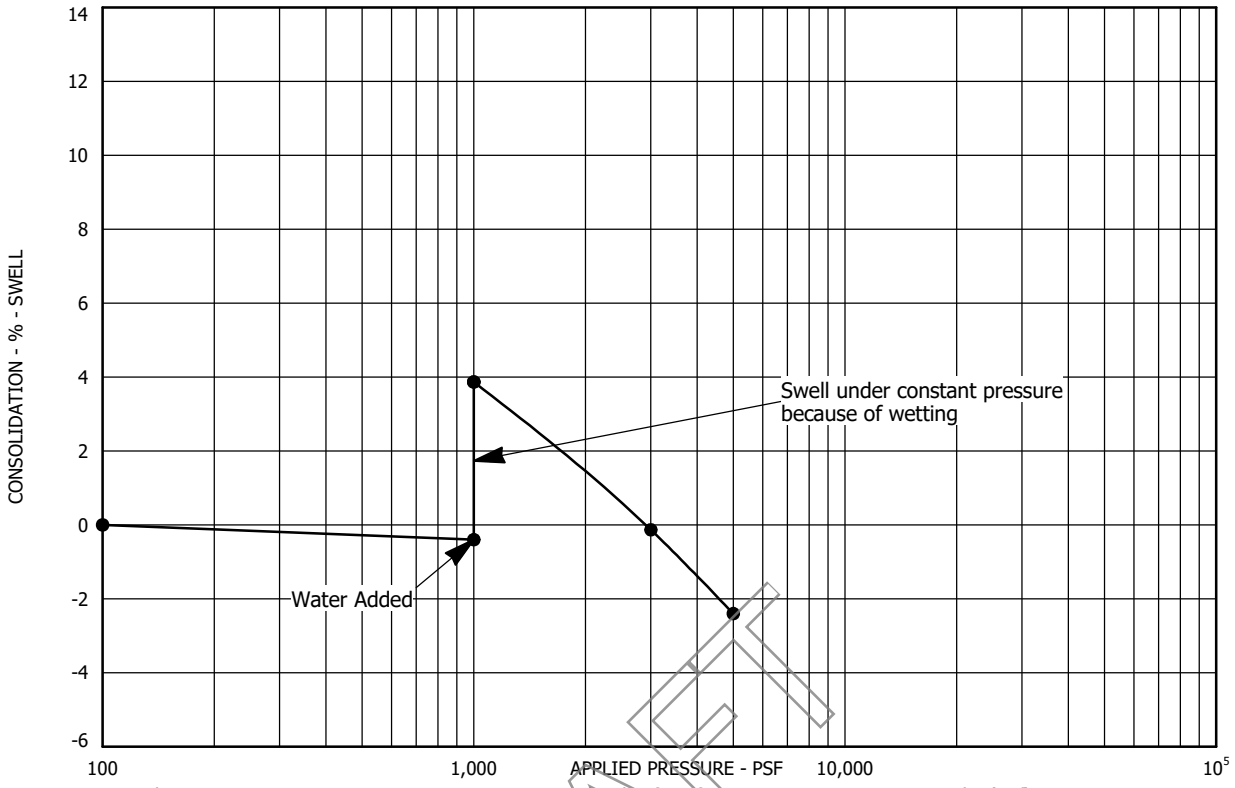
DRAFT



Sample Location: Test Boring No. 28 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 98
Moisture Content (%): 22

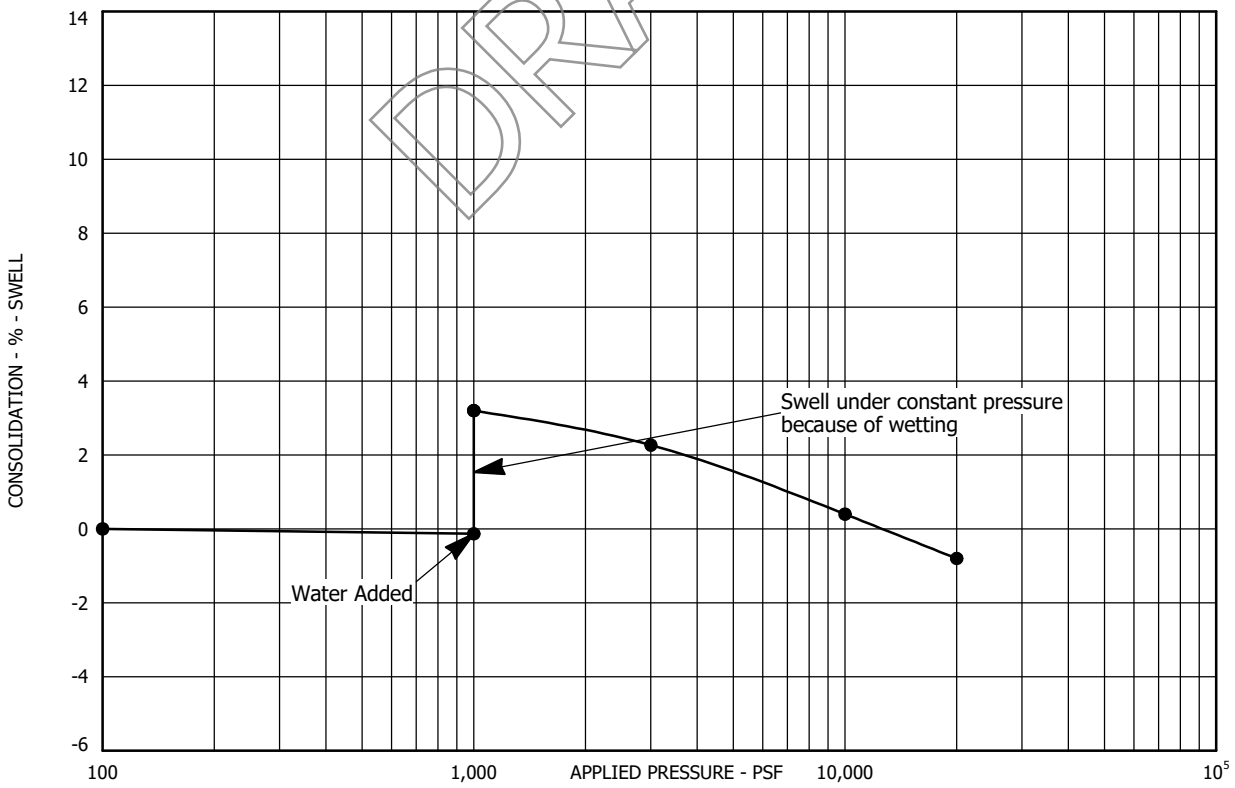
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-35
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 28 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 112
Moisture Content (%): 17

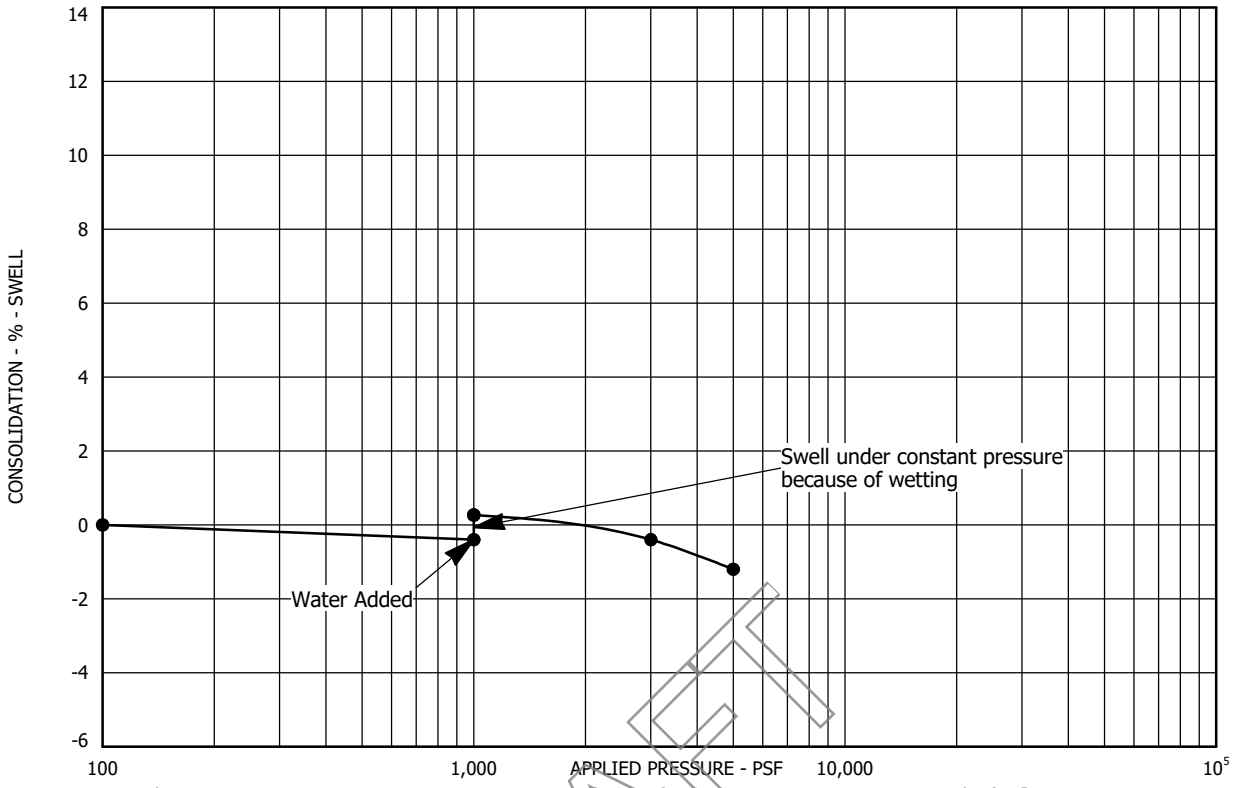
DRAFT



Sample Location: Test Boring No. 28 at a depth of 34 feet
Sample Description: Claystone, sandy (lens)
Dry Unit Weight (pcf): 128
Moisture Content (%): 11

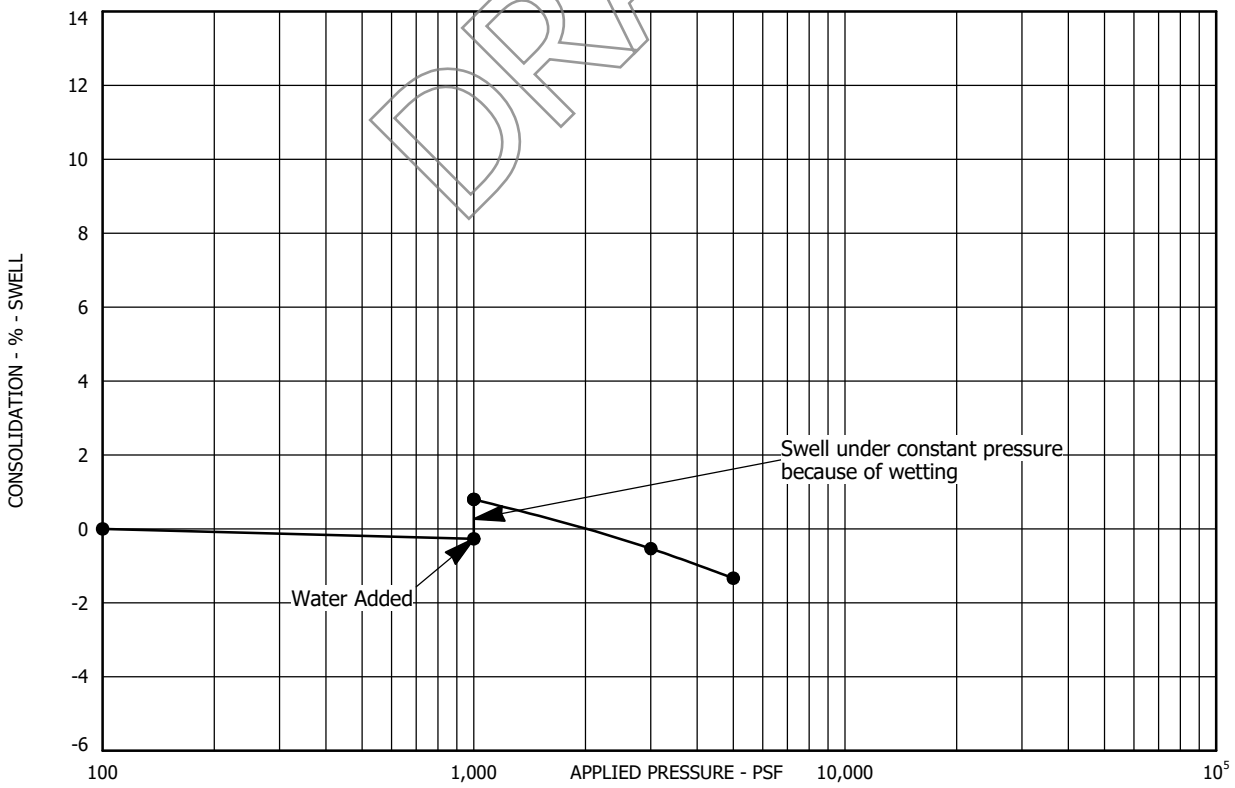
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-36
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 29 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 16

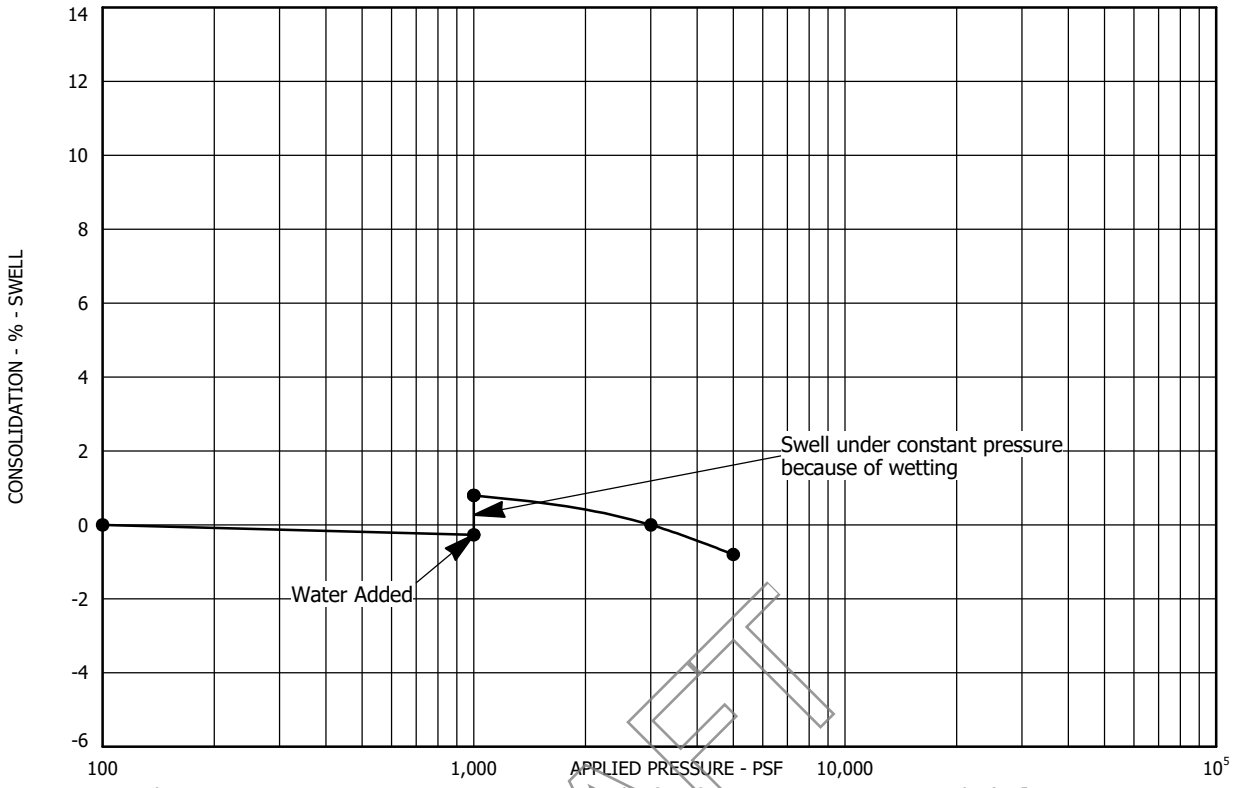
DRAFT



Sample Location: Test Boring No. 30 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 8

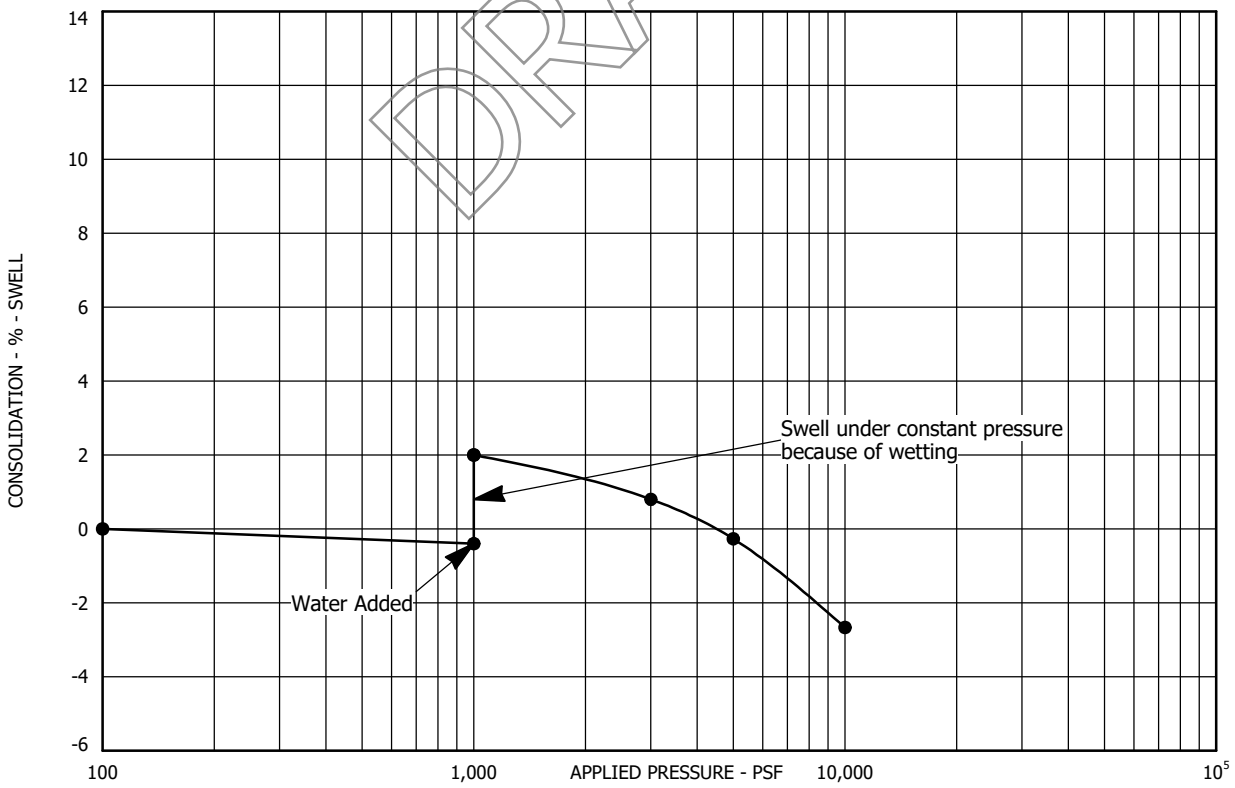
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-37
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 30 at a depth of 14 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 15

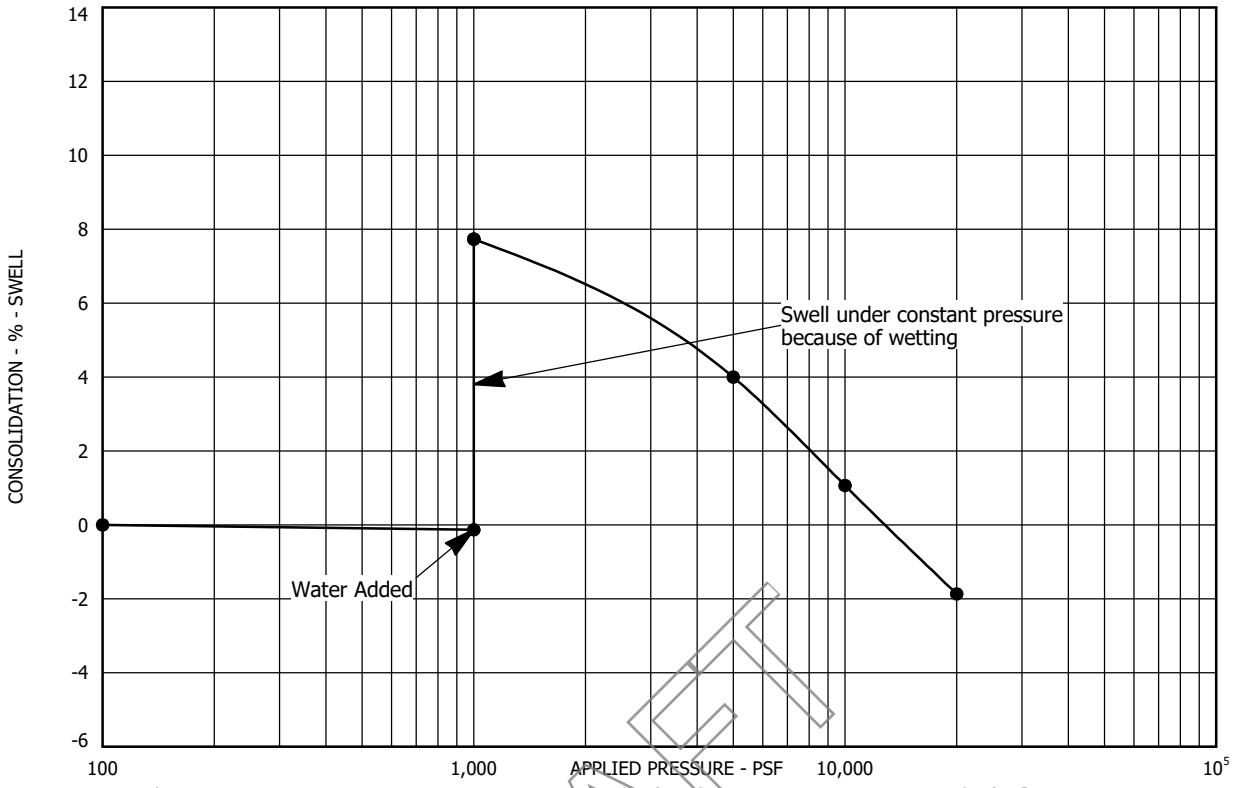
DRAFT



Sample Location: Test Boring No. 31 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 9

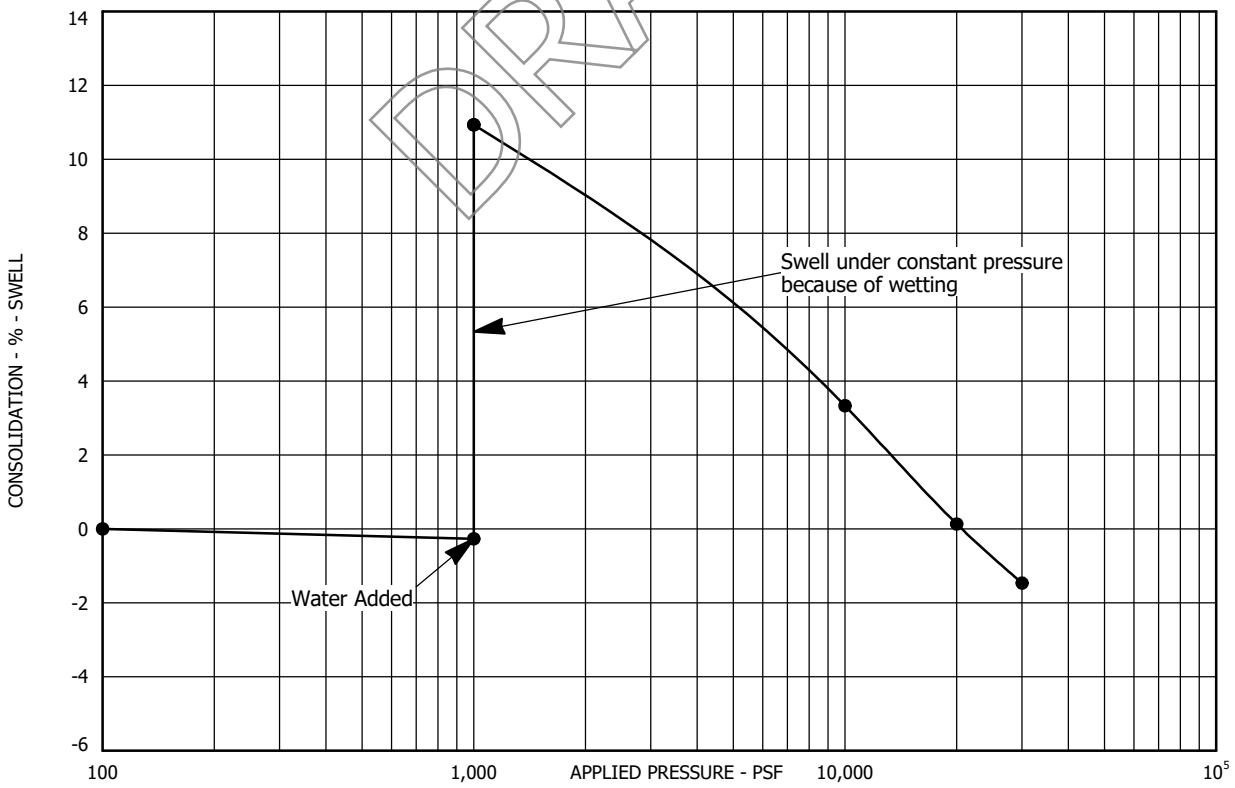
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-38
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 31 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 16

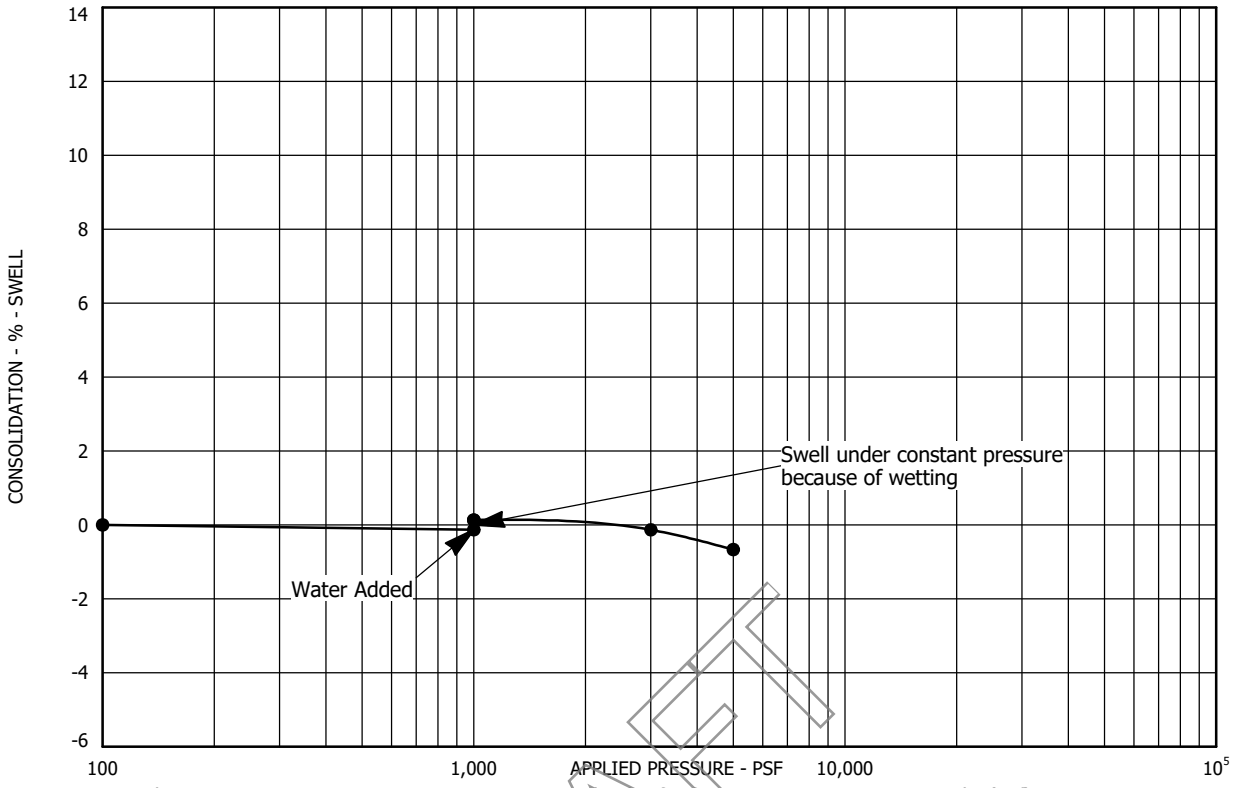
DRAFT



Sample Location: Test Boring No. 31 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 15

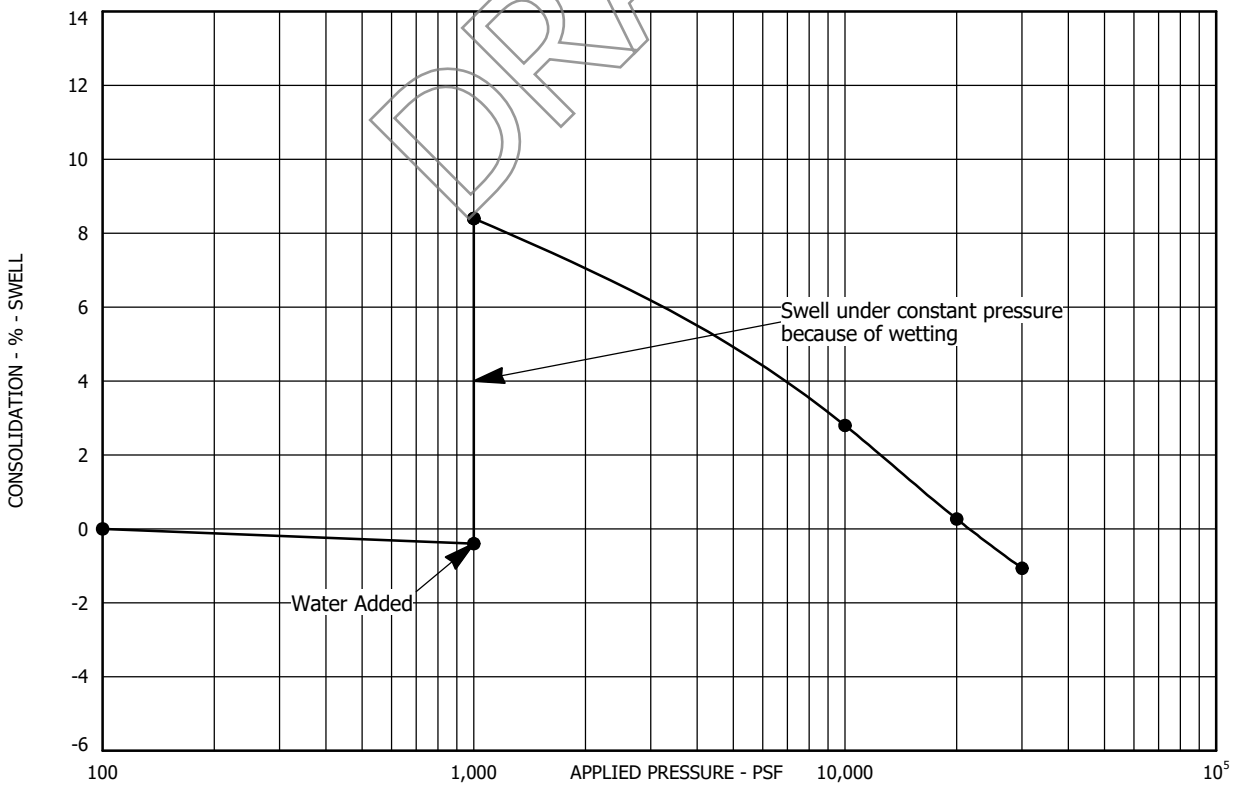
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-39
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 32 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

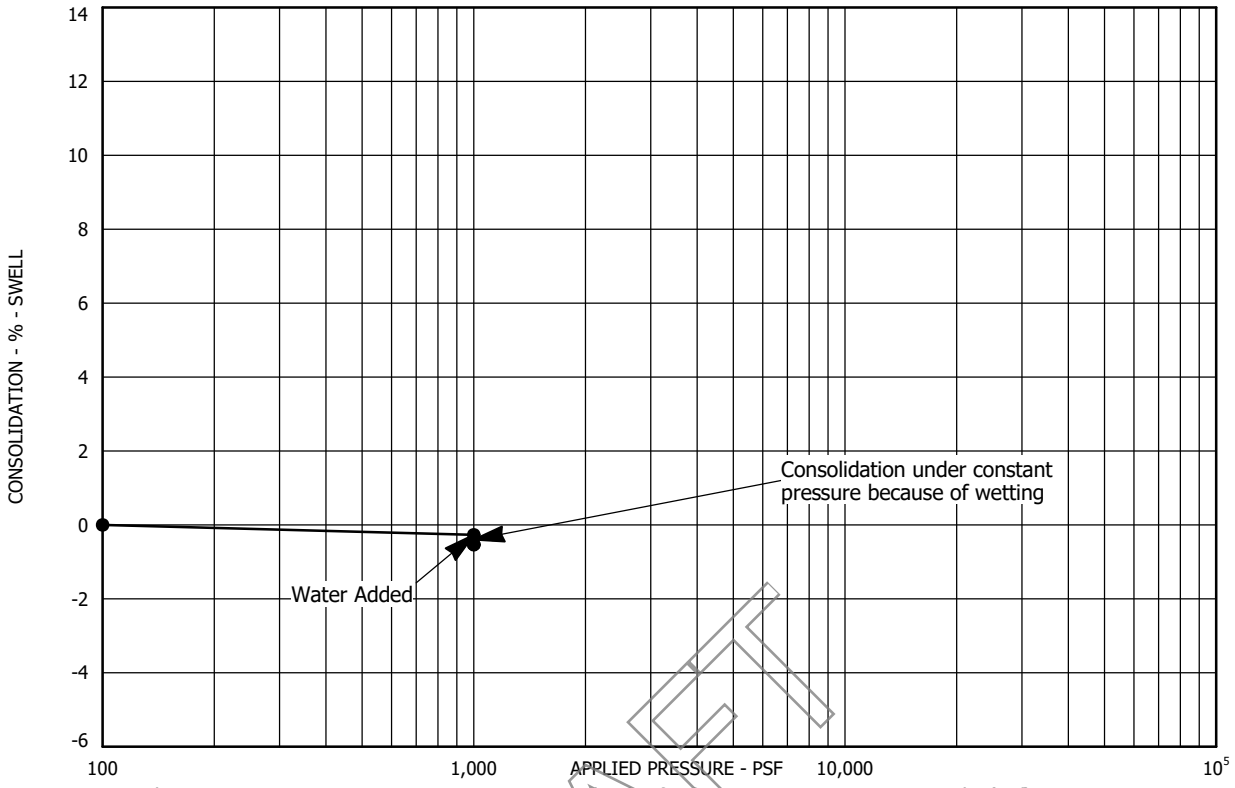
DRAFT



Sample Location: Test Boring No. 32 at a depth of 19 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

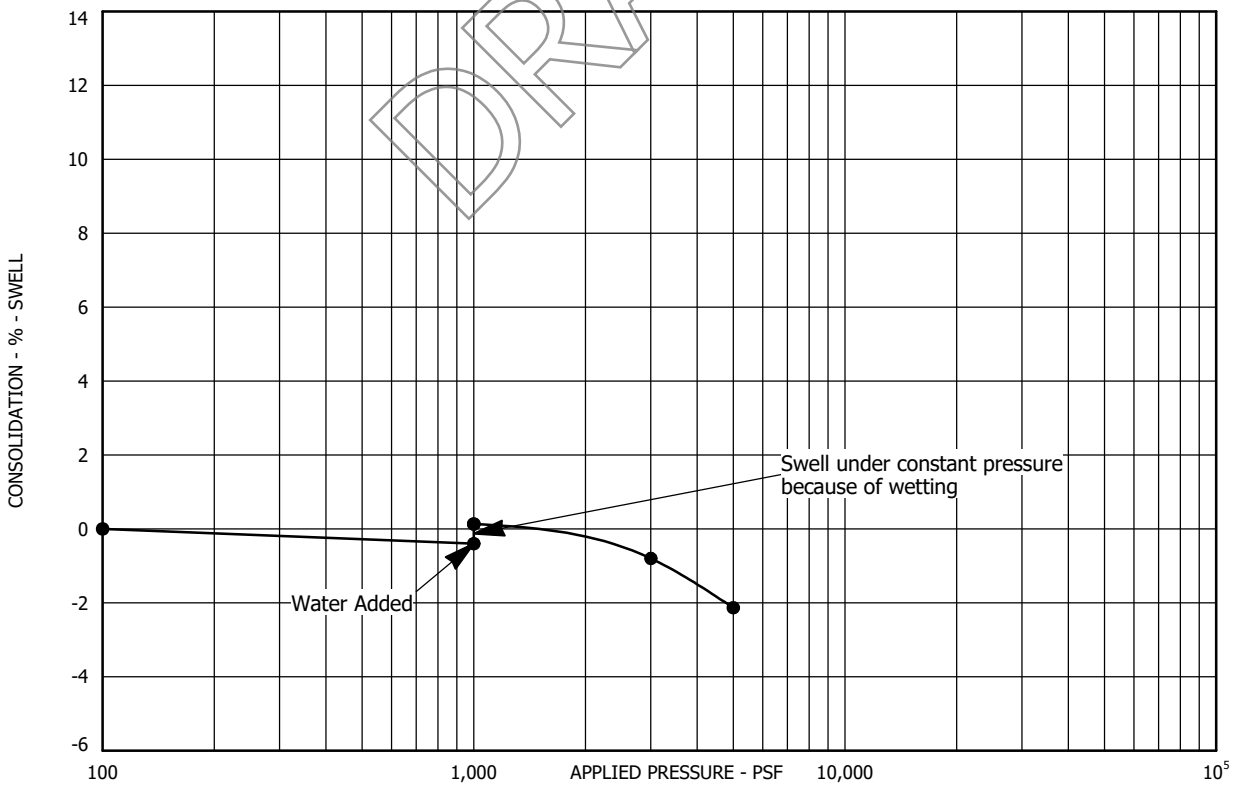
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-40
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 33 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 100
Moisture Content (%): 19

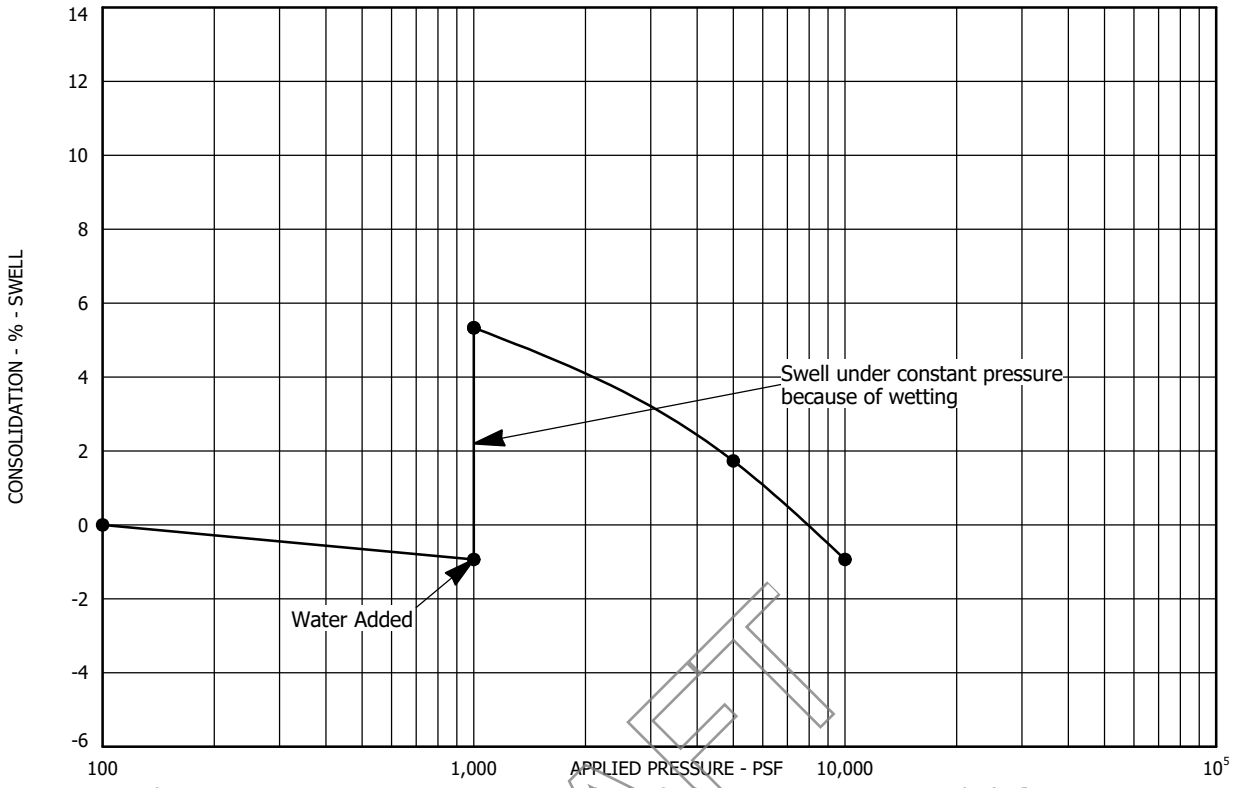
DRAFT



Sample Location: Test Boring No. 34 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 17

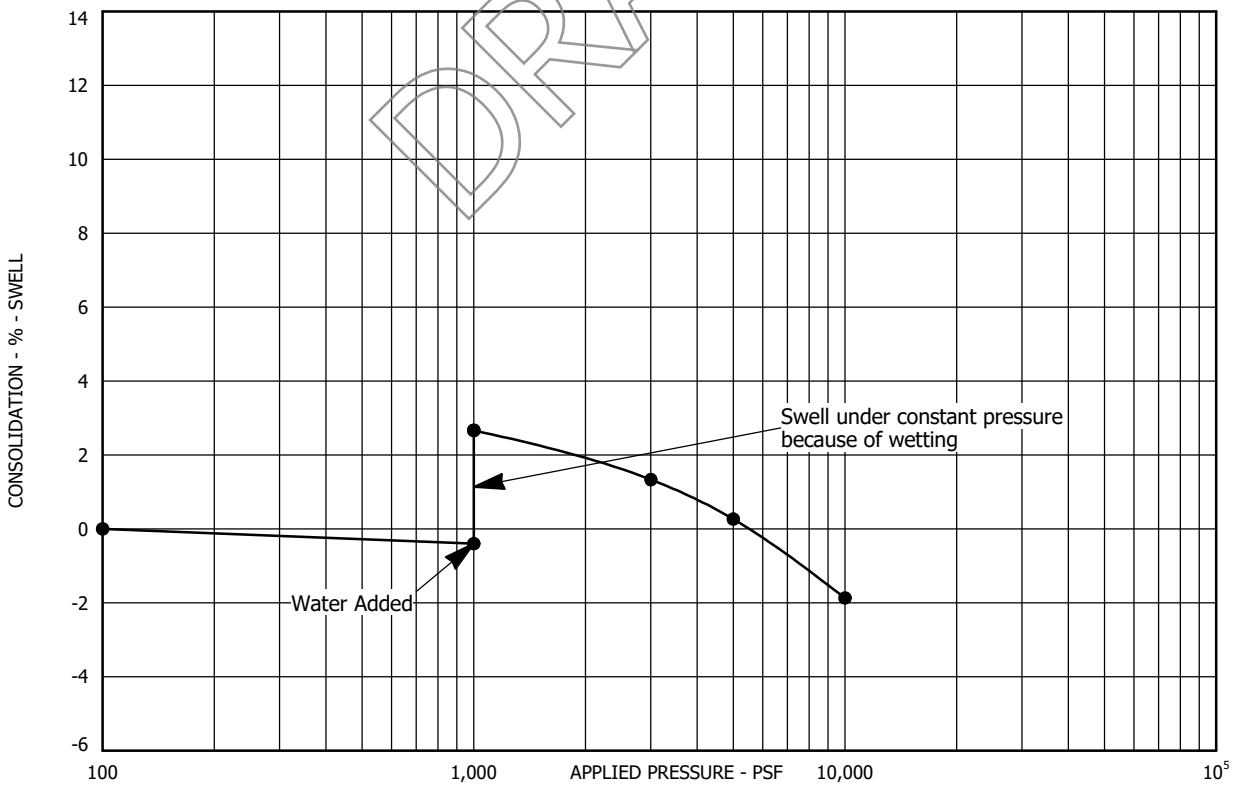
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-41
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 34 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 19

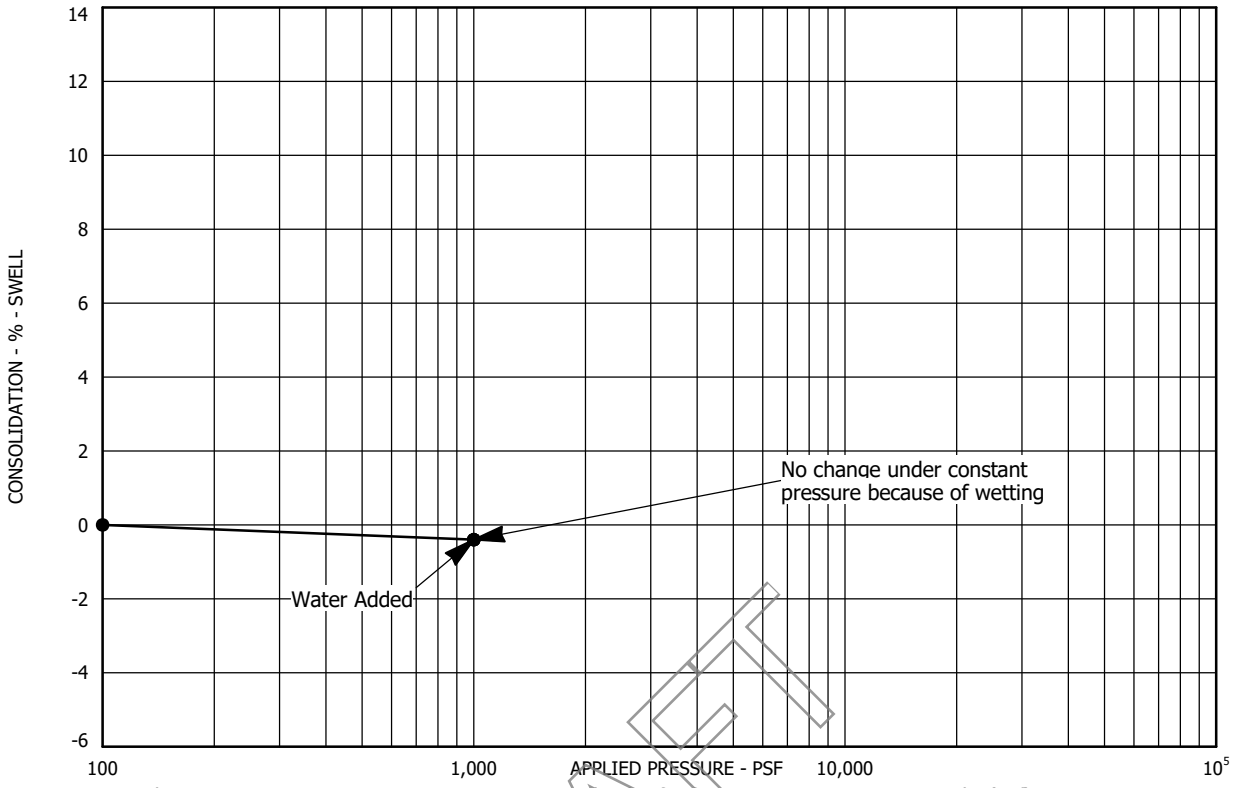
DRAFT



Sample Location: Test Boring No. 34 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 12

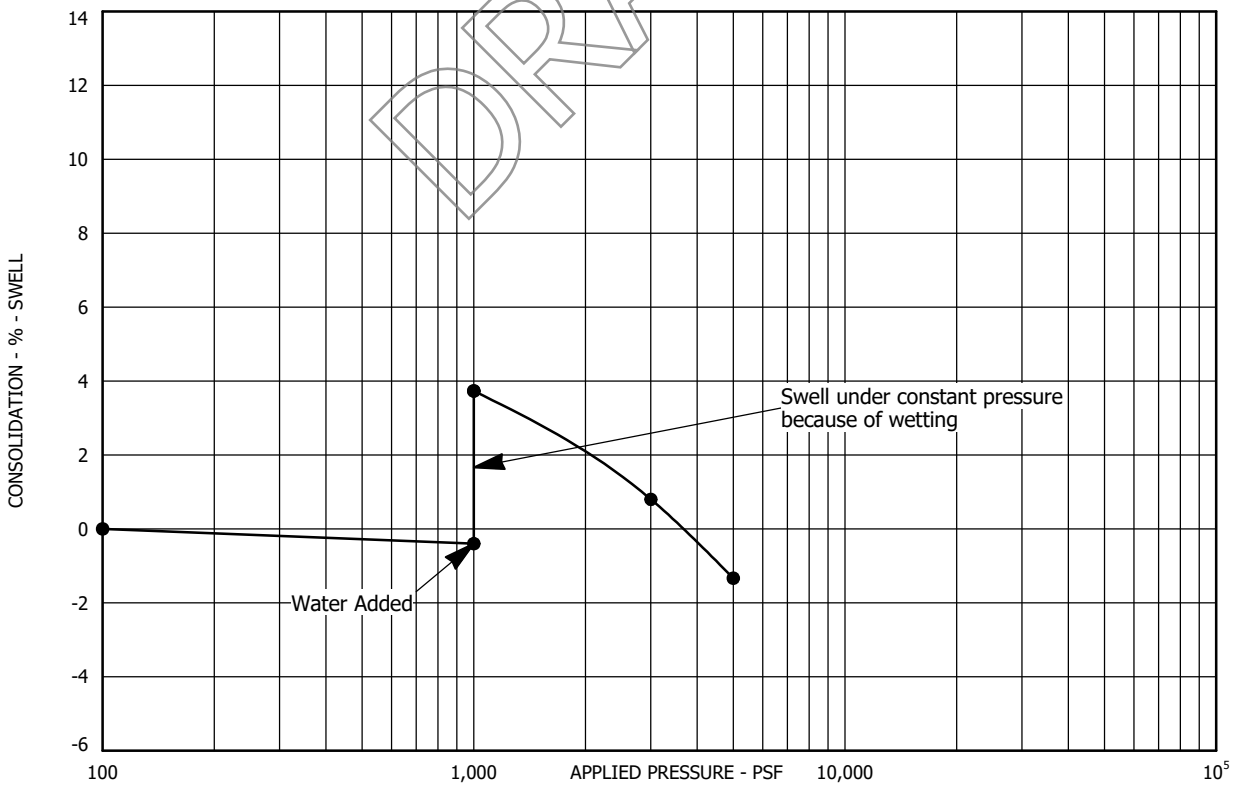
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-42
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 35 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 16

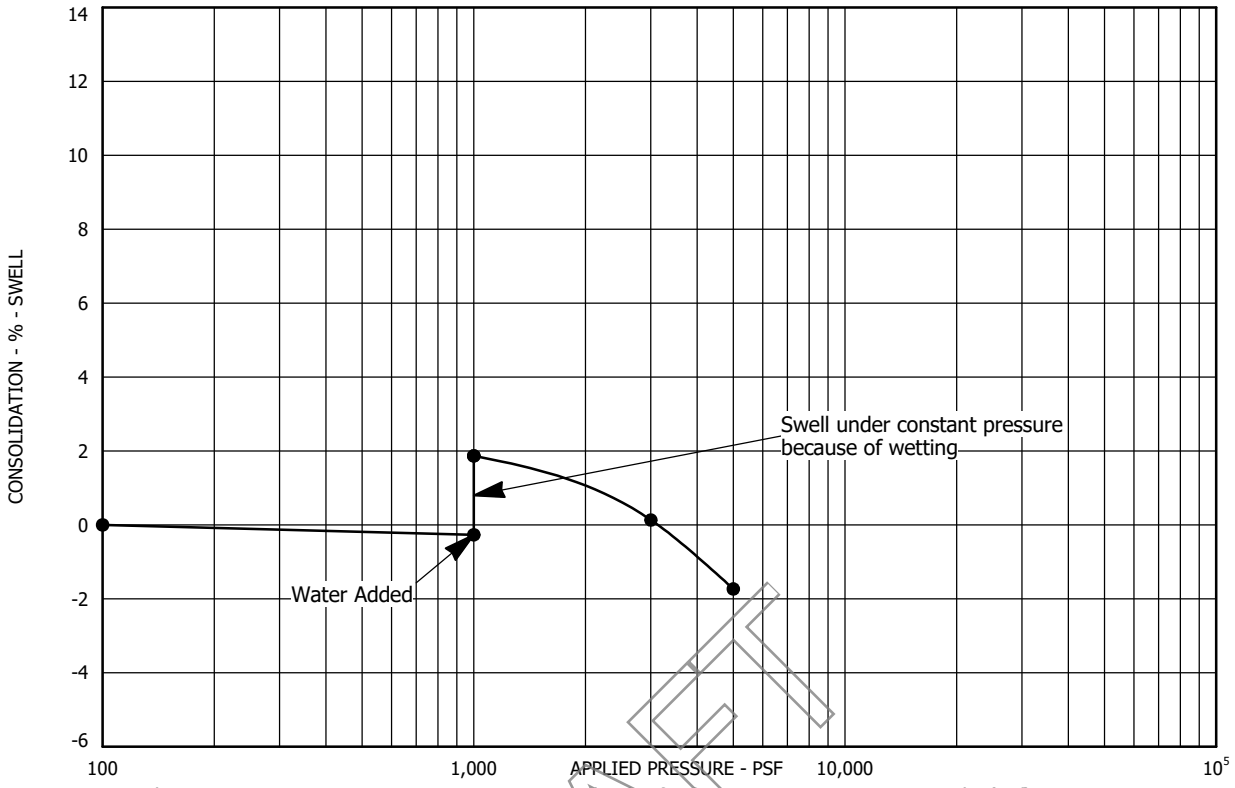
DRAFT



Sample Location: Test Boring No. 35 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 106
Moisture Content (%): 20

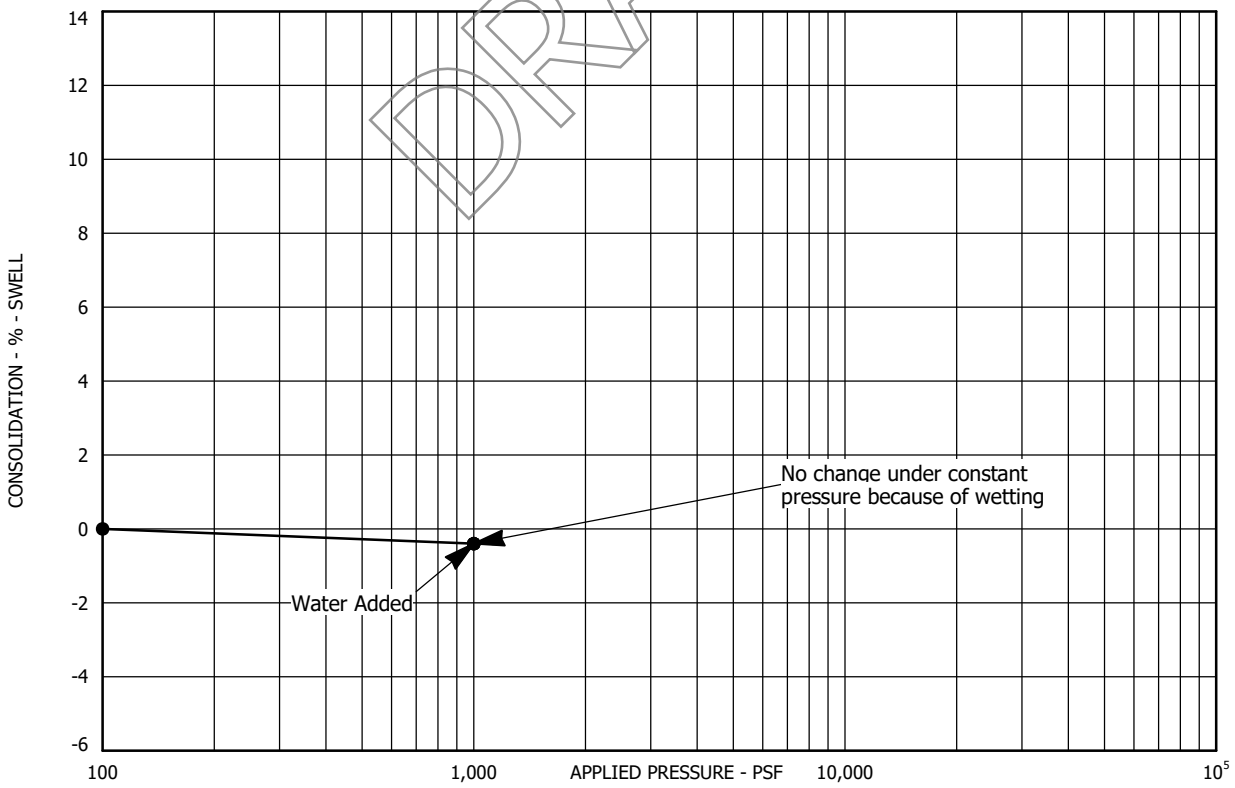
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-43
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 36 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 8

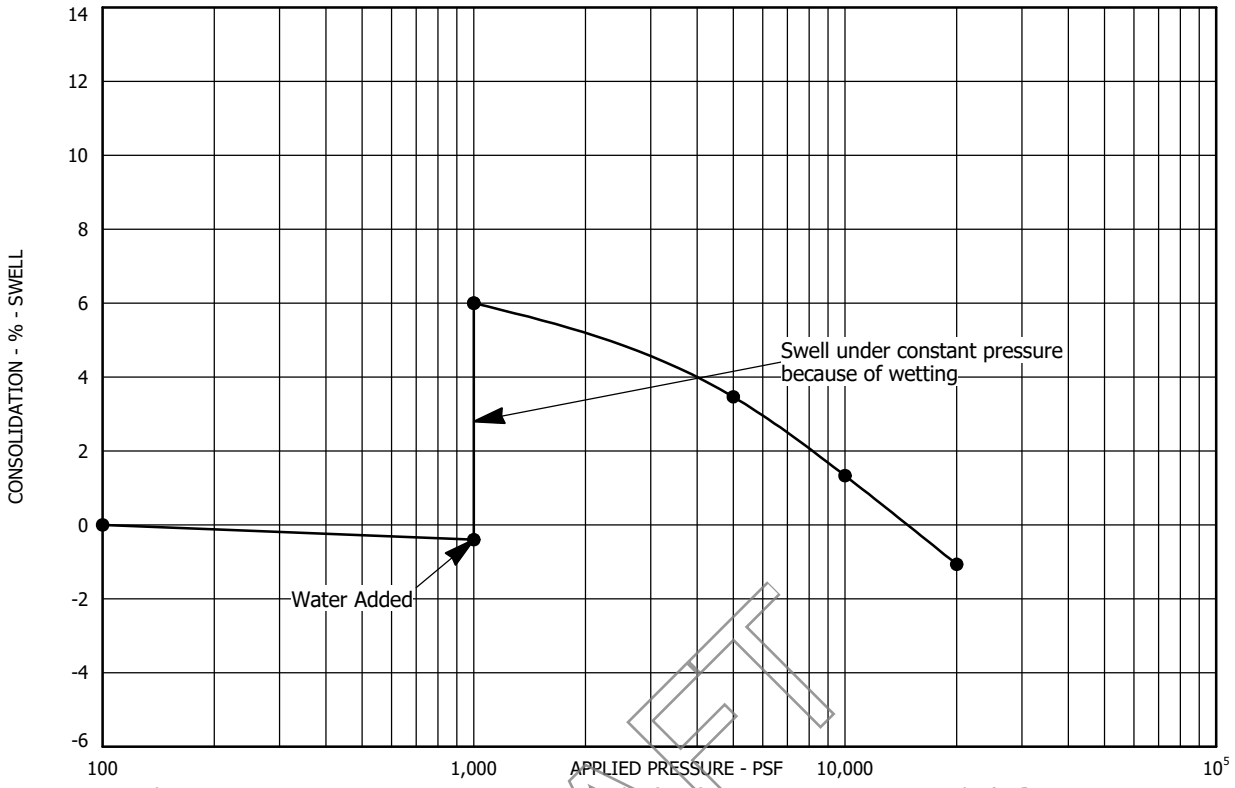
DRAFT



Sample Location: Test Boring No. 36 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 15

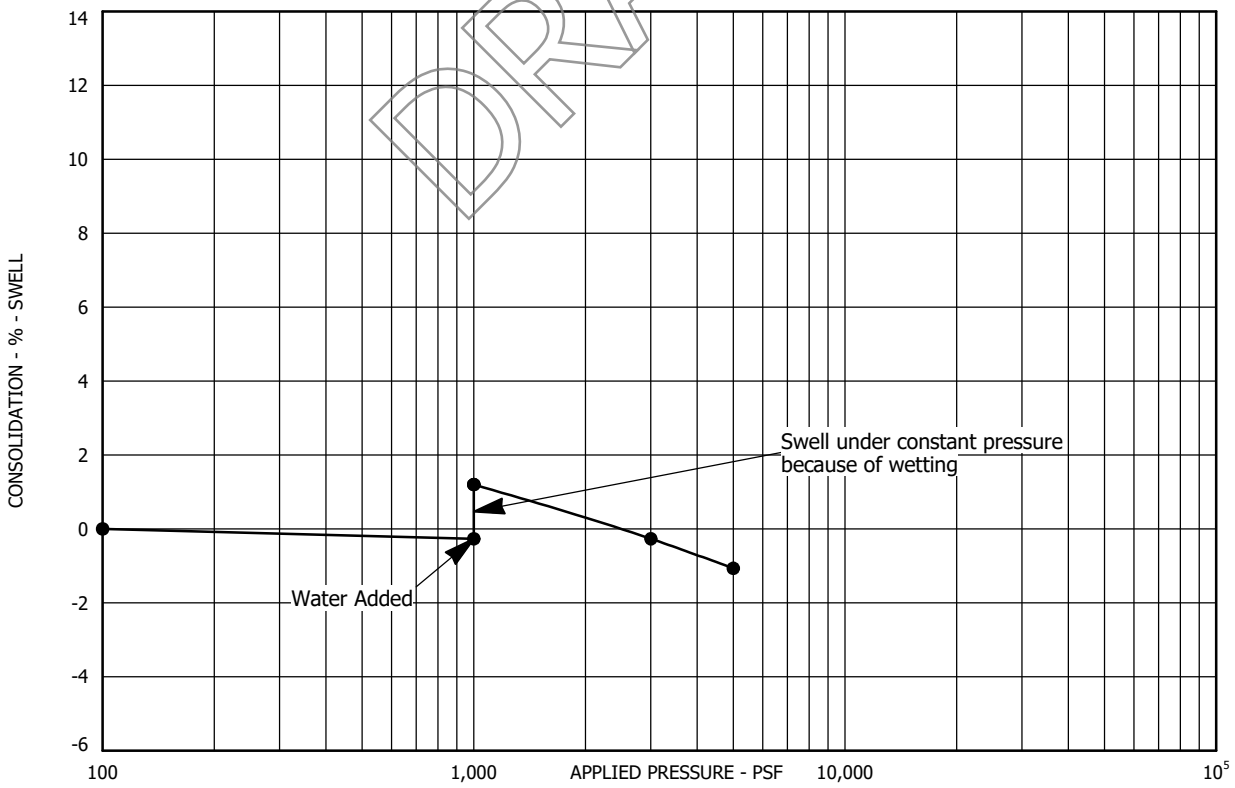
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-44
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 36 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 17

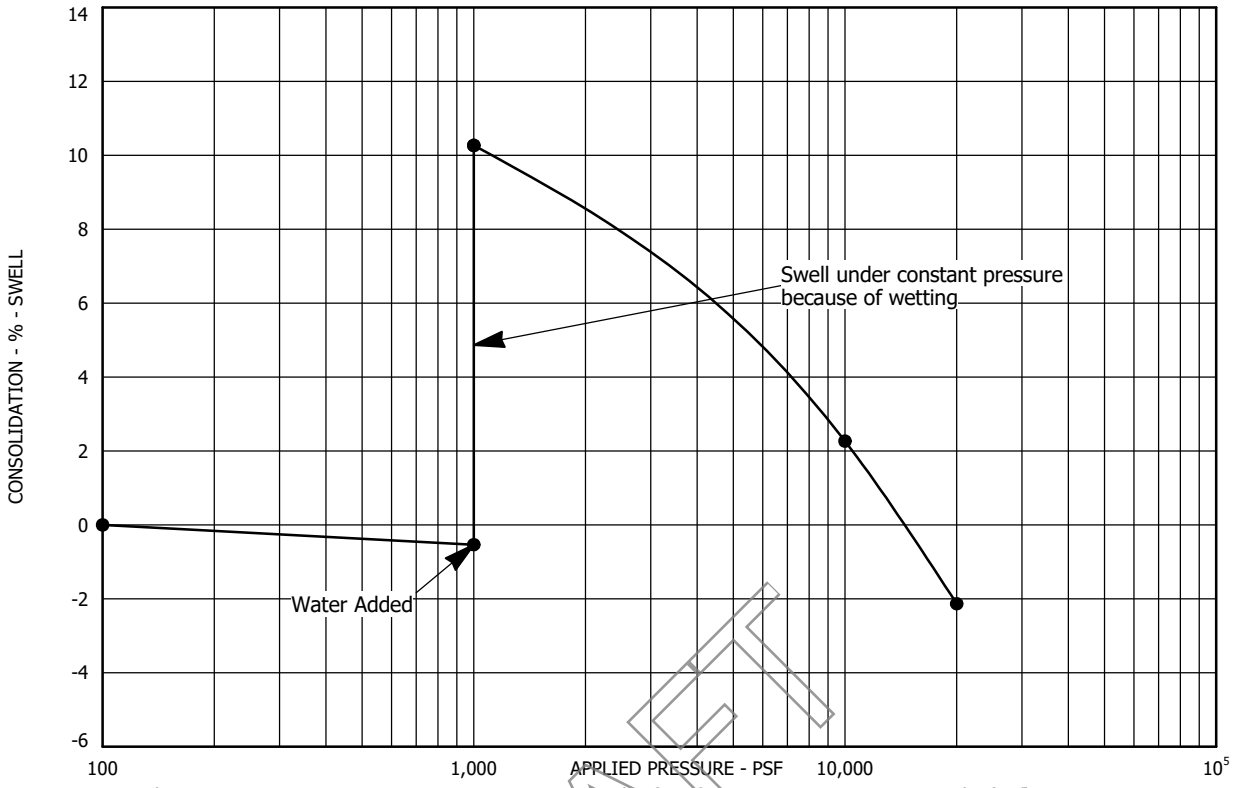
DRAFT



Sample Location: Test Boring No. 37 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 12

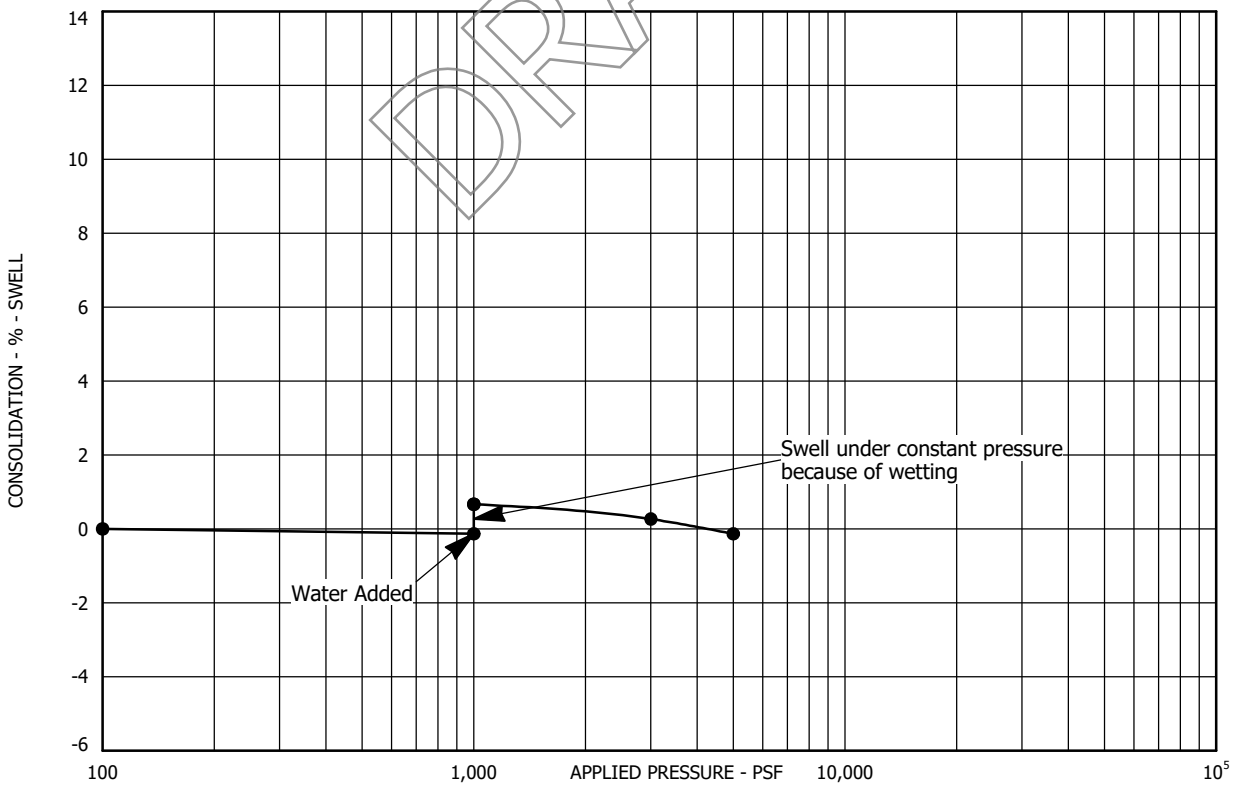
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-45
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 37 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 16

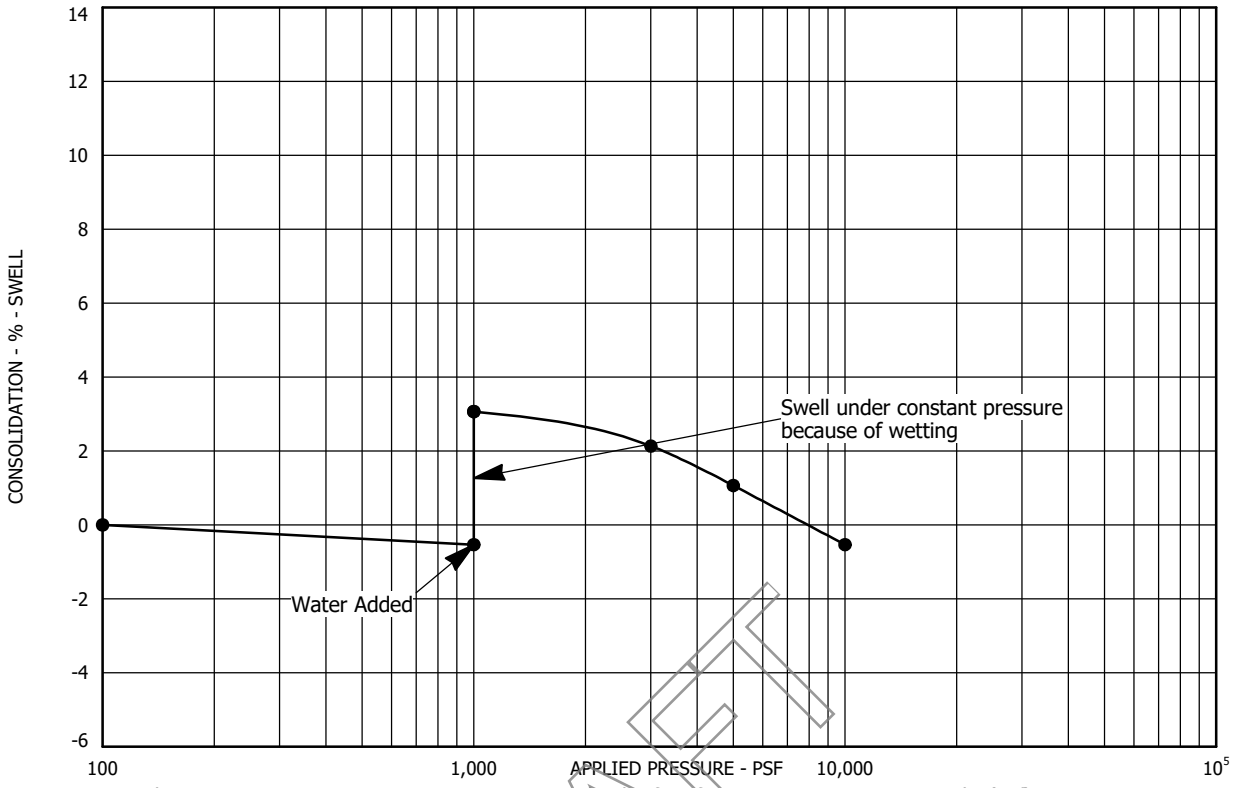
DRAFT



Sample Location: Test Boring No. 38 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 10

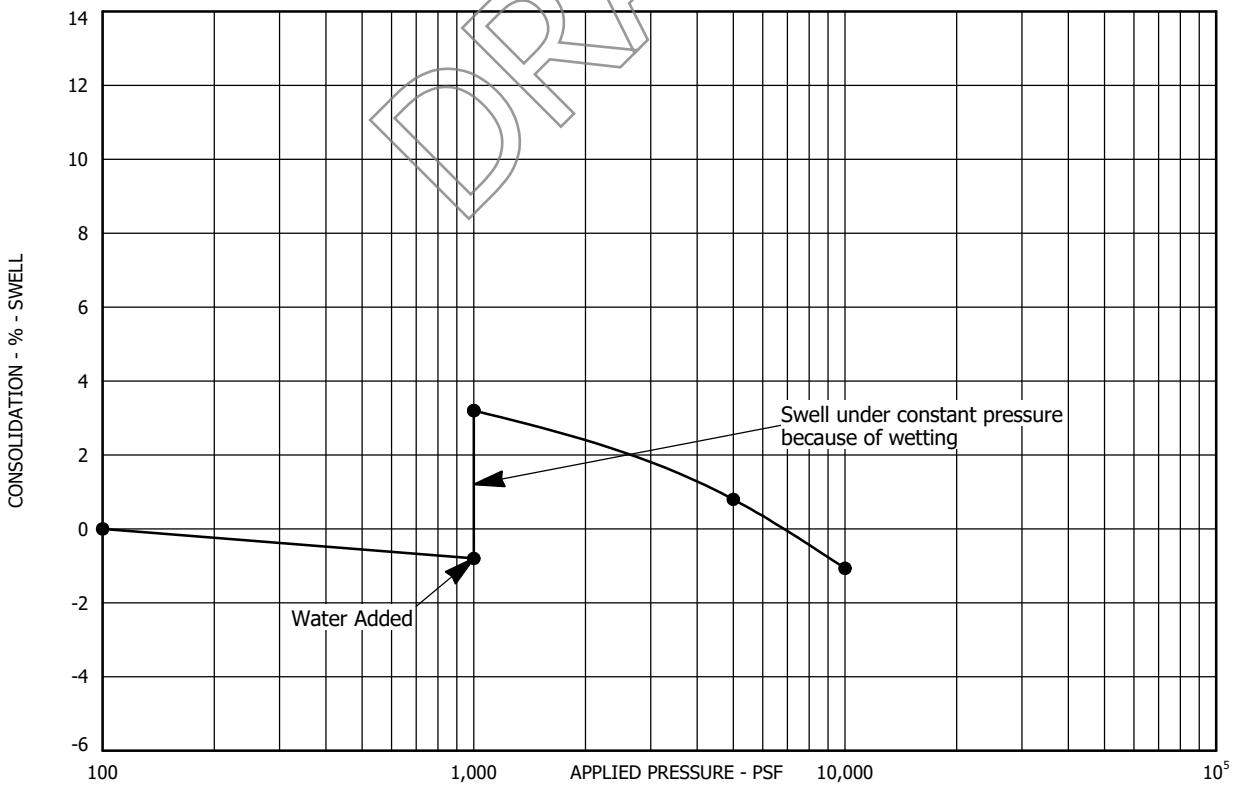
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-46
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 38 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

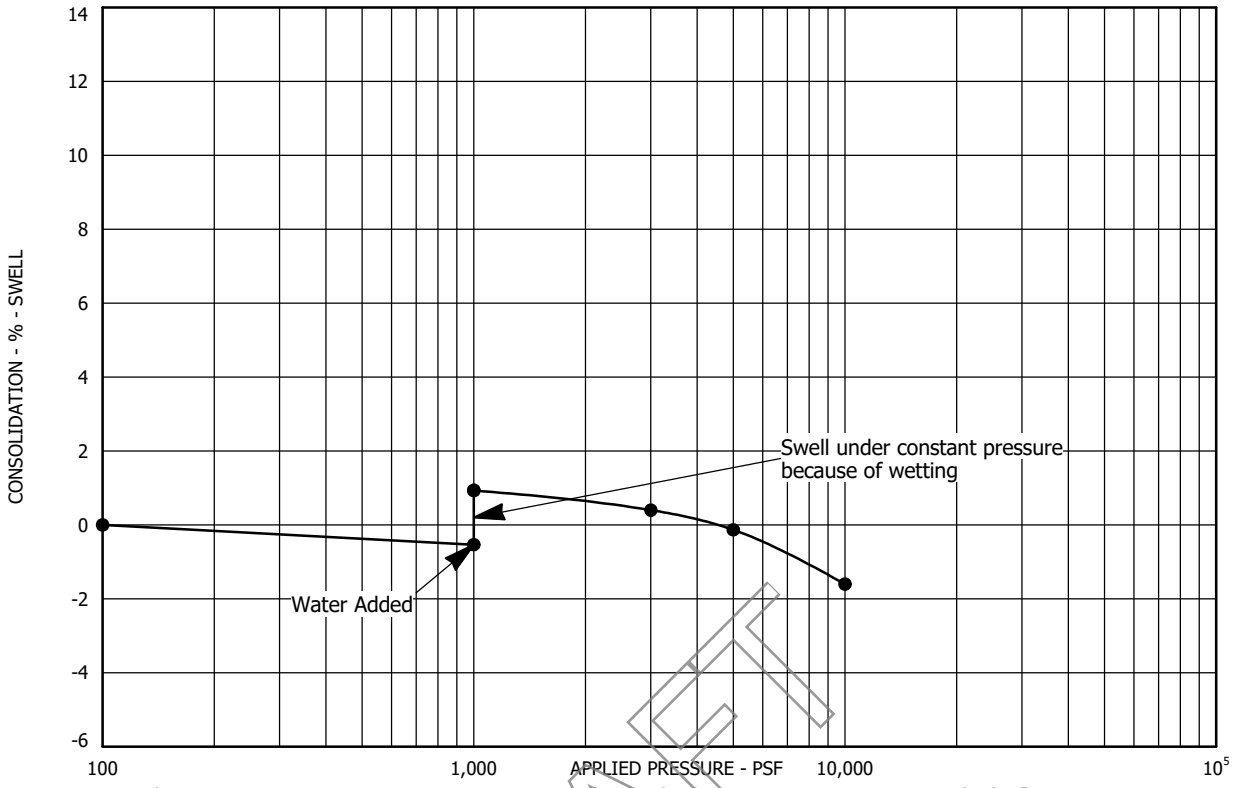
DRAFT



Sample Location: Test Boring No. 38 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 14

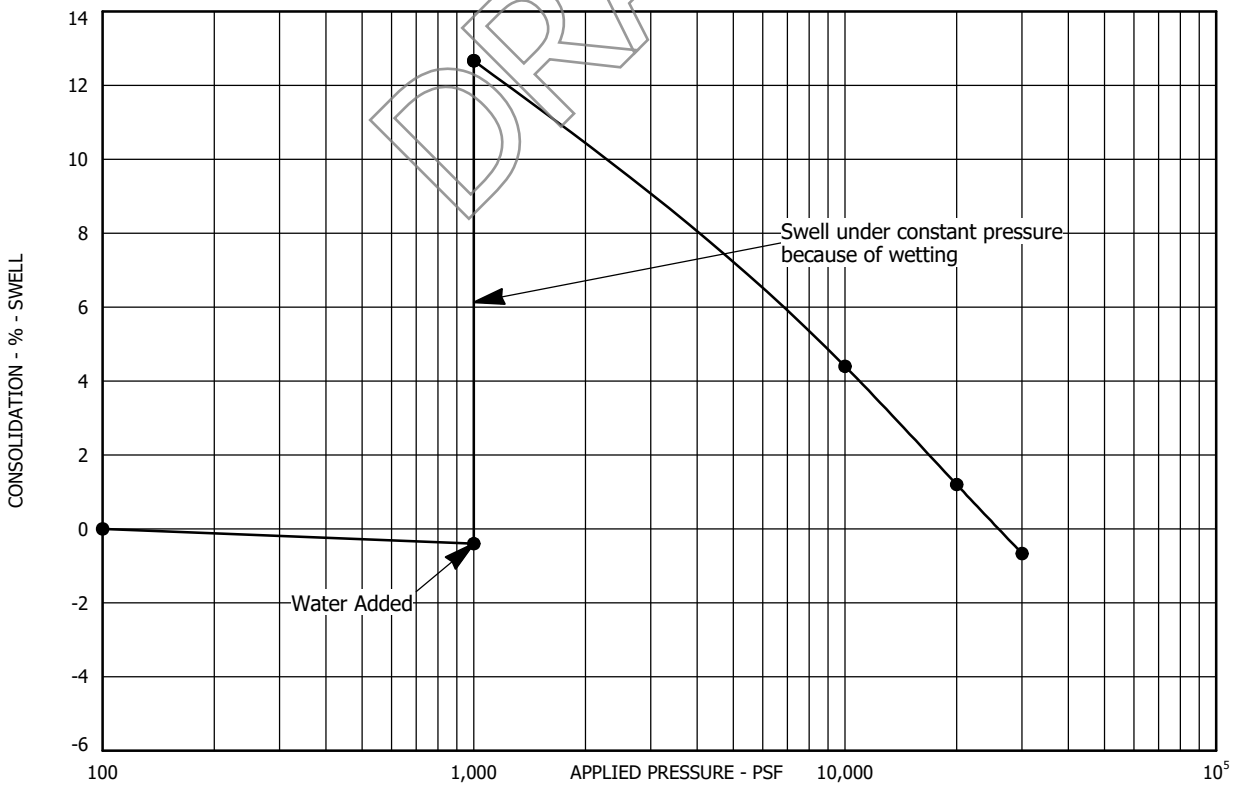
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-47
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 39 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 11

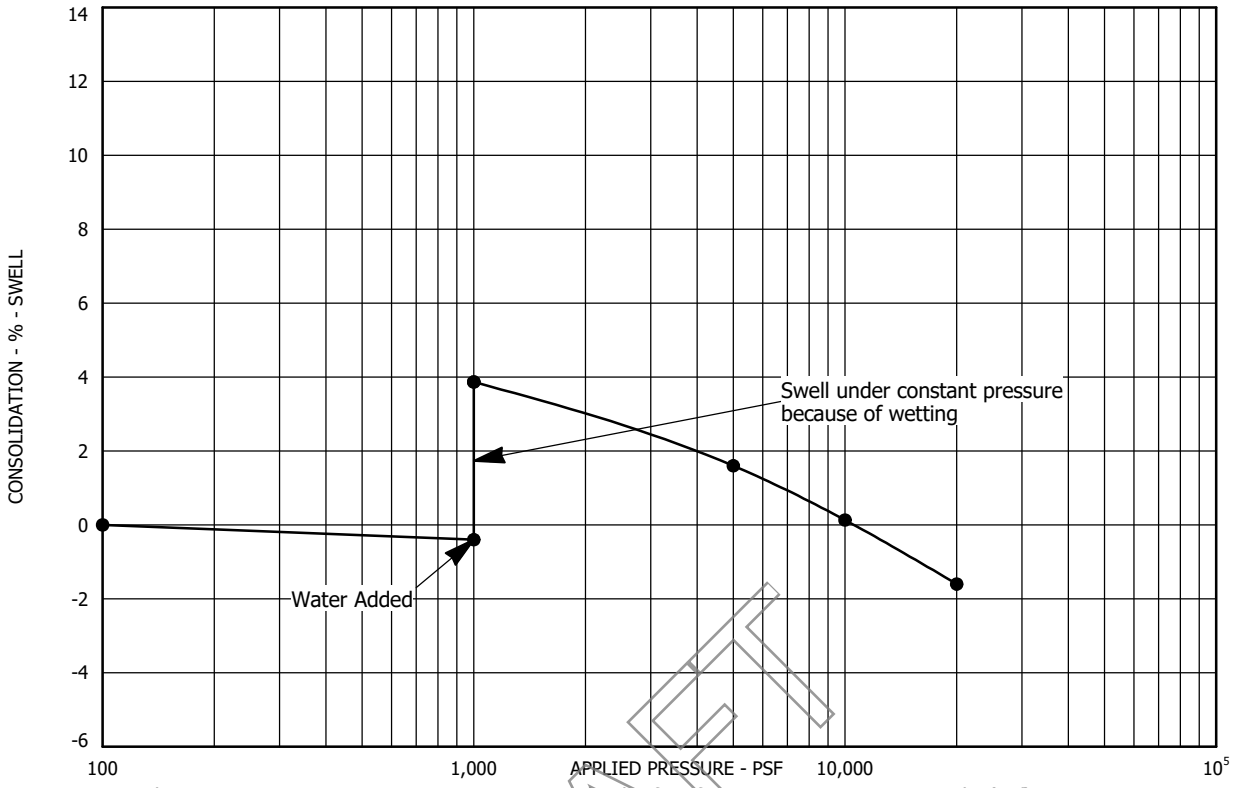
DRAFT



Sample Location: Test Boring No. 39 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 14

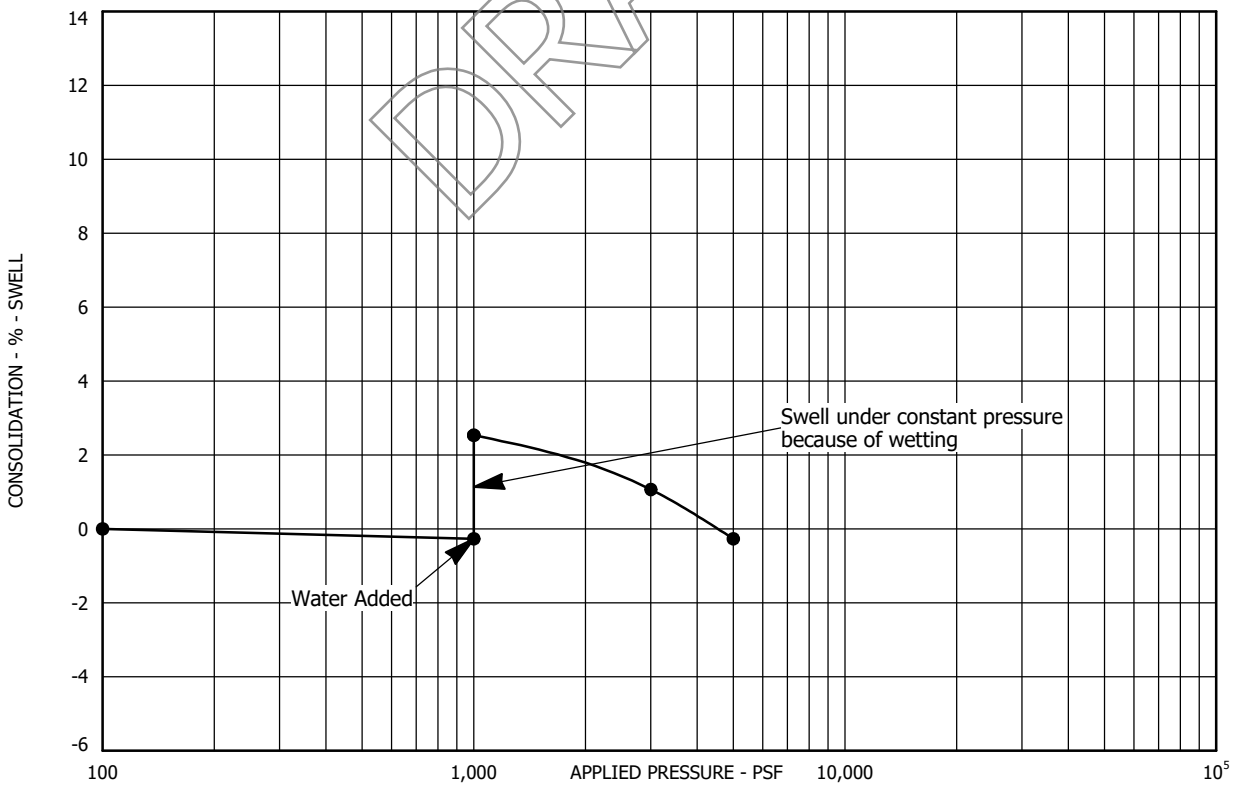
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-48
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 39 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 128
Moisture Content (%): 8

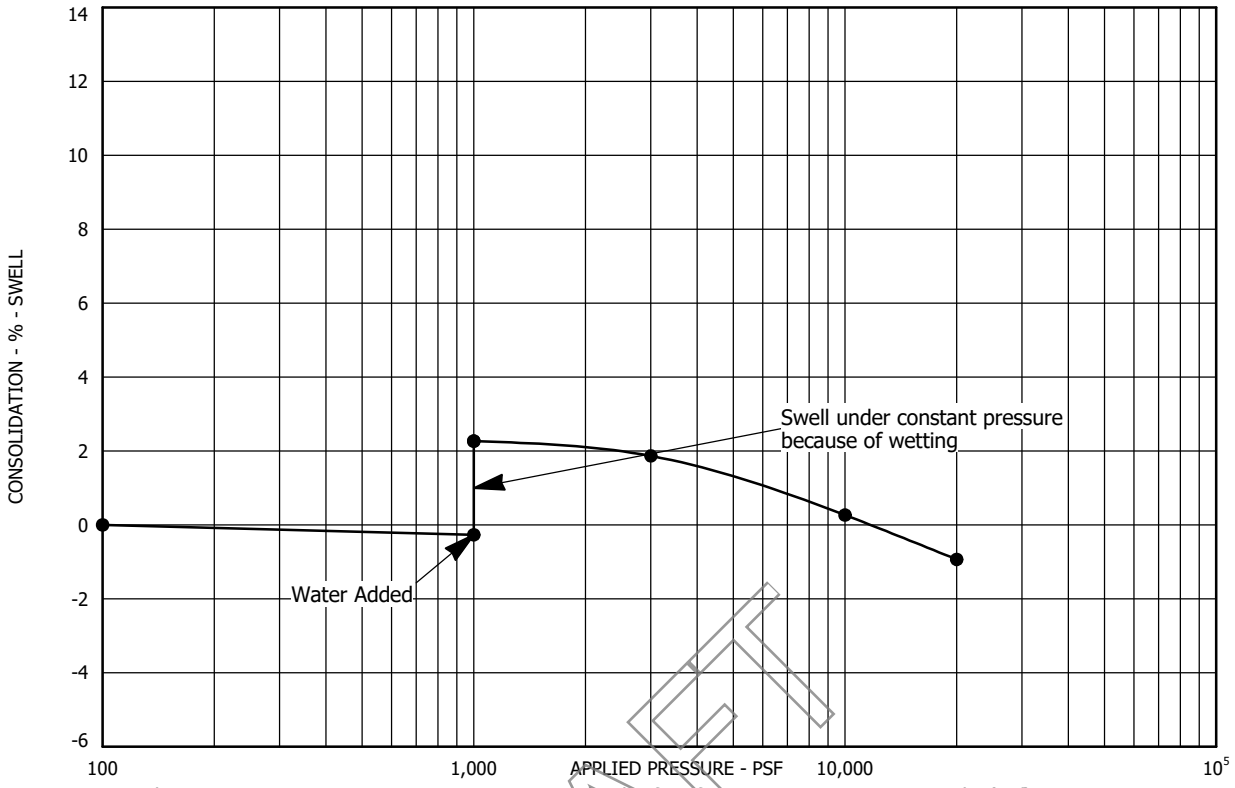
DRAFT



Sample Location: Test Boring No. 40 at a depth of 7 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 112
Moisture Content (%): 17

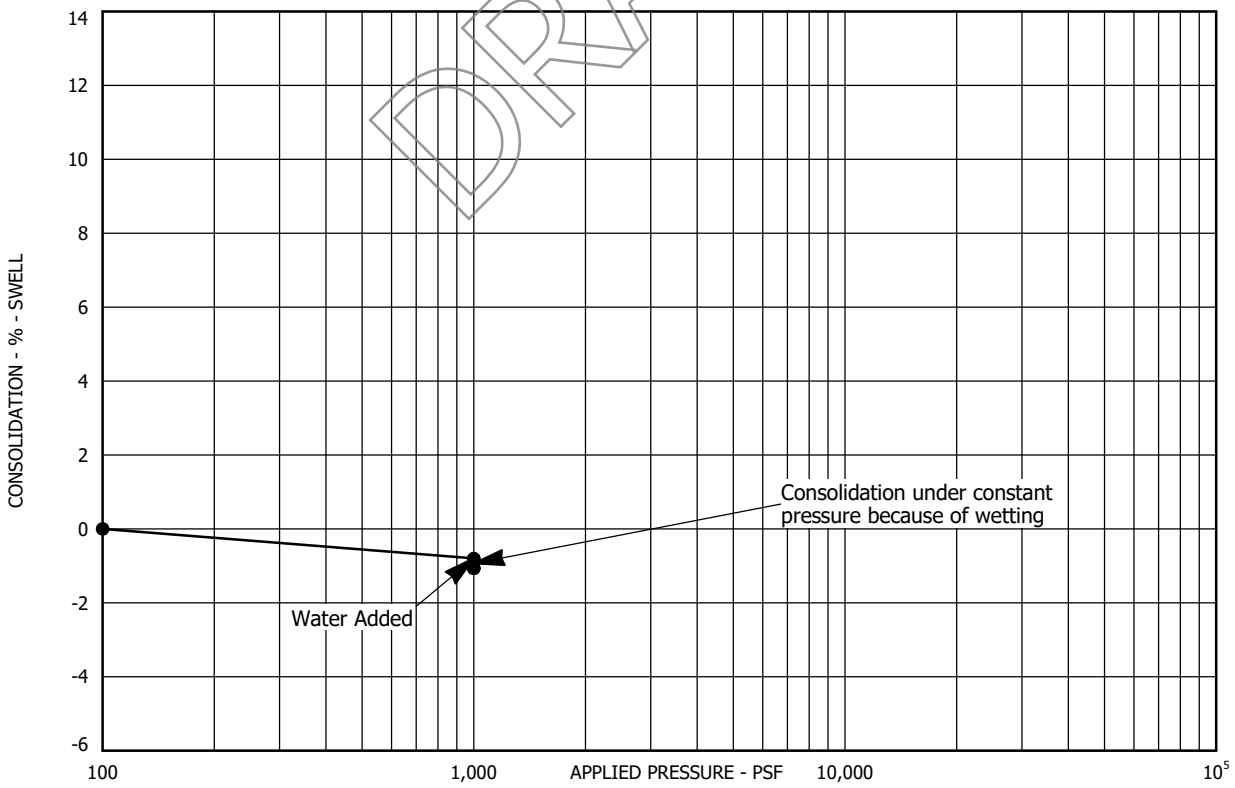
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-49
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 40 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 125
Moisture Content (%): 13

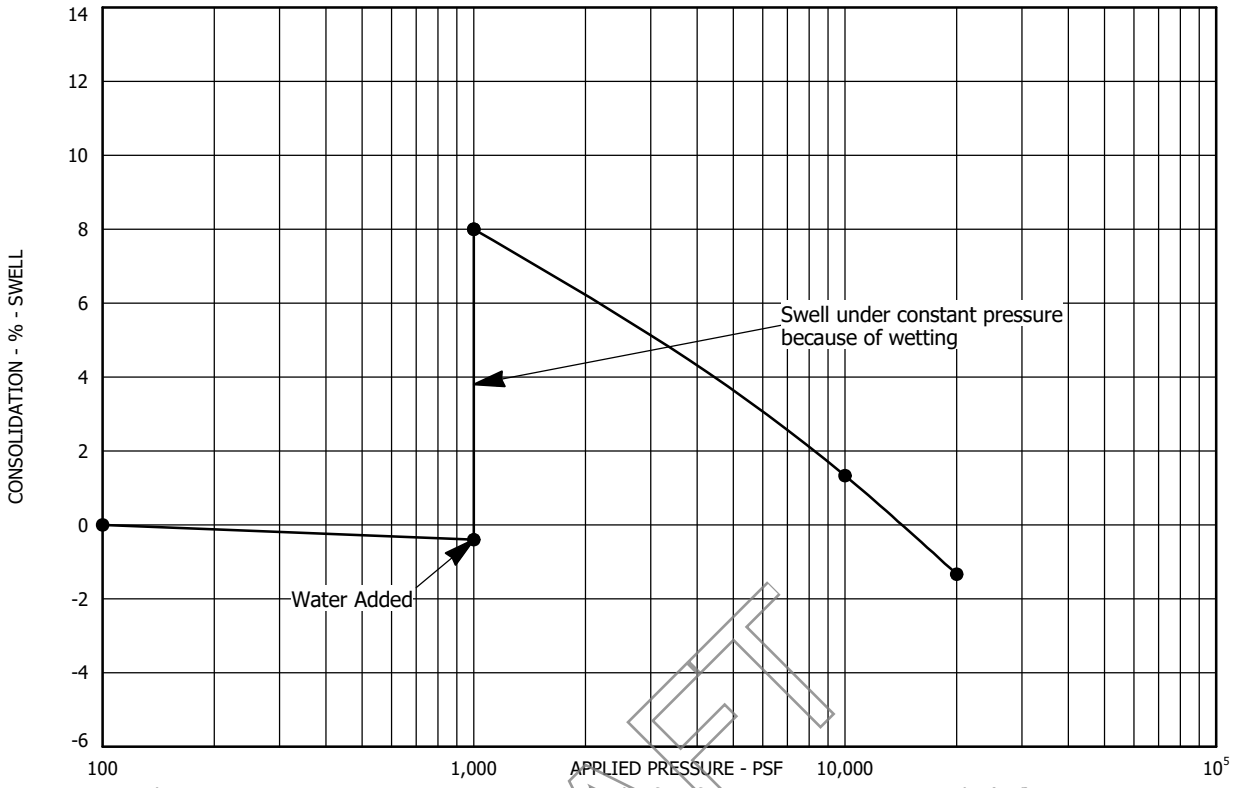
DRAFT



Sample Location: Test Boring No. 41 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 23

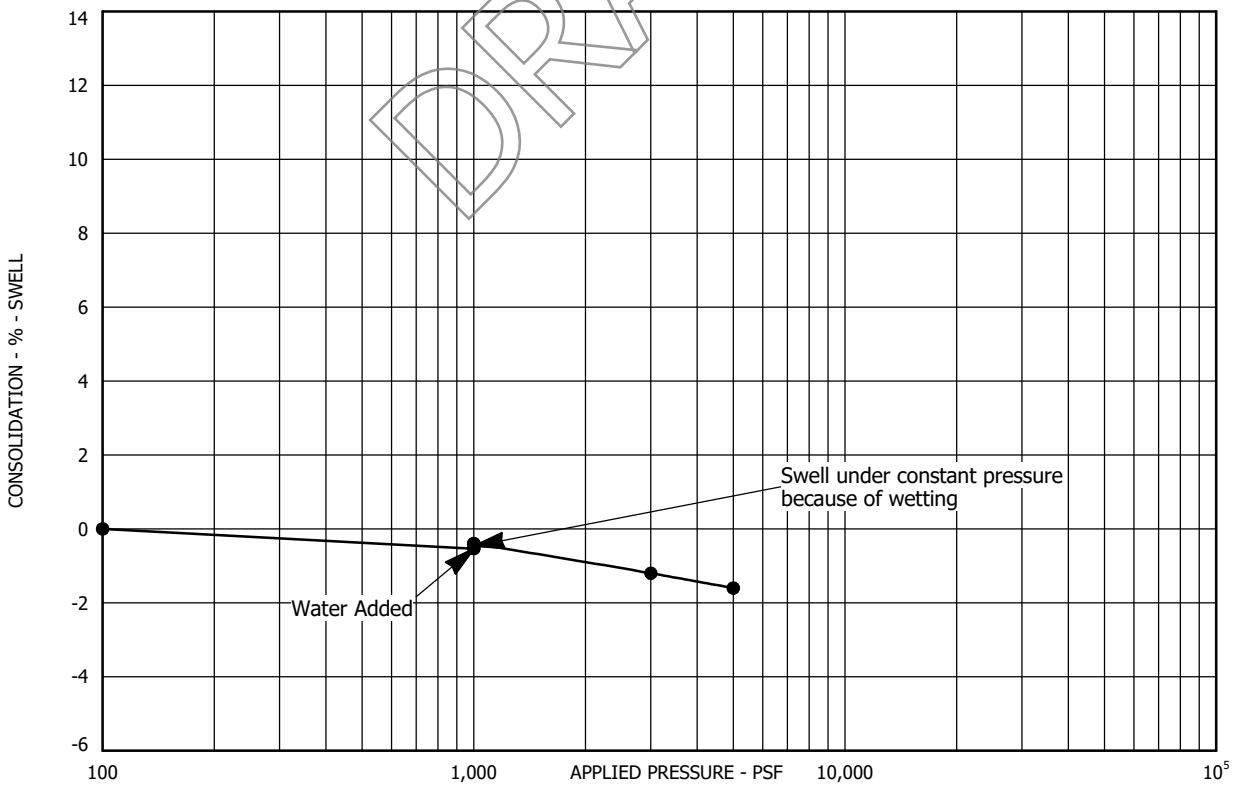
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-50
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 41 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 15

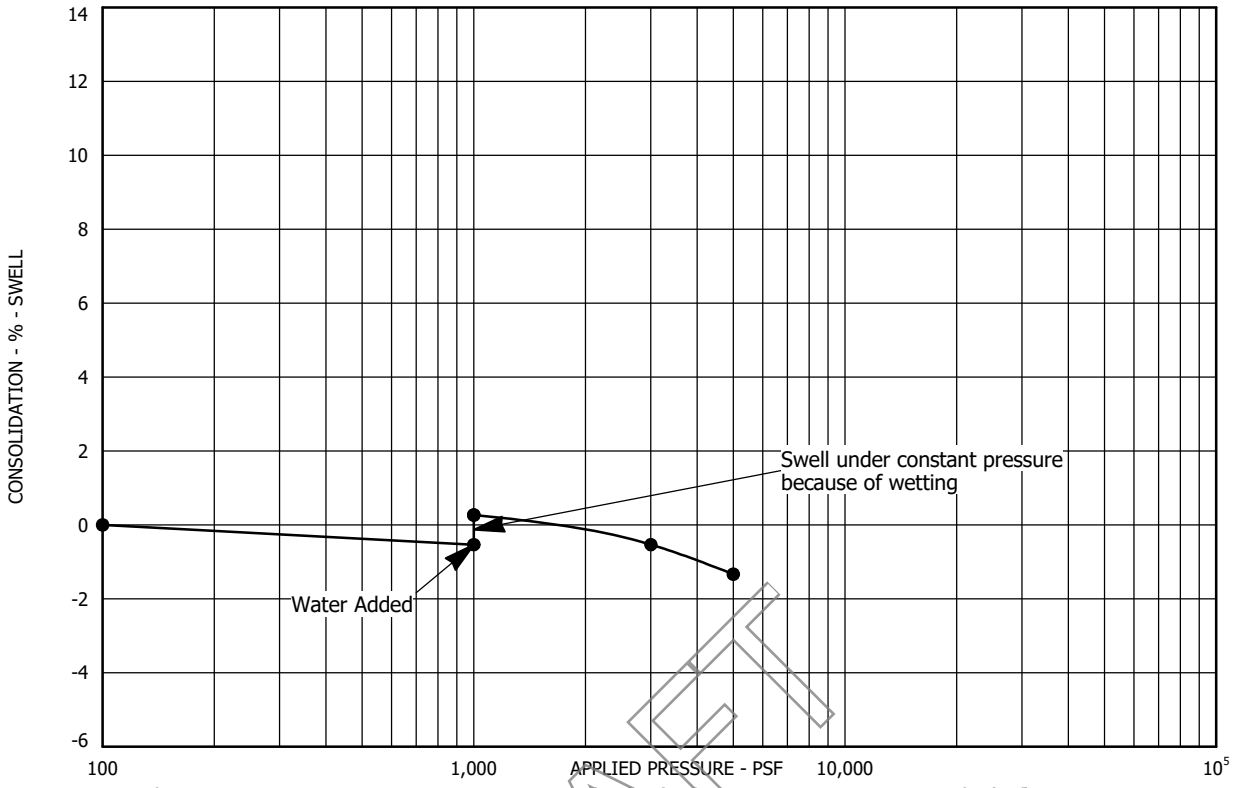
DRAFT



Sample Location: Test Boring No. 42 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 17

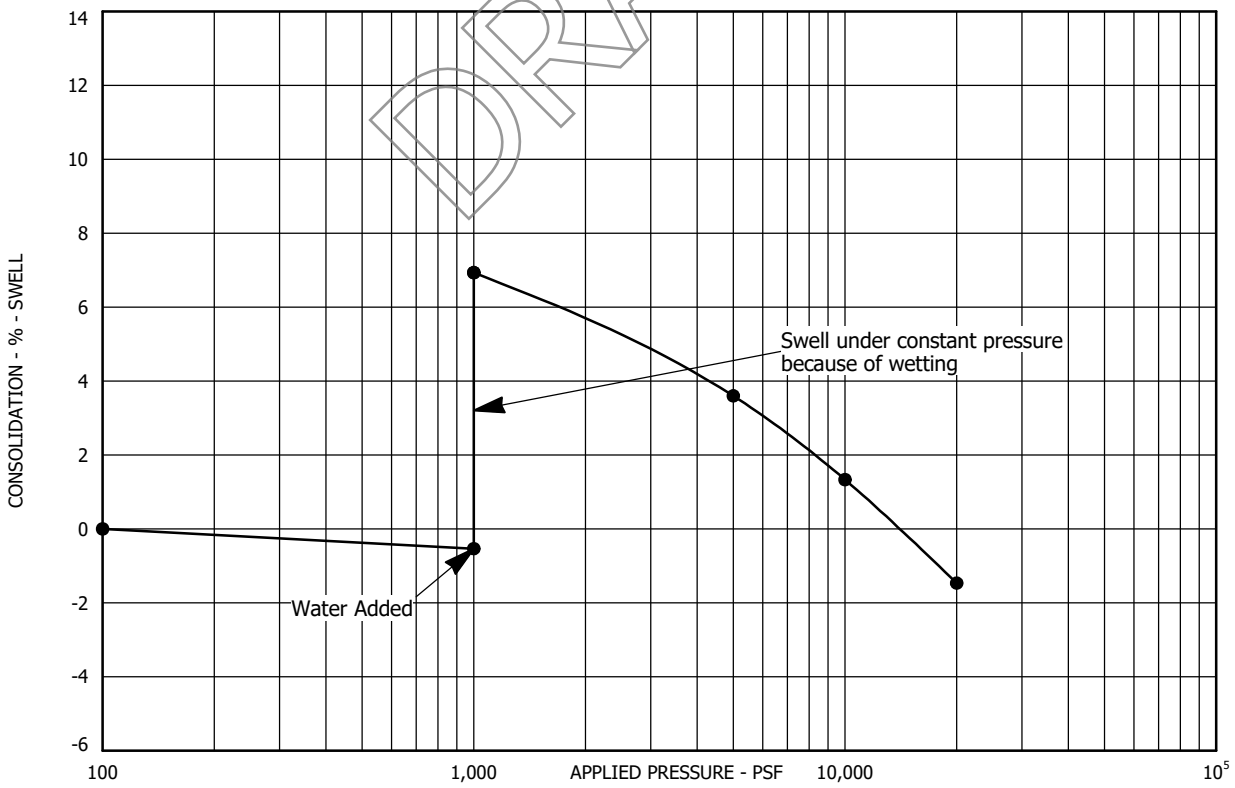
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-51
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 42 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 16

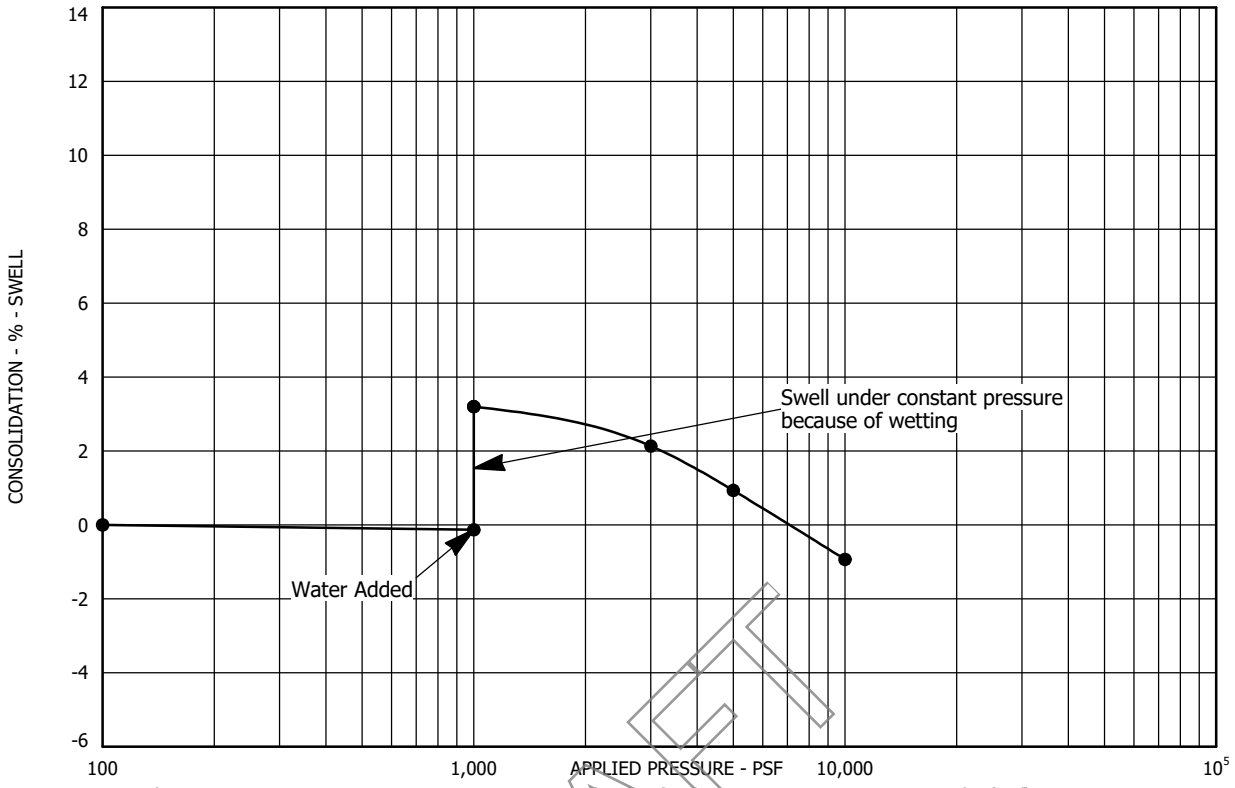
DRAFT



Sample Location: Test Boring No. 42 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 19

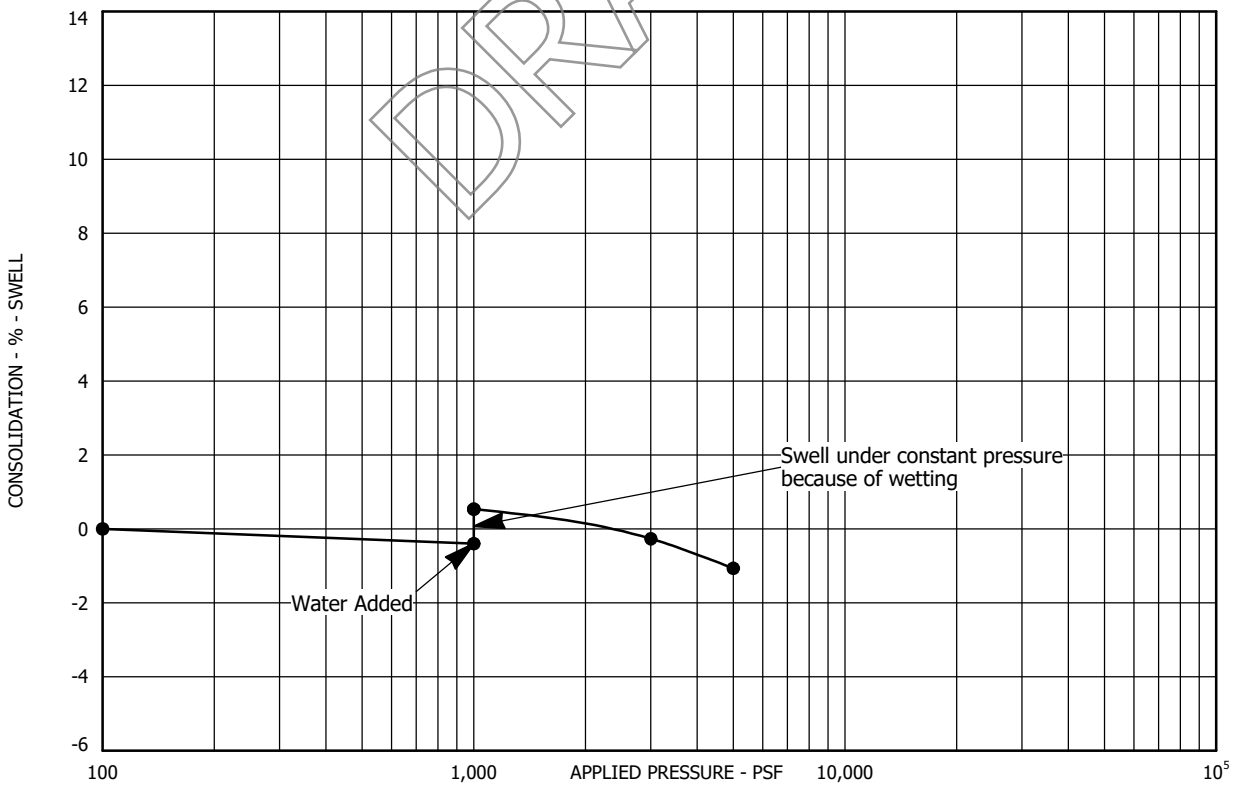
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-52
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 43 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 9

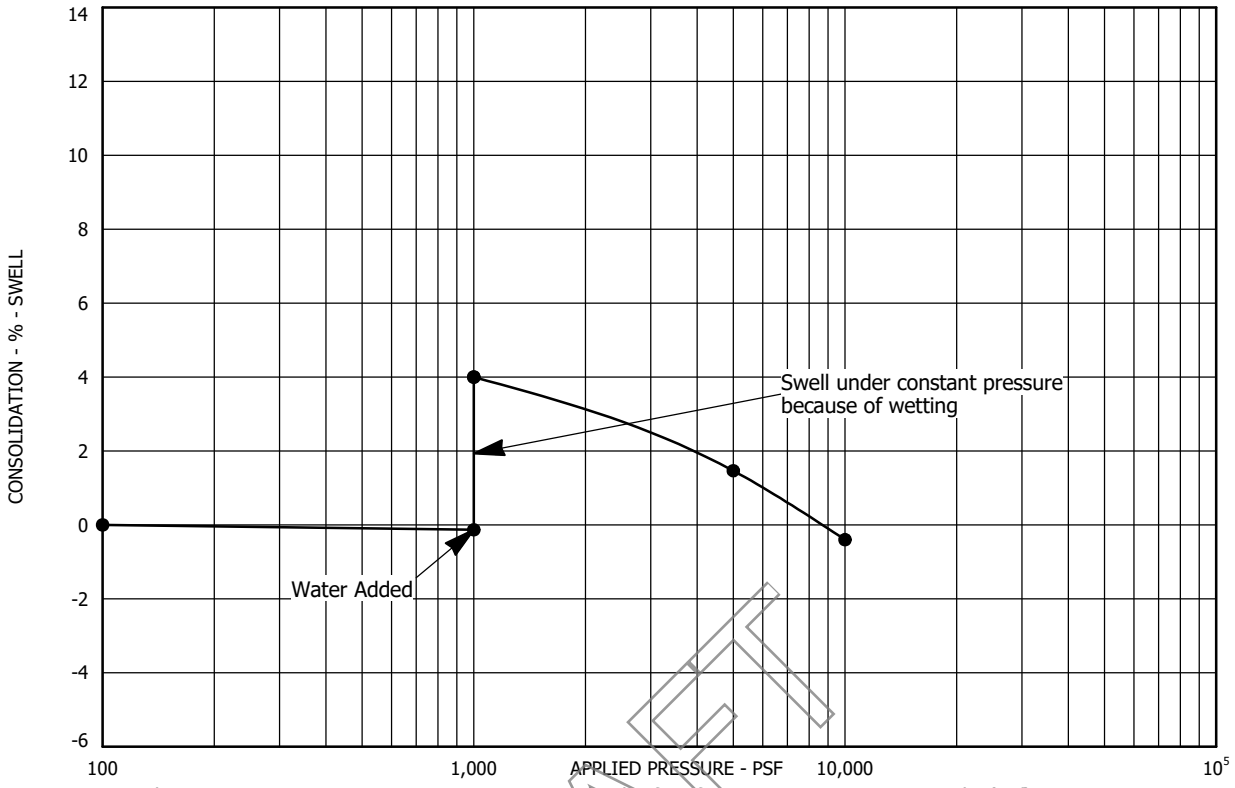
DRAFT



Sample Location: Test Boring No. 43 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Dry Unit Weight (pcf): 117
Moisture Content (%): 15

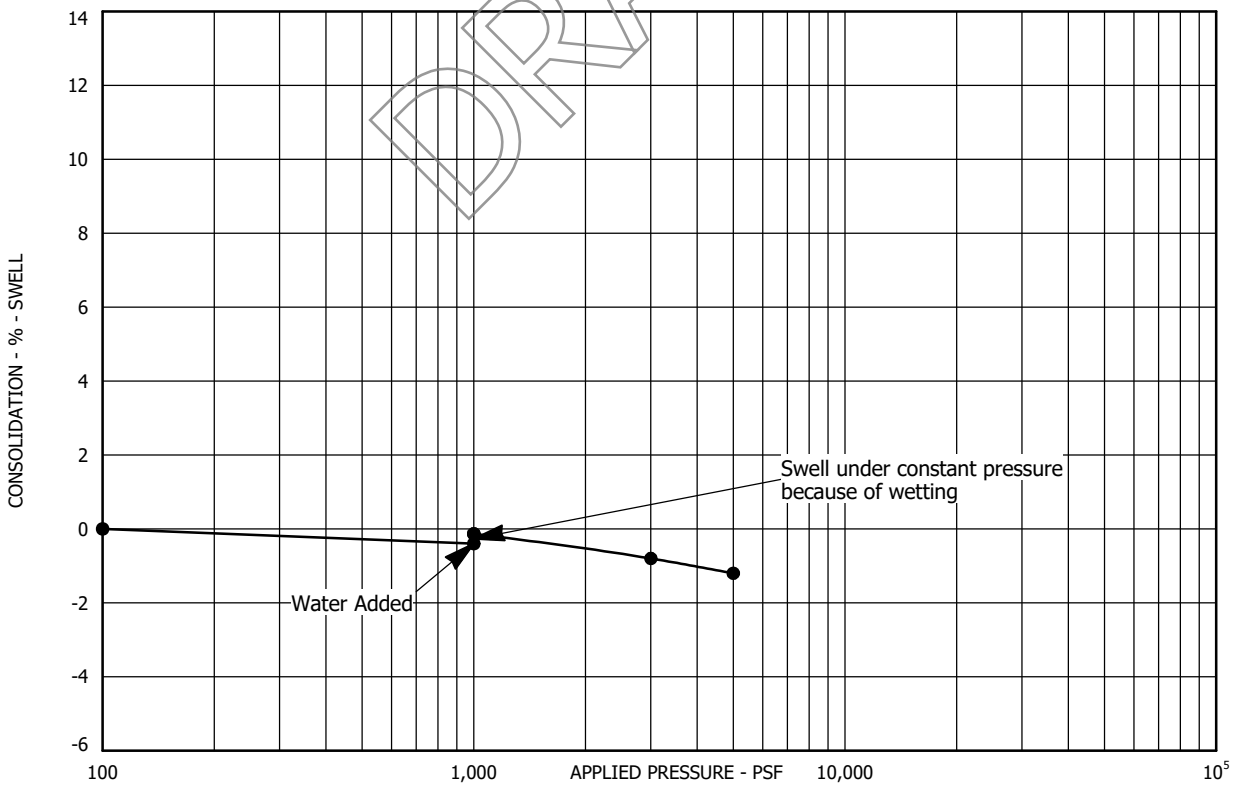
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-53
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 43 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 17

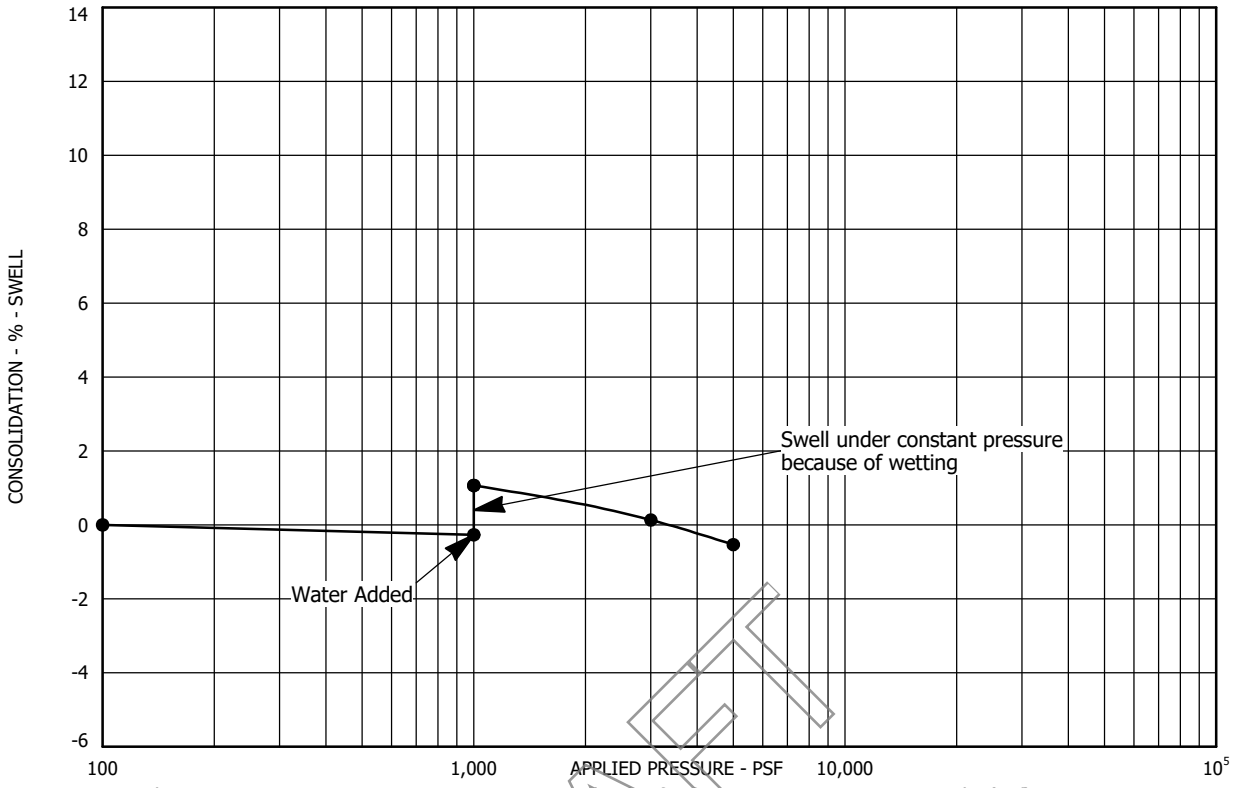
DRAFT



Sample Location: Test Boring No. 44 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 14

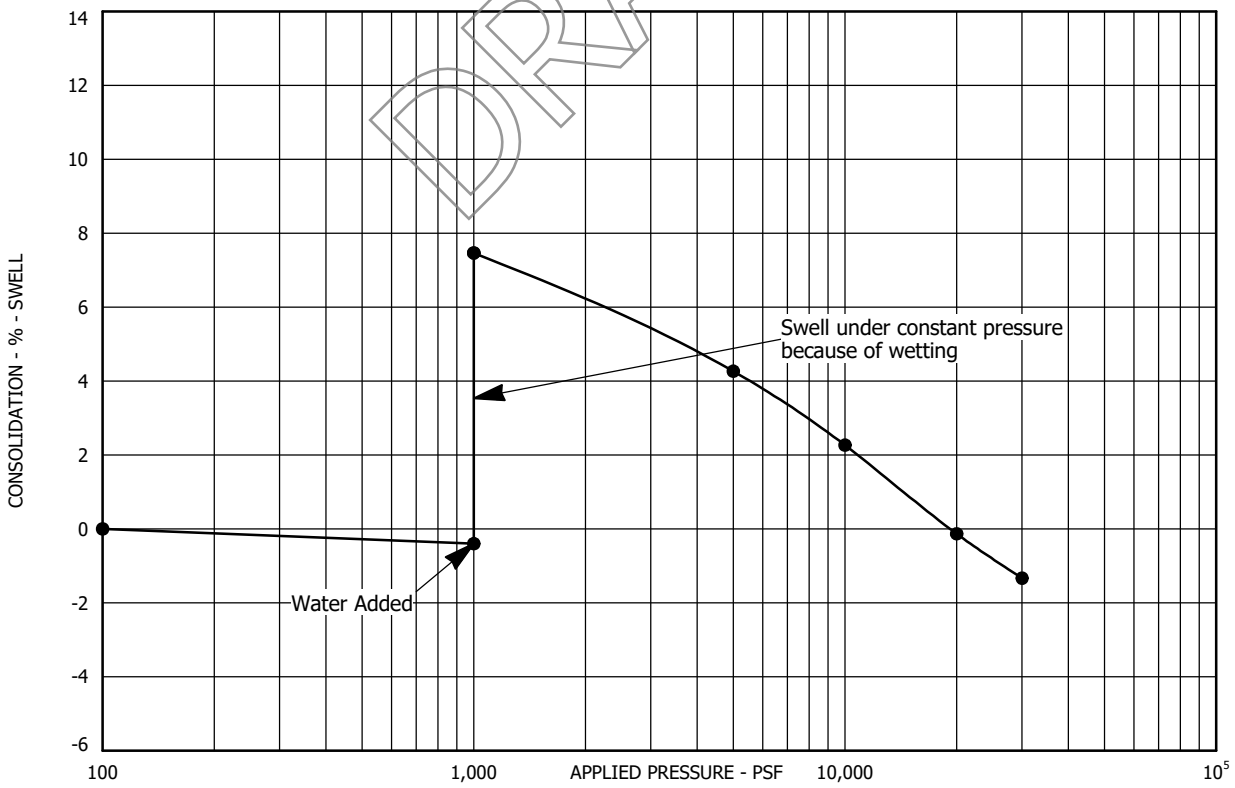
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-54
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 44 at a depth of 9 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

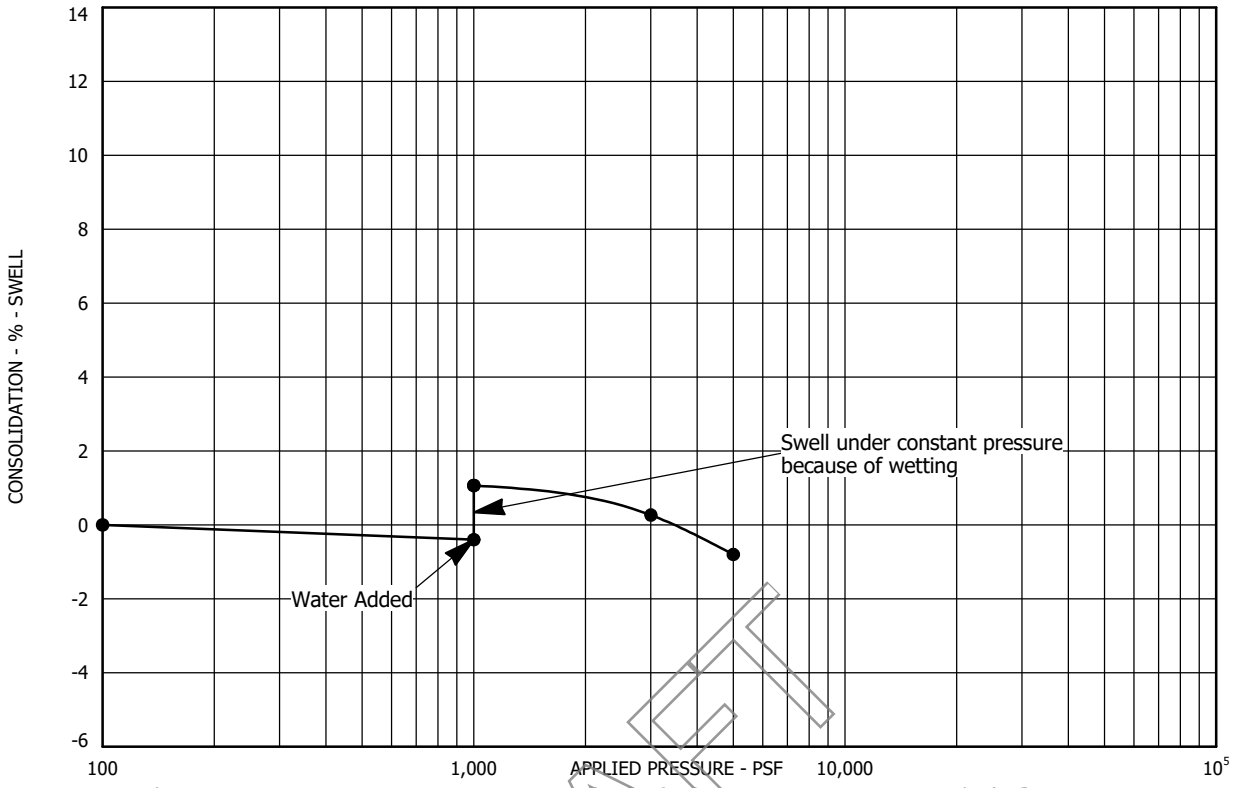
DRAFT



Sample Location: Test Boring No. 44 at a depth of 29 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 125
Moisture Content (%): 12

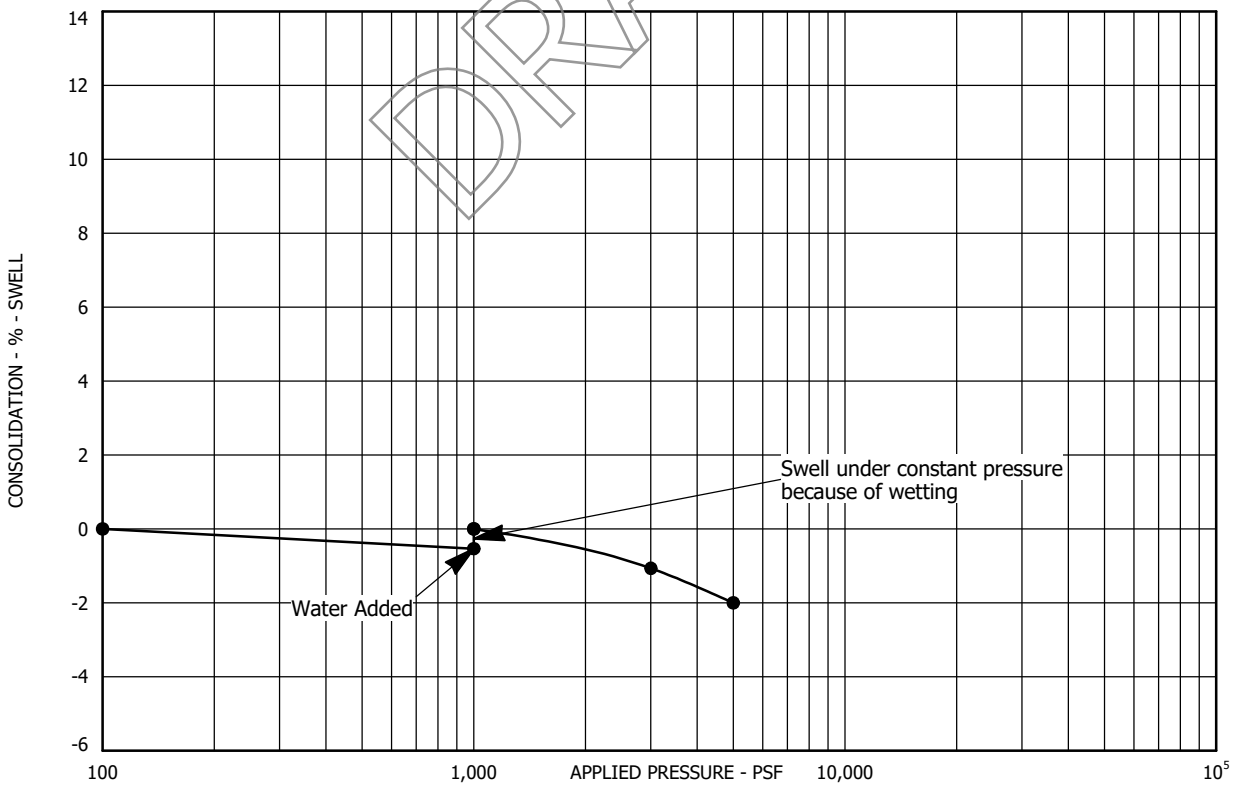
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-55
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 45 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 8

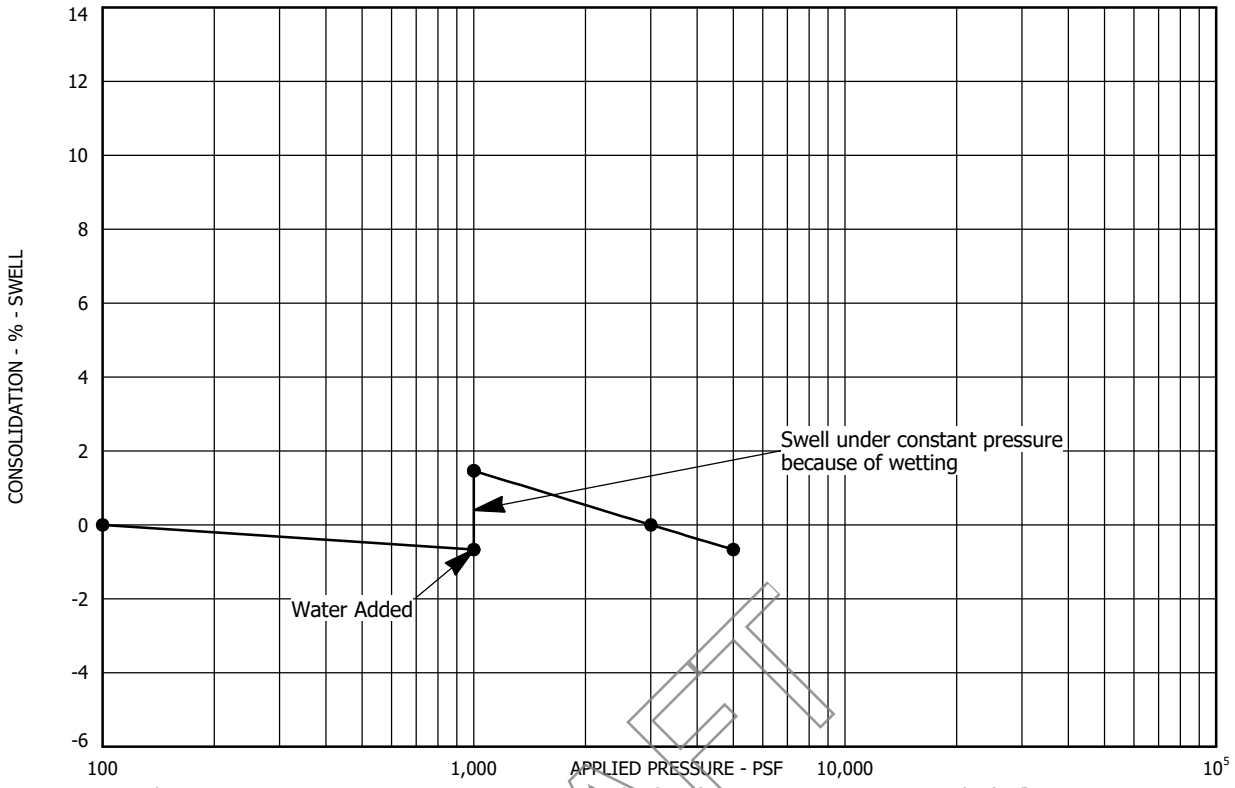
DRAFT



Sample Location: Test Boring No. 45 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 22

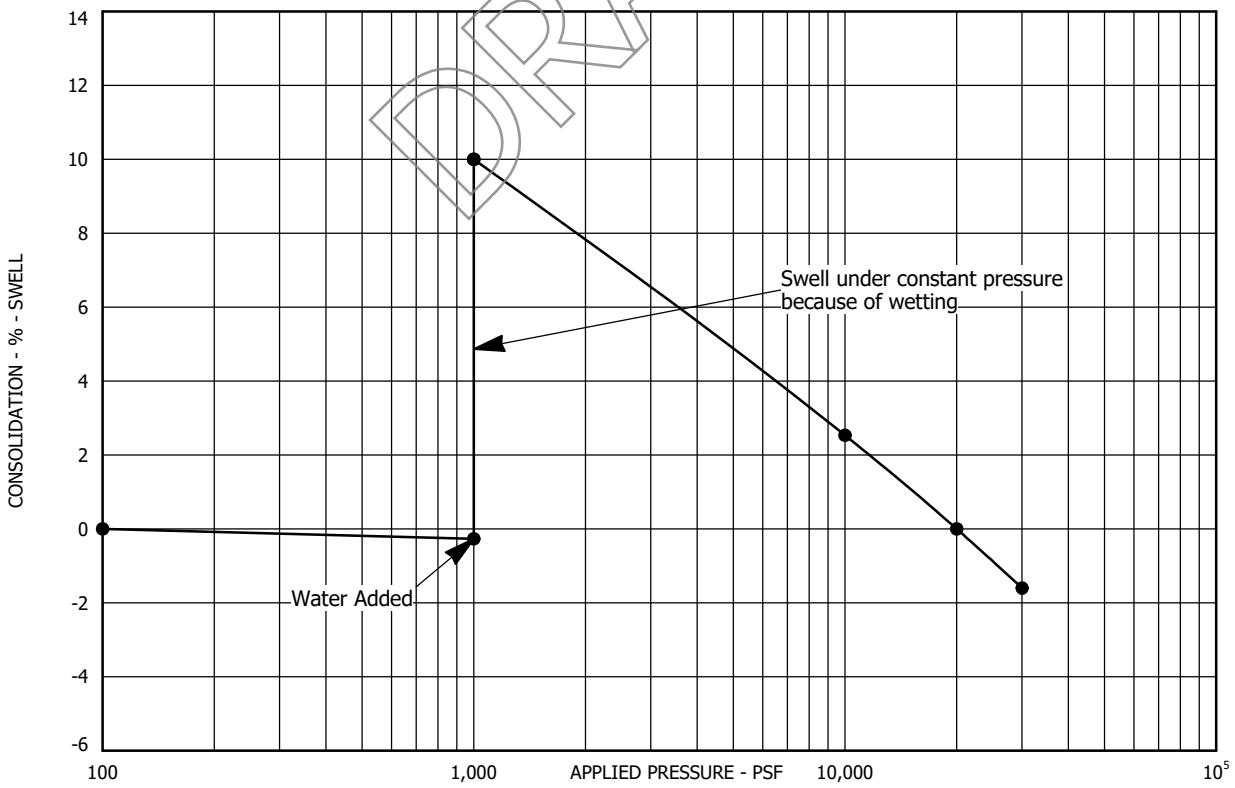
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-56
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 45 at a depth of 14 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 11

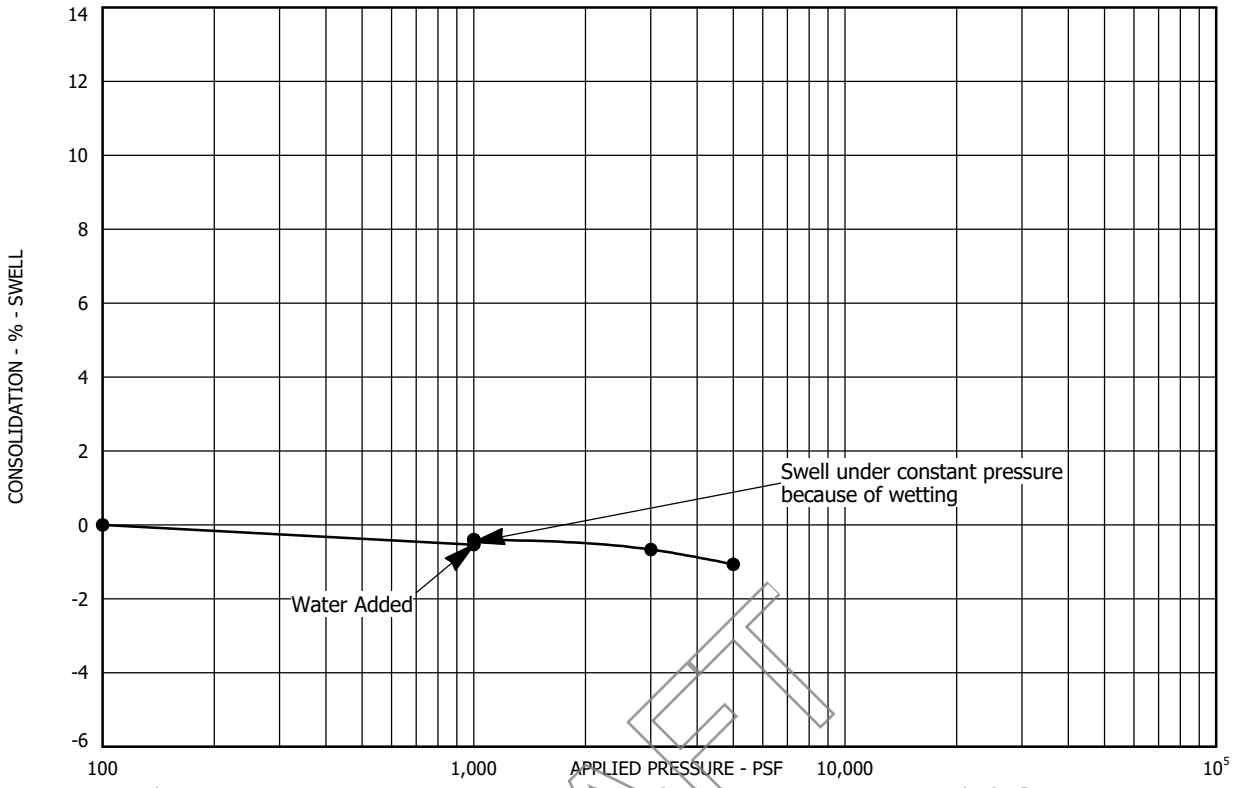
DRAFT



Sample Location: Test Boring No. 45 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 13

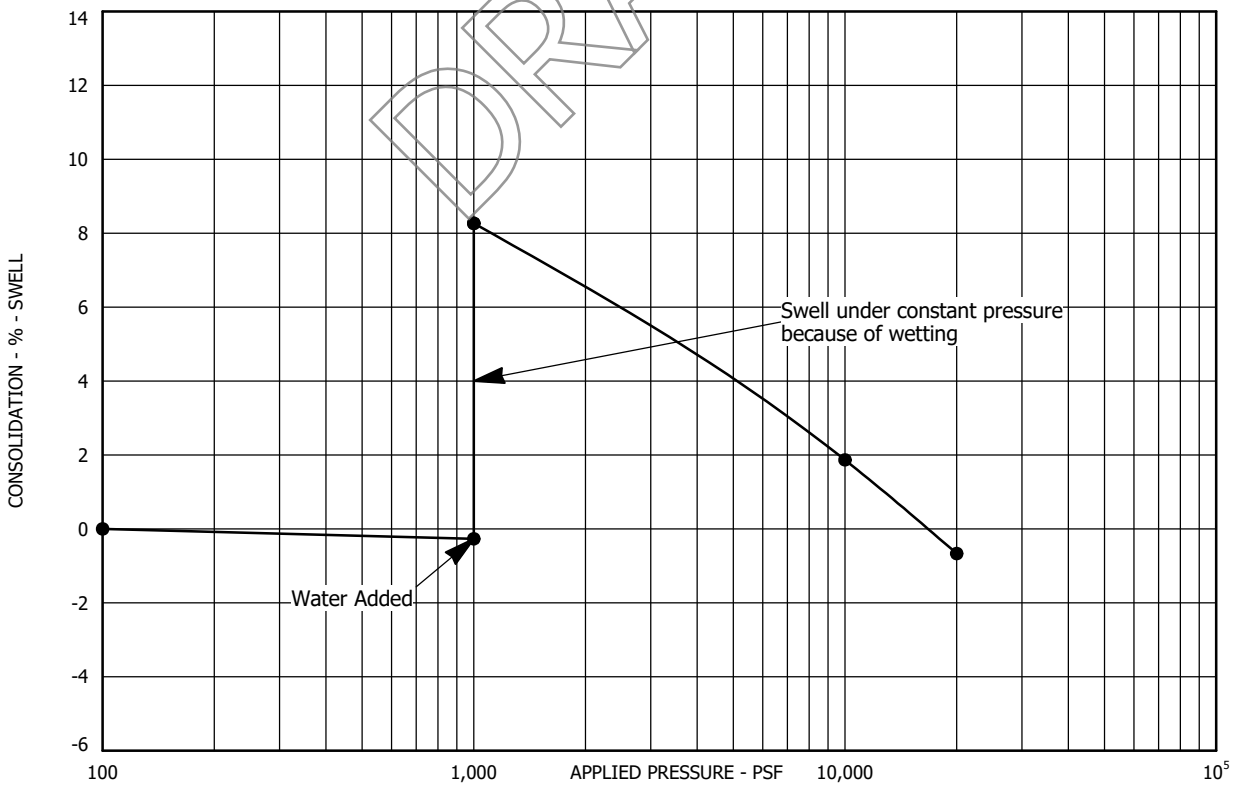
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-57
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 46 at a depth of 9 feet
Sample Description: Sand, very clayey
Dry Unit Weight (pcf): 122
Moisture Content (%): 8

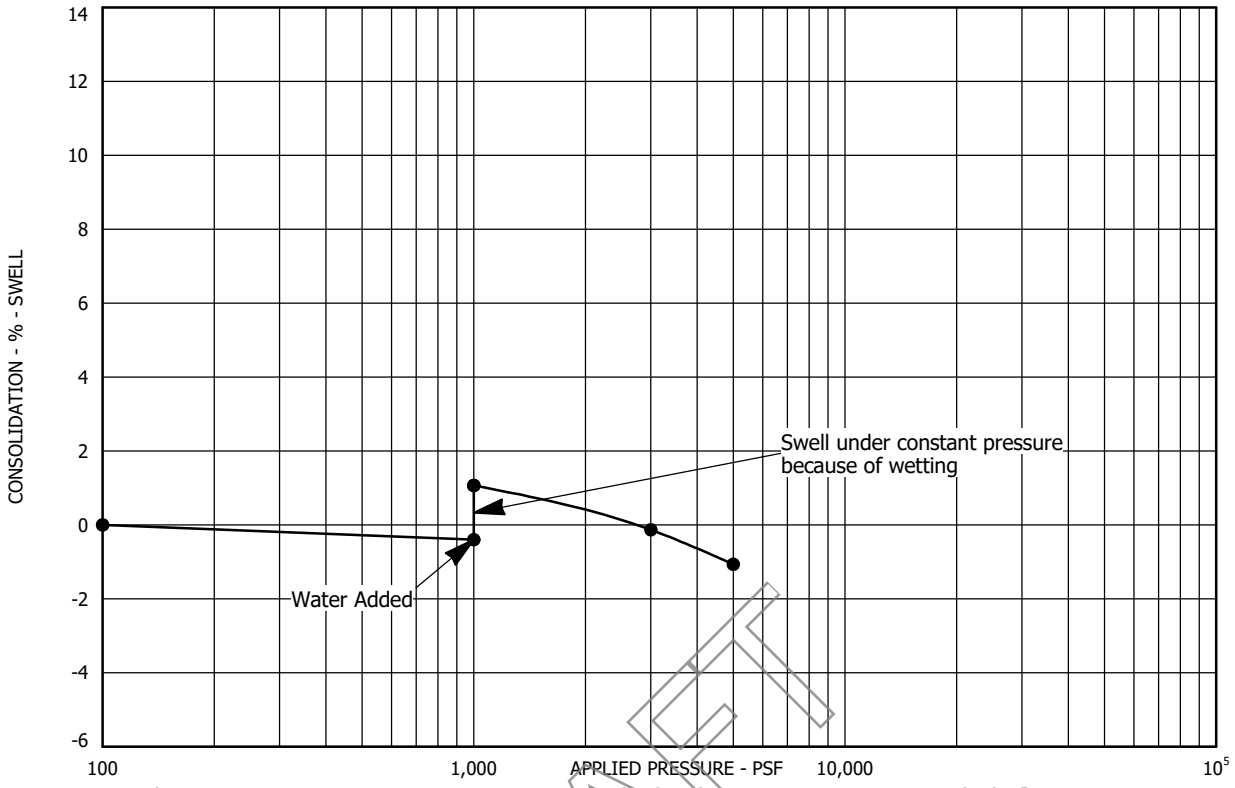
DRAFT



Sample Location: Test Boring No. 46 at a depth of 19 feet
Sample Description: Claystone, silty
Dry Unit Weight (pcf): 112
Moisture Content (%): 17

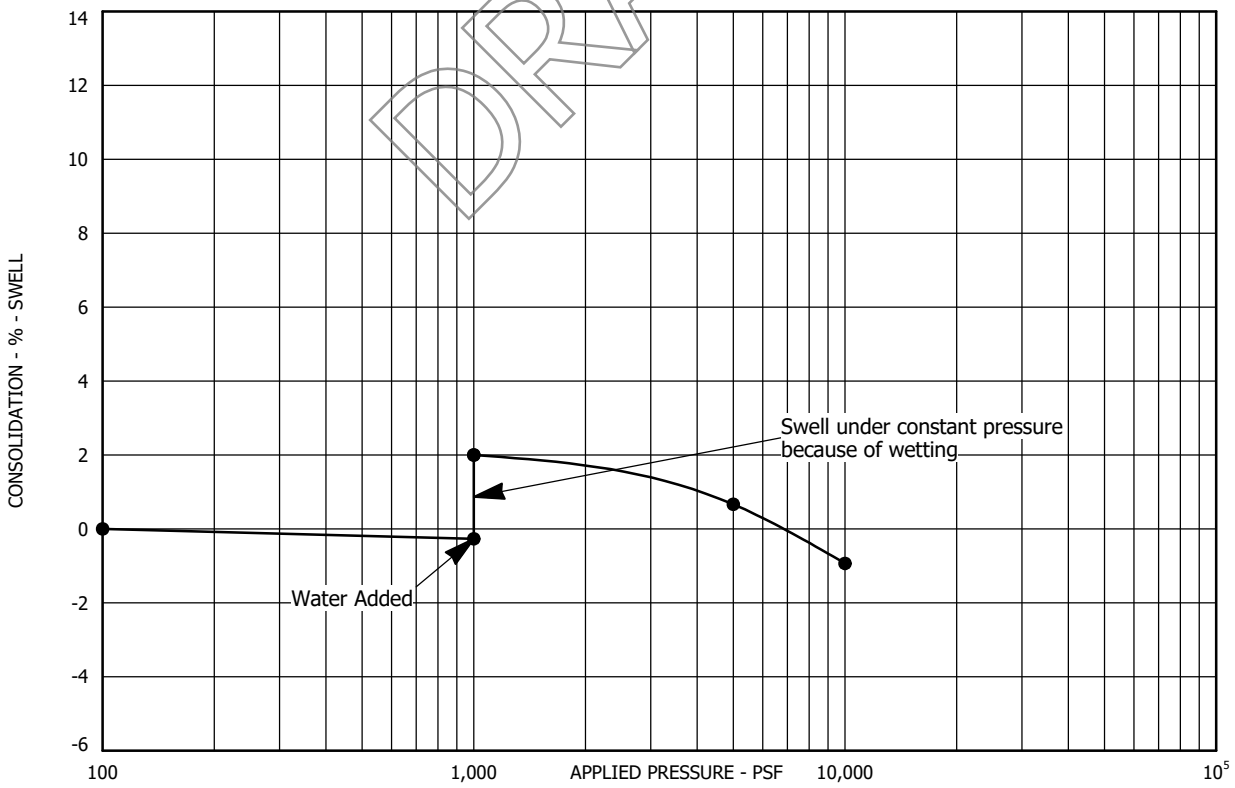
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-58
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 46 at a depth of 29 feet
Sample Description: Claystone, silty
Dry Unit Weight (pcf): 116
Moisture Content (%): 13

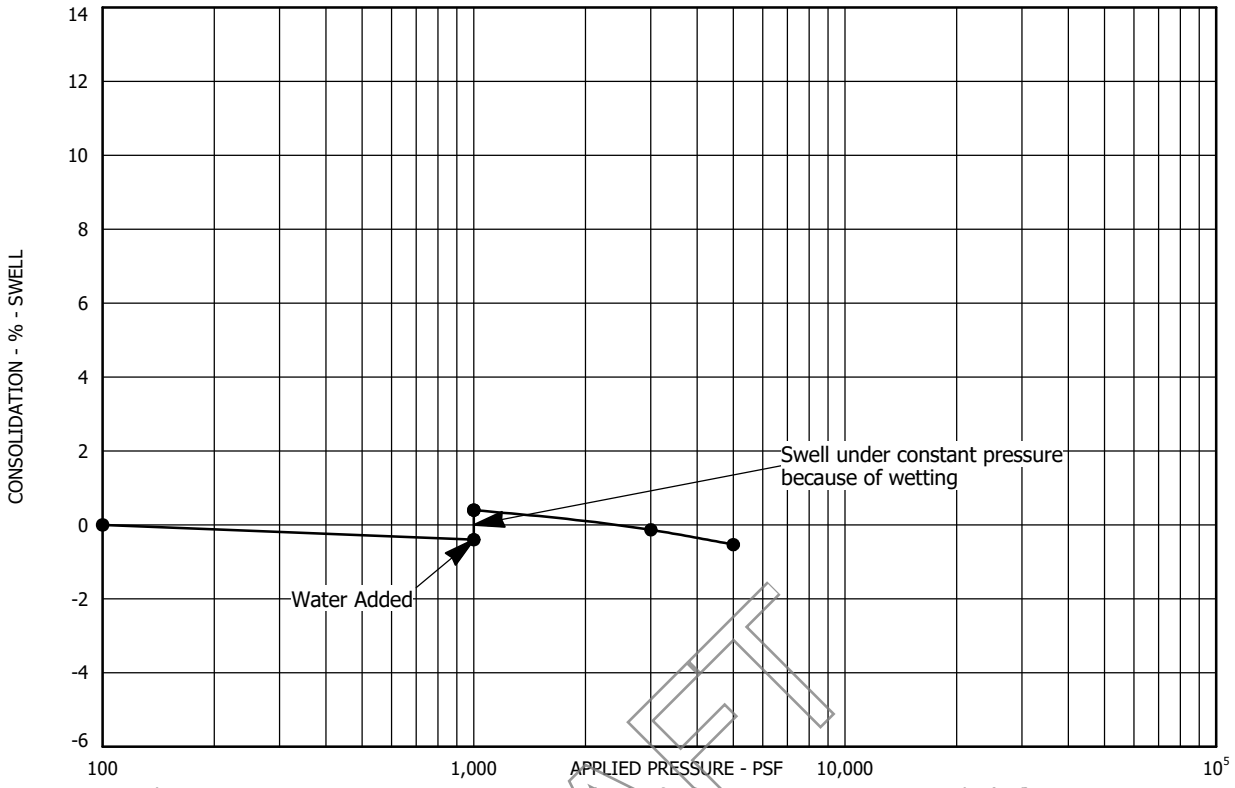
DRAFT



Sample Location: Test Boring No. 47 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 11

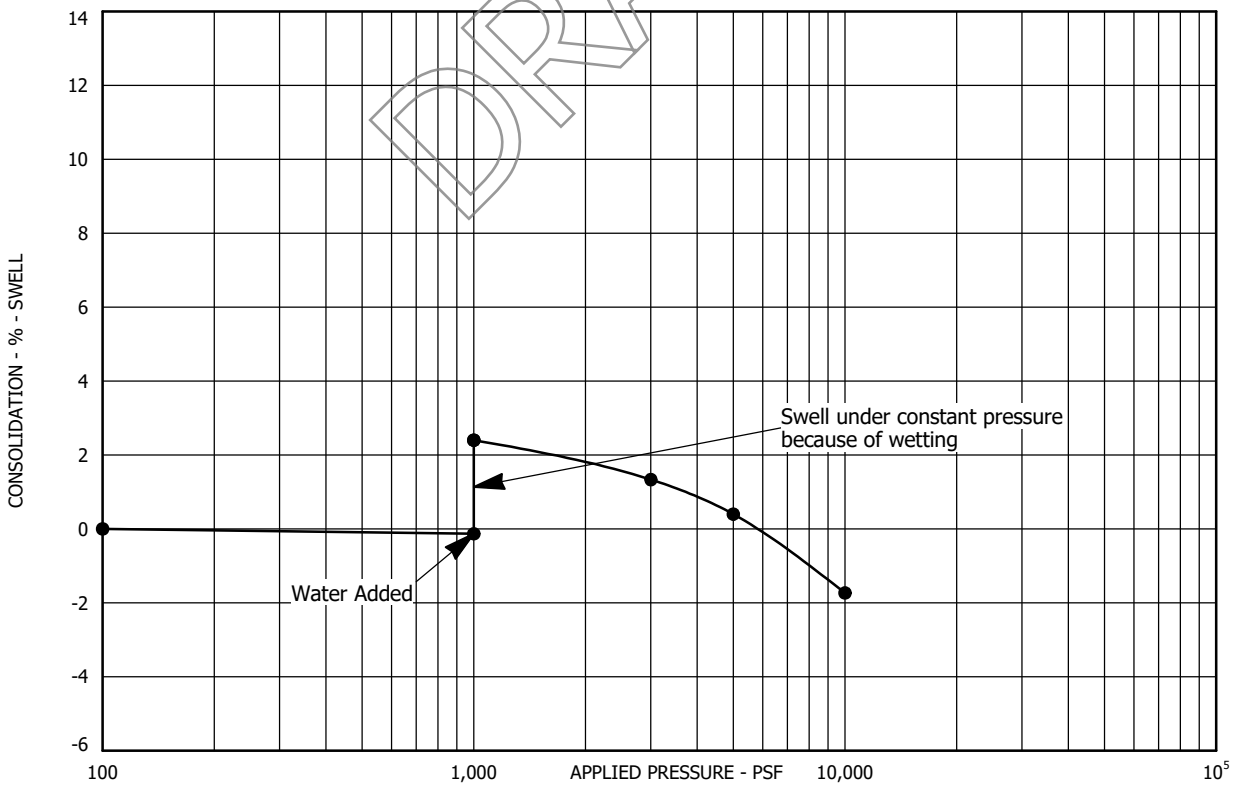
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-59
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 47 at a depth of 9 feet
Sample Description: Sand, very clayey, slightly gravelly
Dry Unit Weight (pcf): 121
Moisture Content (%): 11

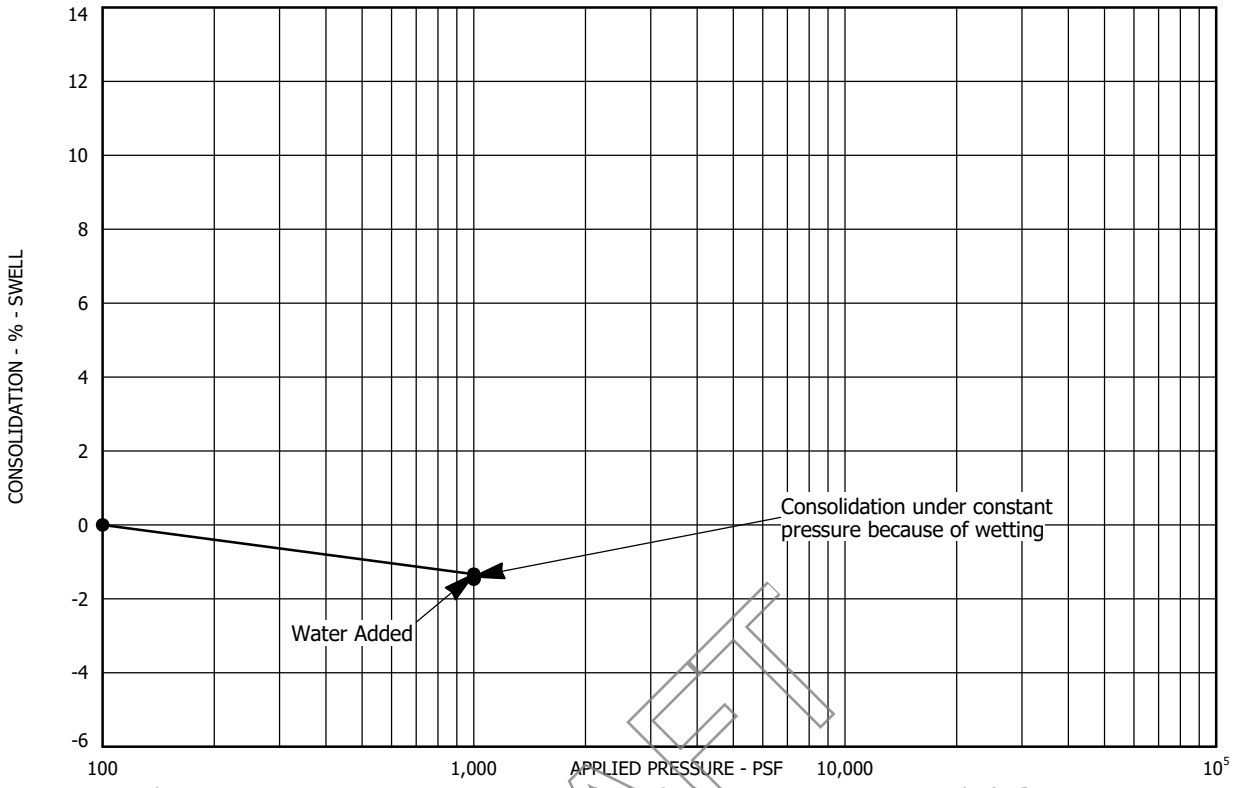
DRAFT



Sample Location: Test Boring No. 48 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 7

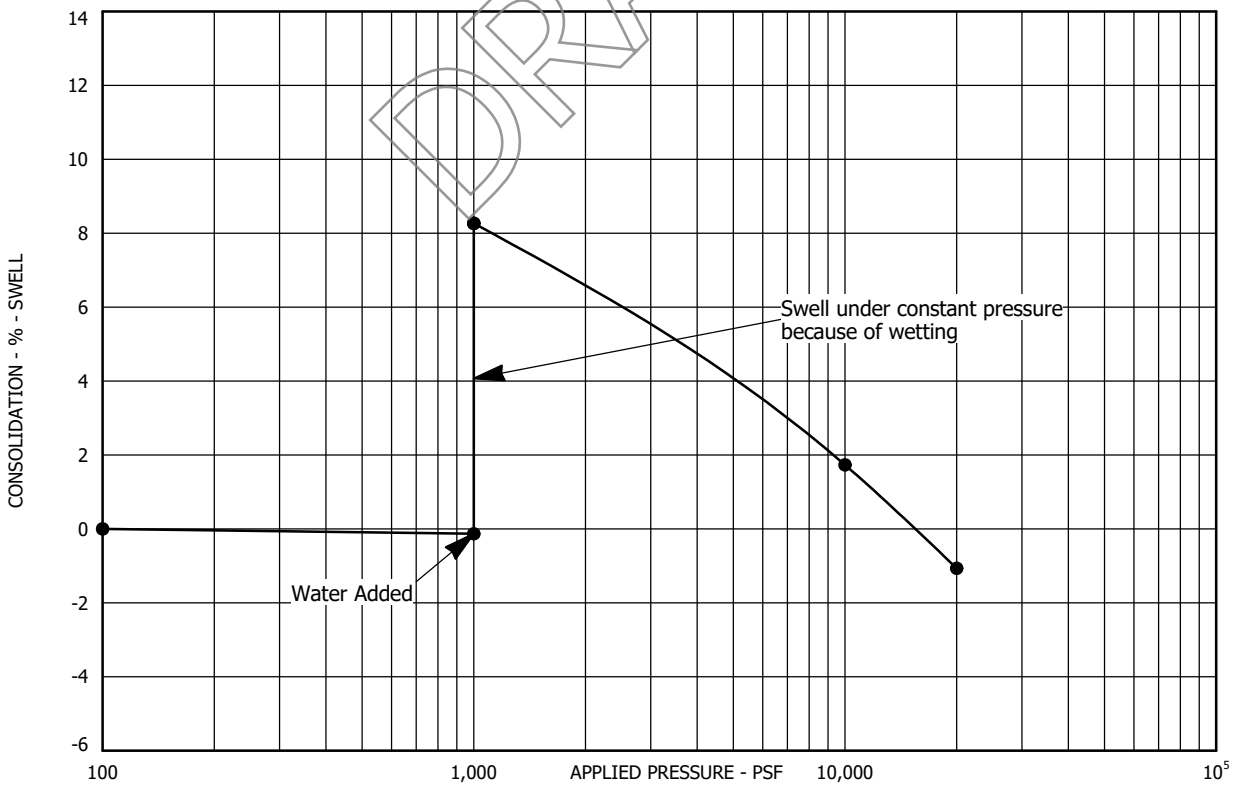
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-60
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 48 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 19

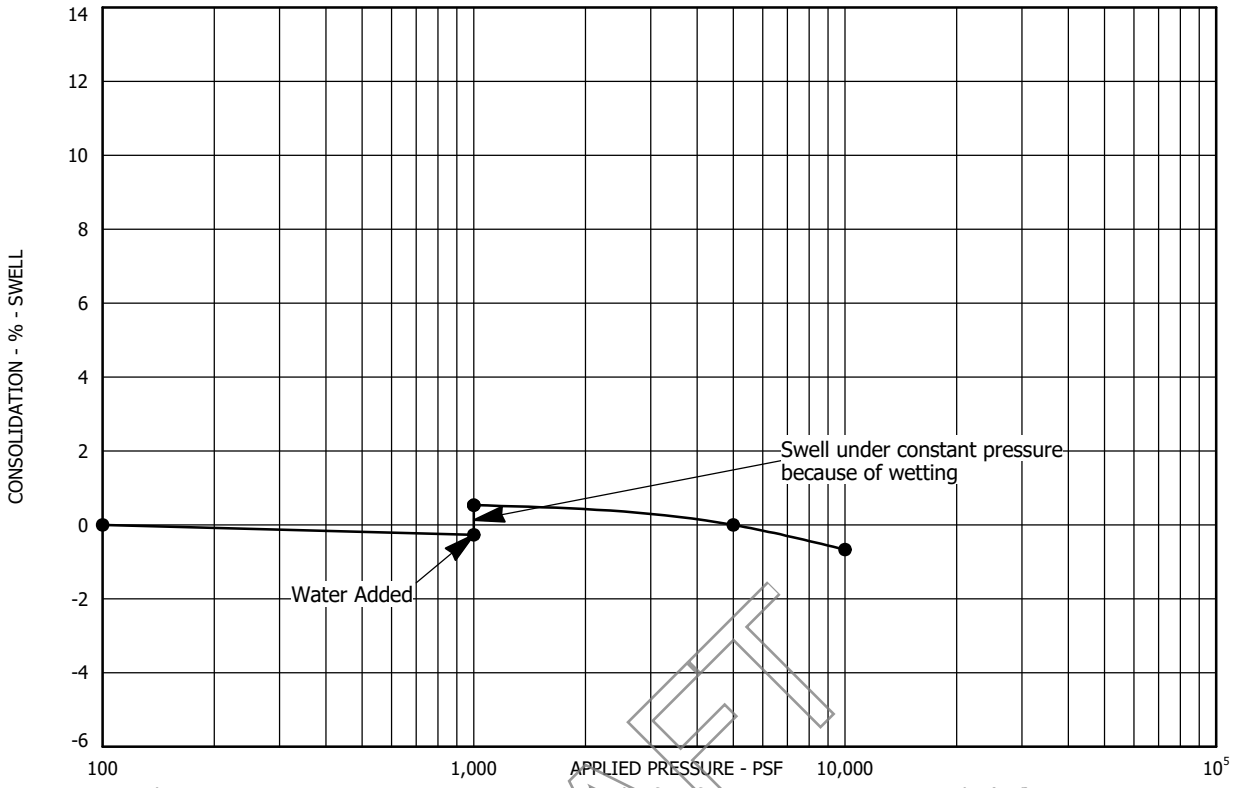
DRAFT



Sample Location: Test Boring No. 48 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 17

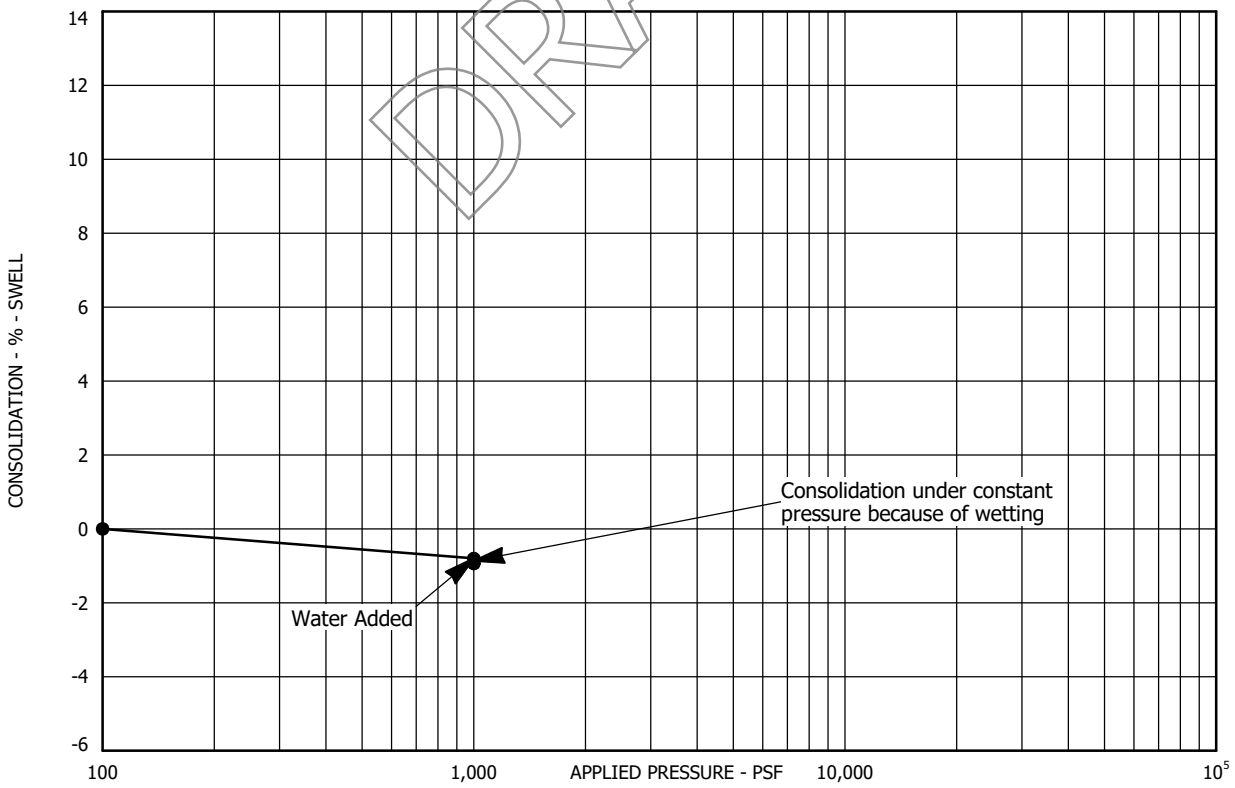
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-61
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 48 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 13

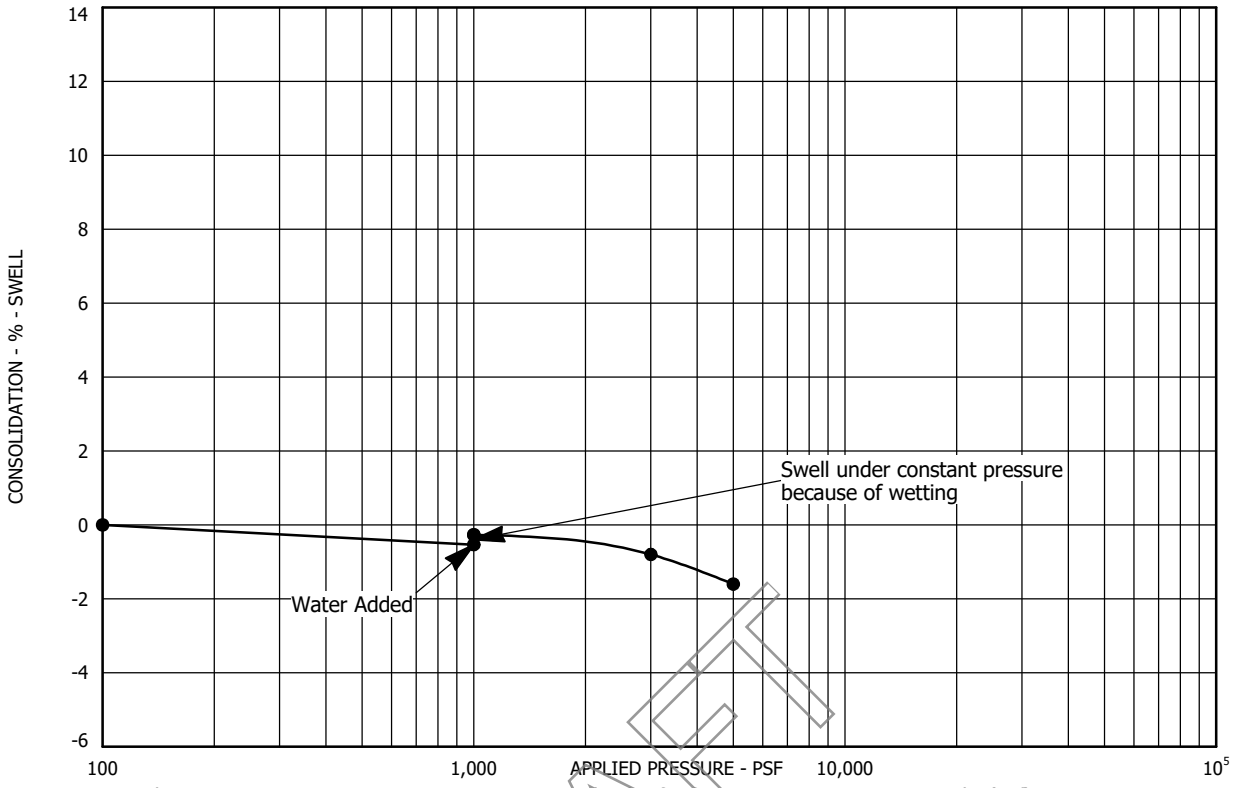
DRAFT



Sample Location: Test Boring No. 49 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 12

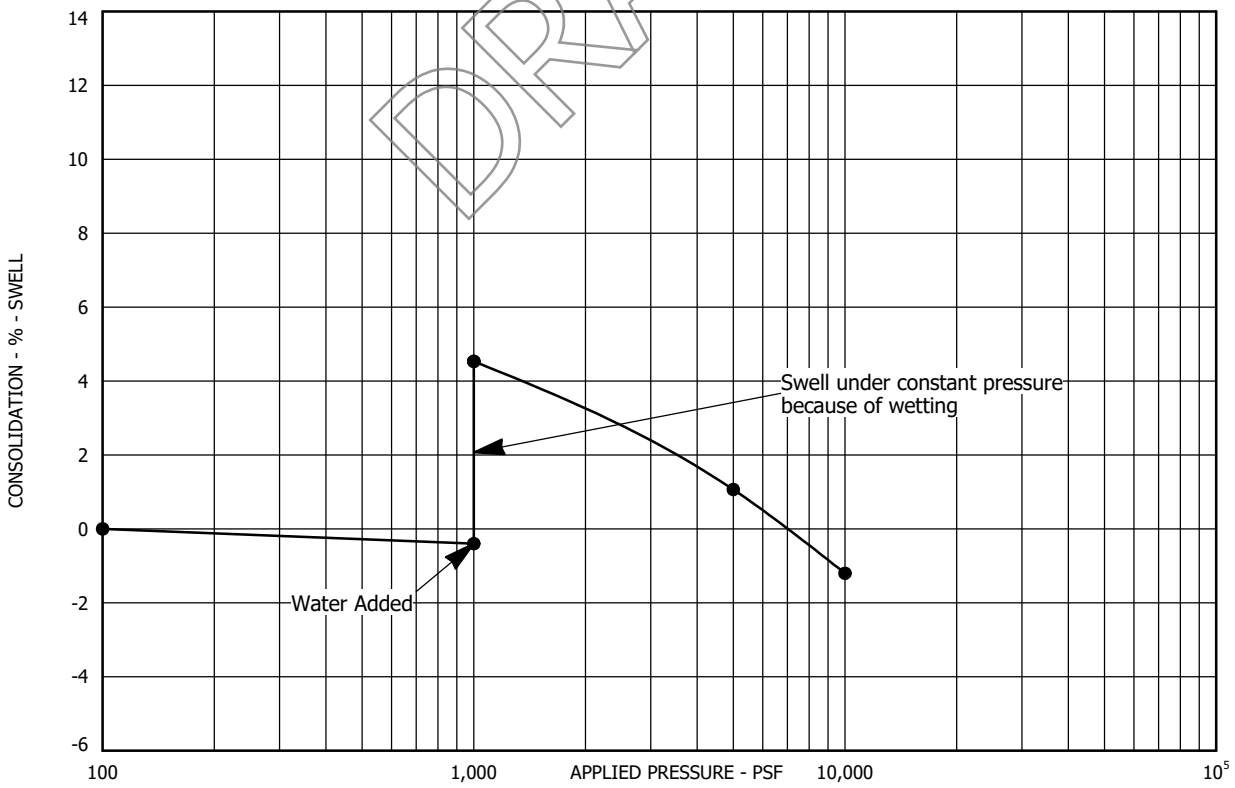
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-62
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 49 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 104
Moisture Content (%): 20

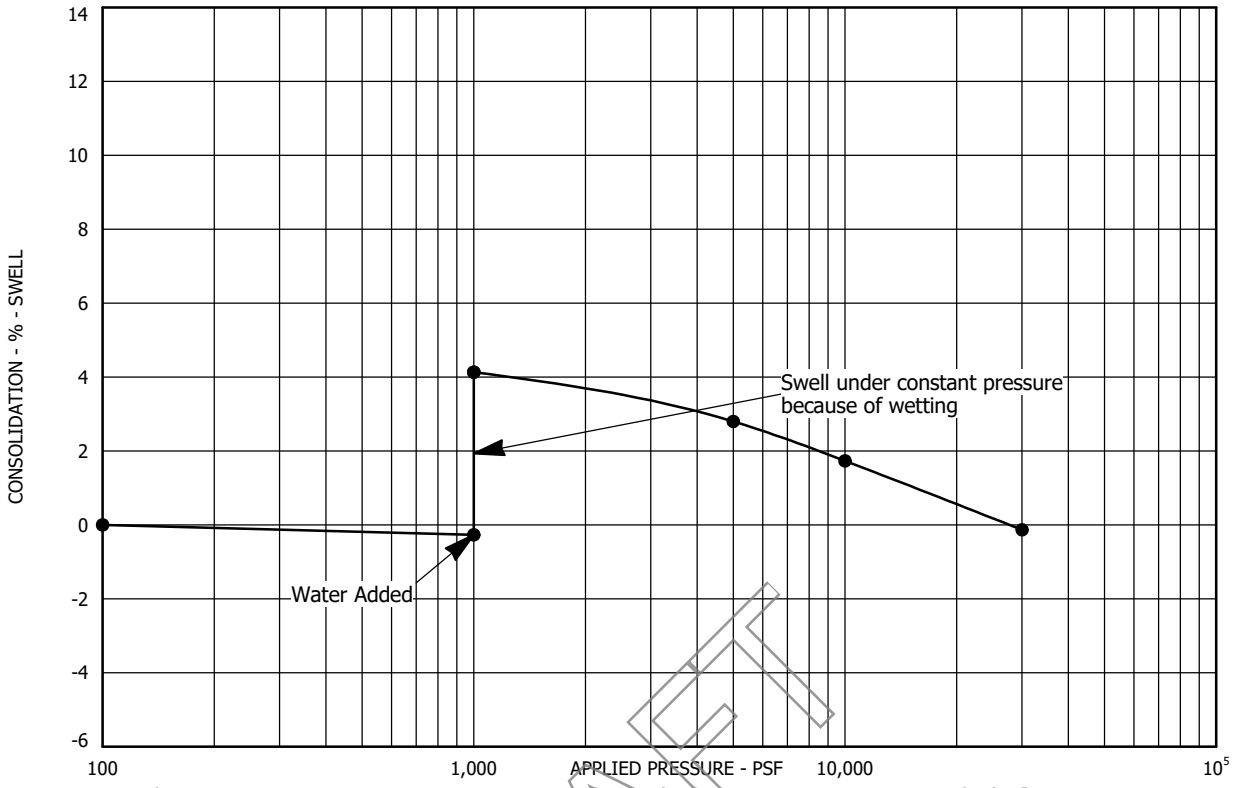
DRAFT



Sample Location: Test Boring No. 49 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 18

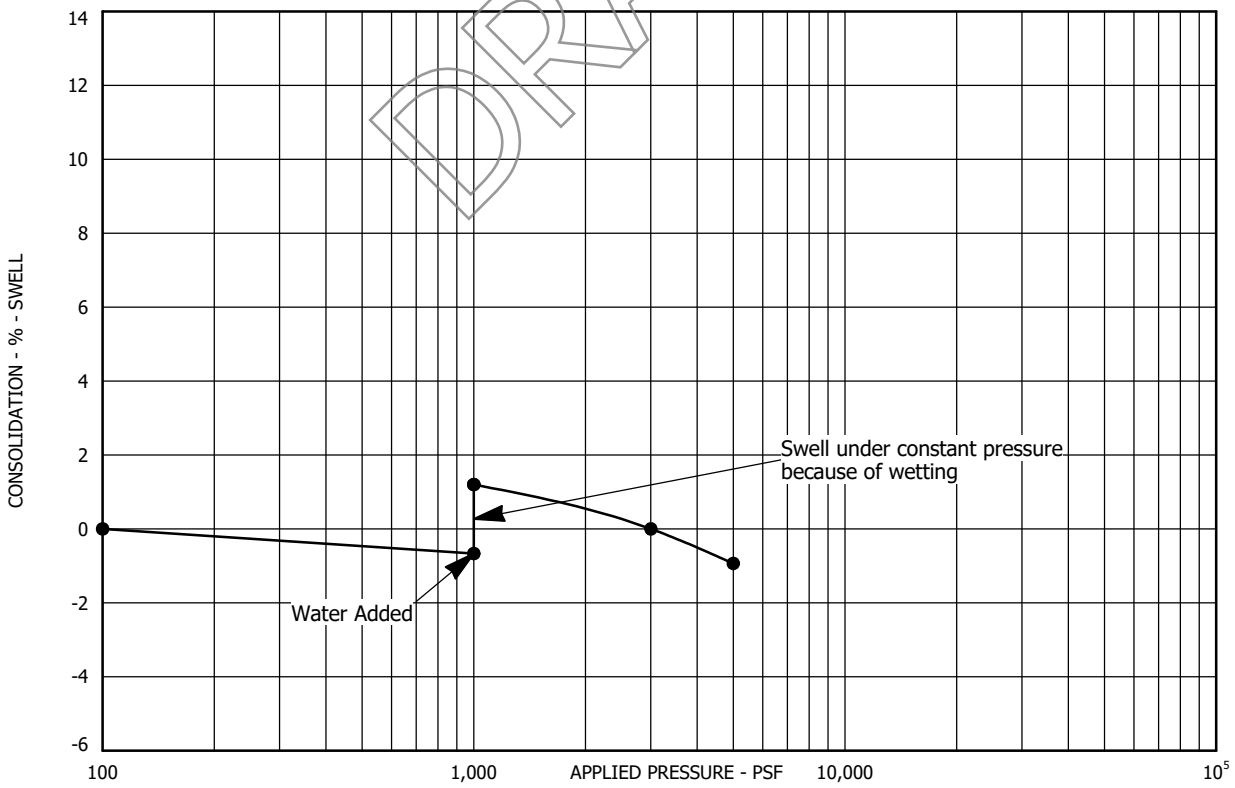
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-63
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 50 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 10

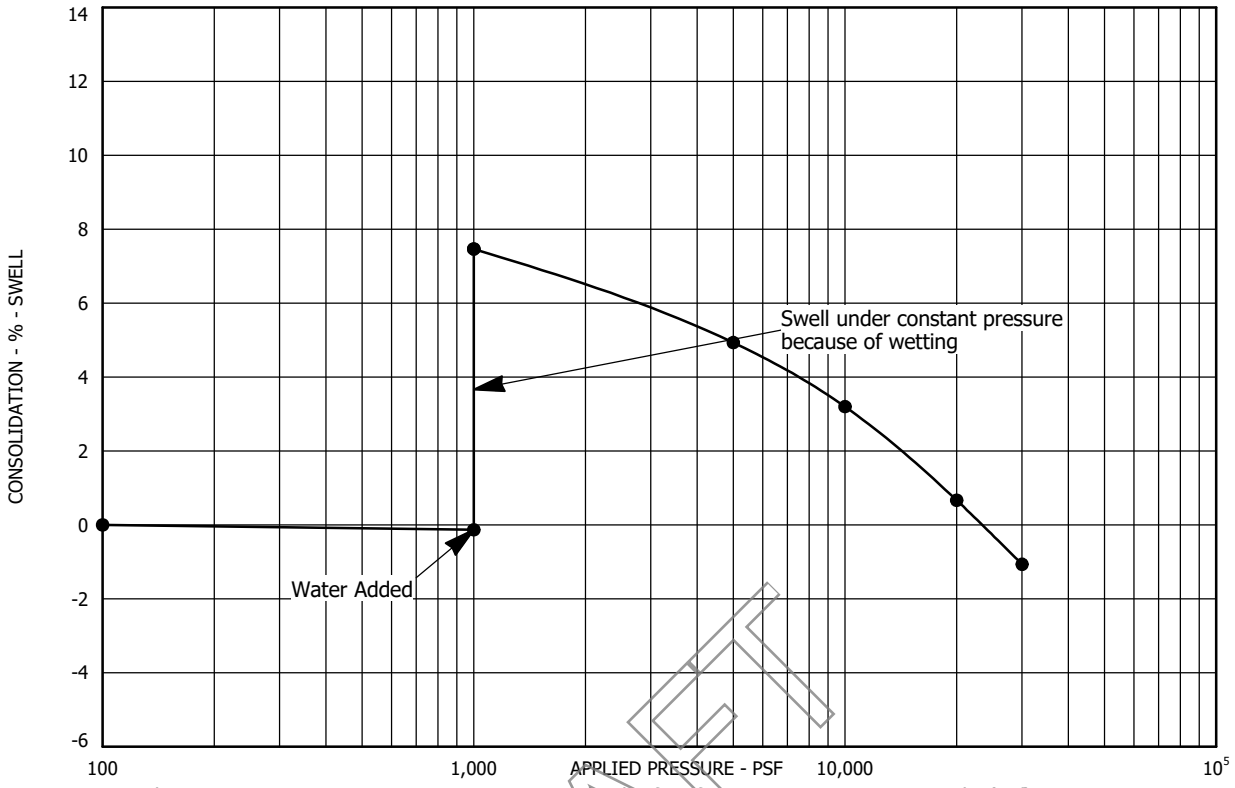
DRAFT



Sample Location: Test Boring No. 50 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

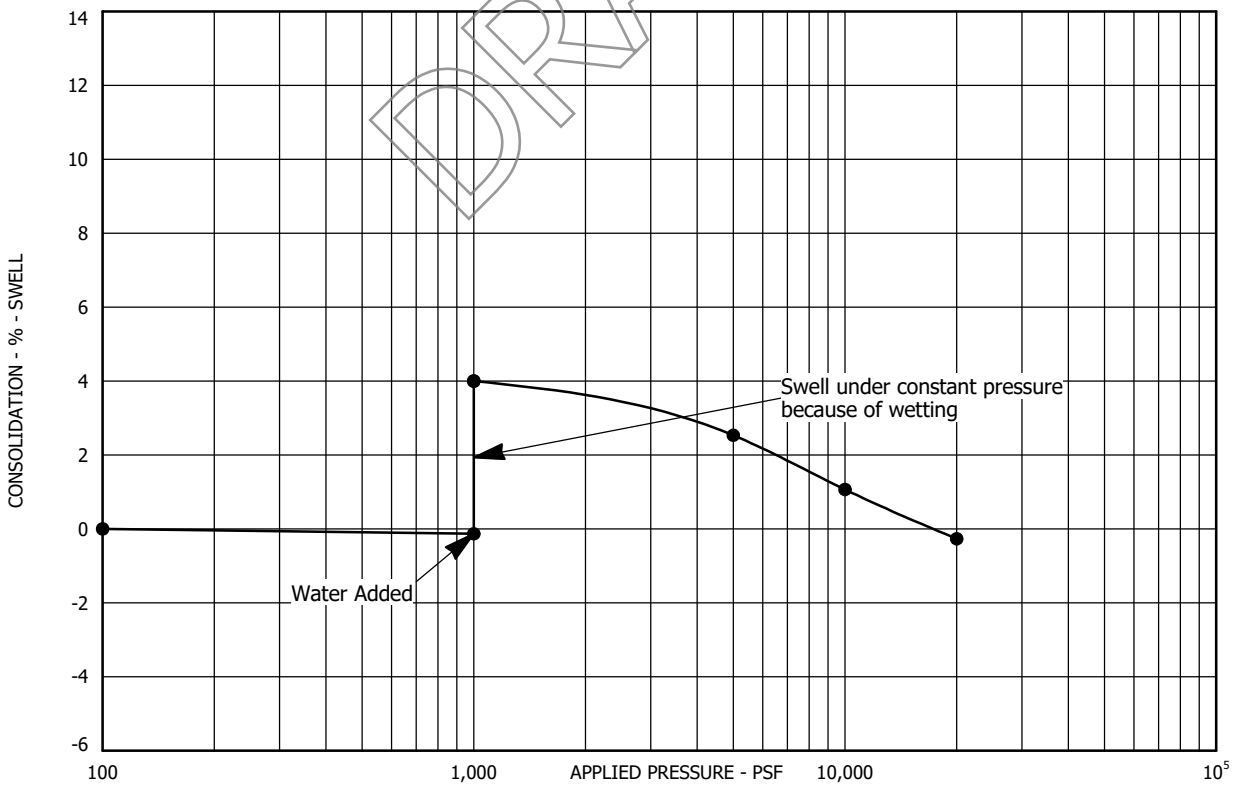
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-64
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 50 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 16

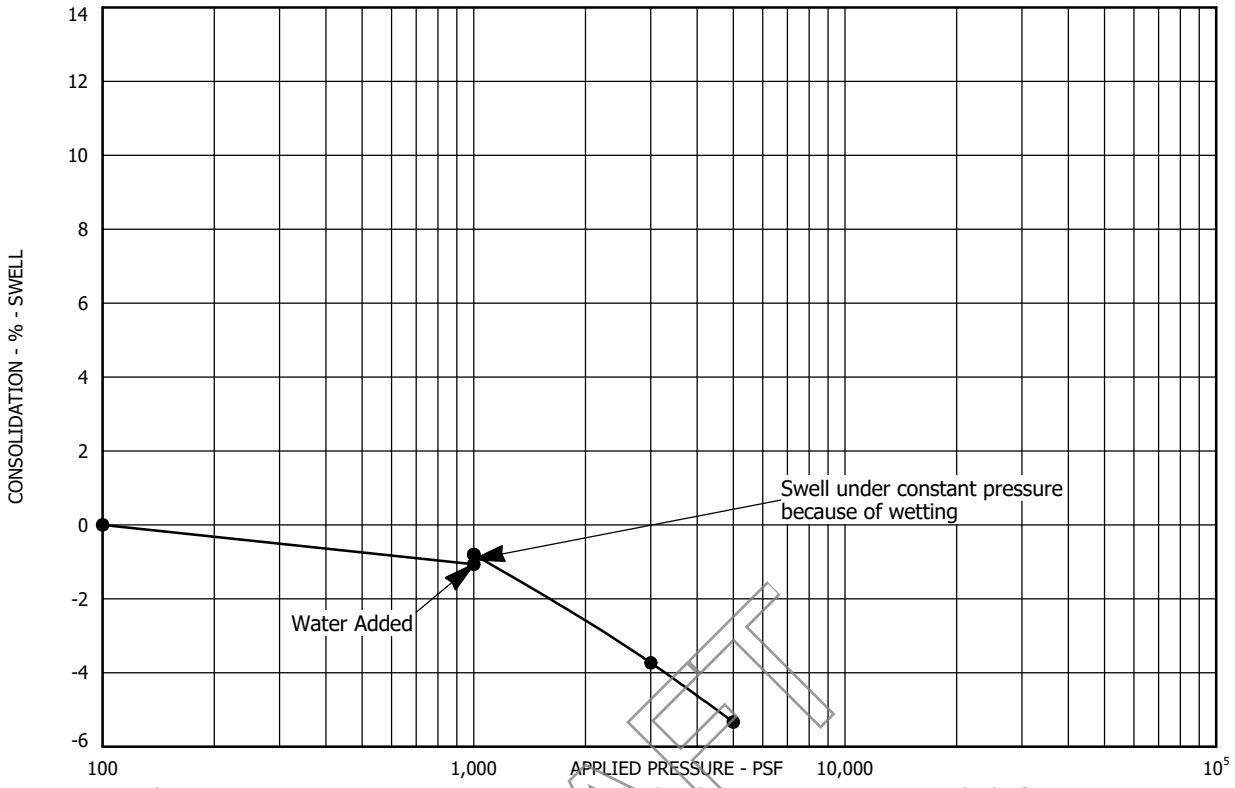
DRAFT



Sample Location: Test Boring No. 51 at a depth of 2 feet
Sample Description: Clay, very sandy, slightly gravelly
Dry Unit Weight (pcf): 124
Moisture Content (%): 11

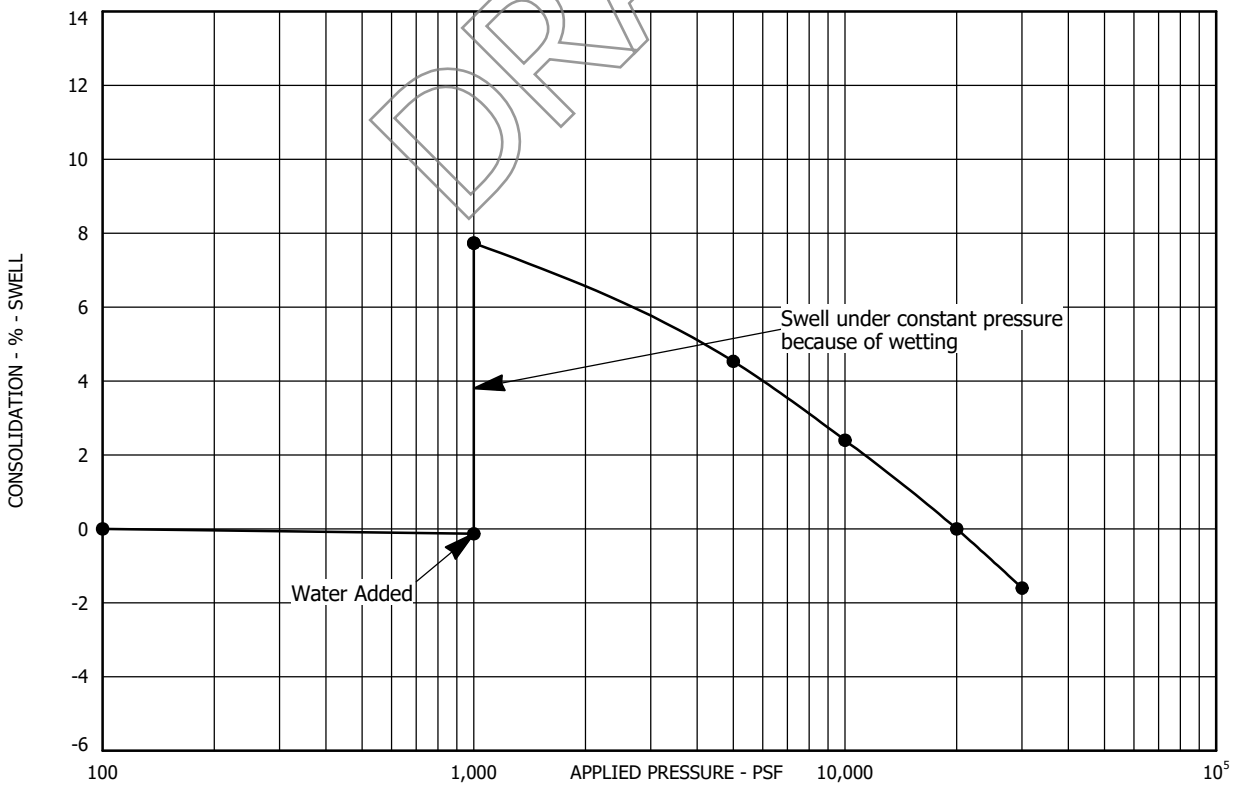
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-65
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 51 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 9

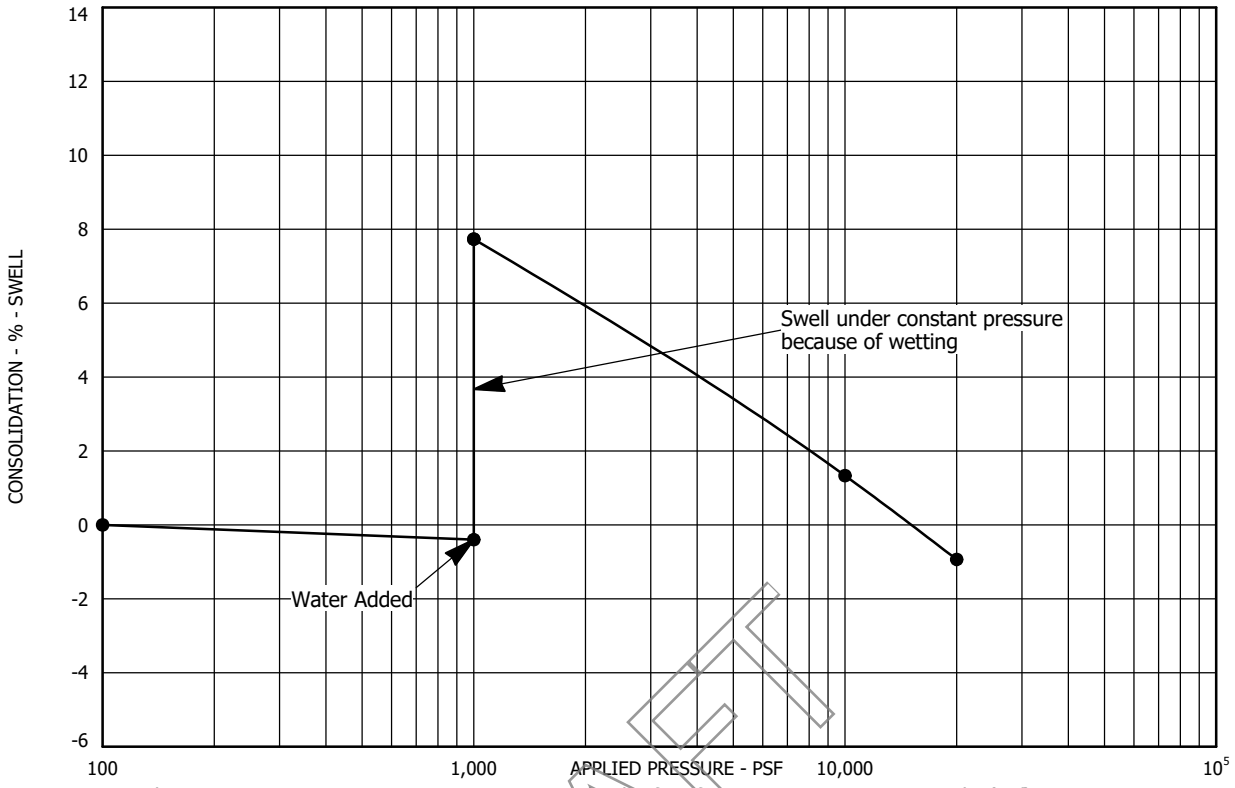
DRAFT



Sample Location: Test Boring No. 51 at a depth of 24 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

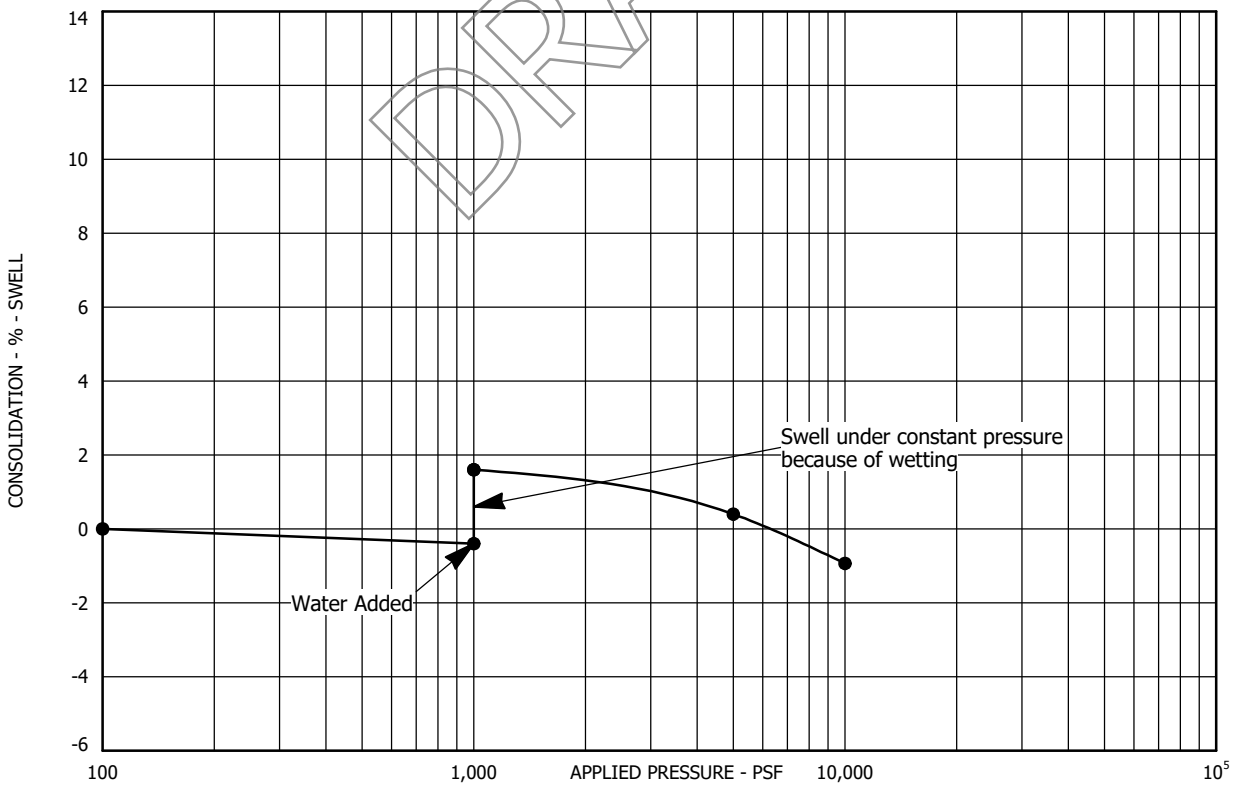
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-66
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 51 at a depth of 44 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 127
Moisture Content (%): 12

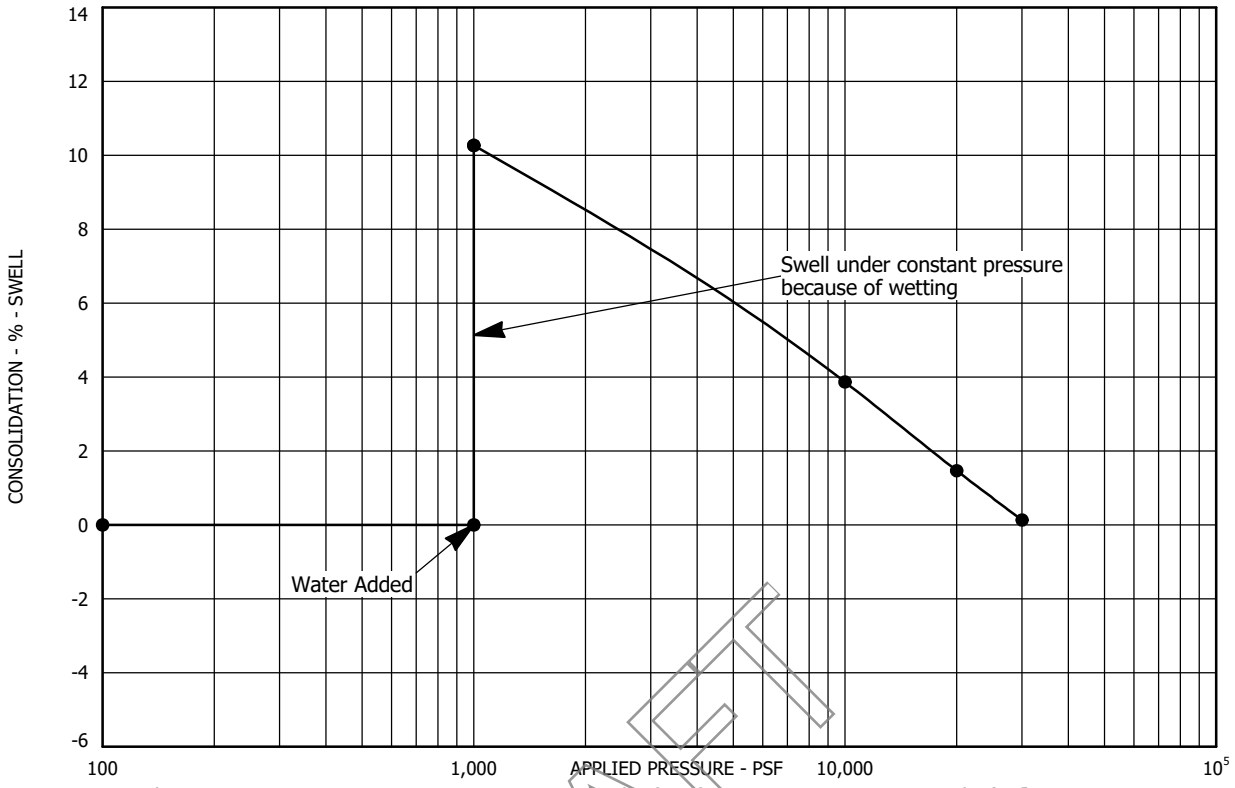
DRAFT



Sample Location: Test Boring No. 52 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

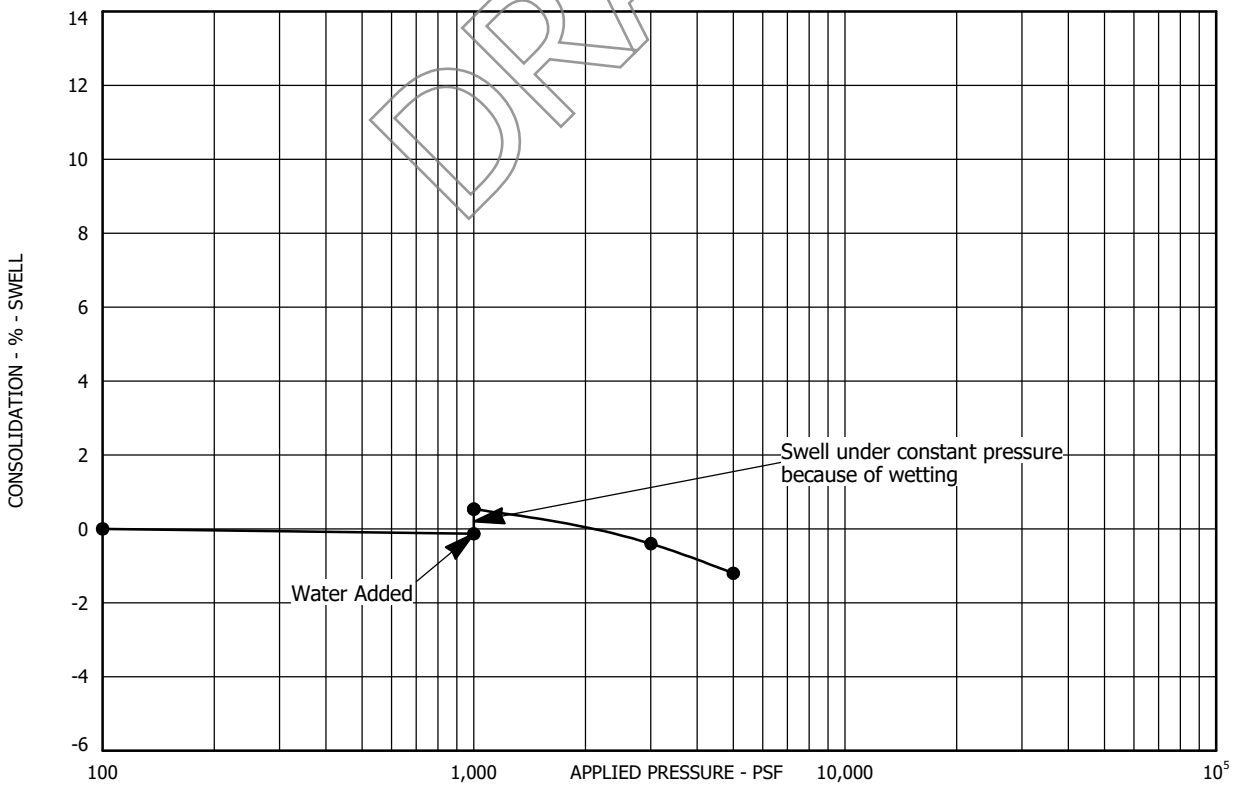
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-67
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 52 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 12

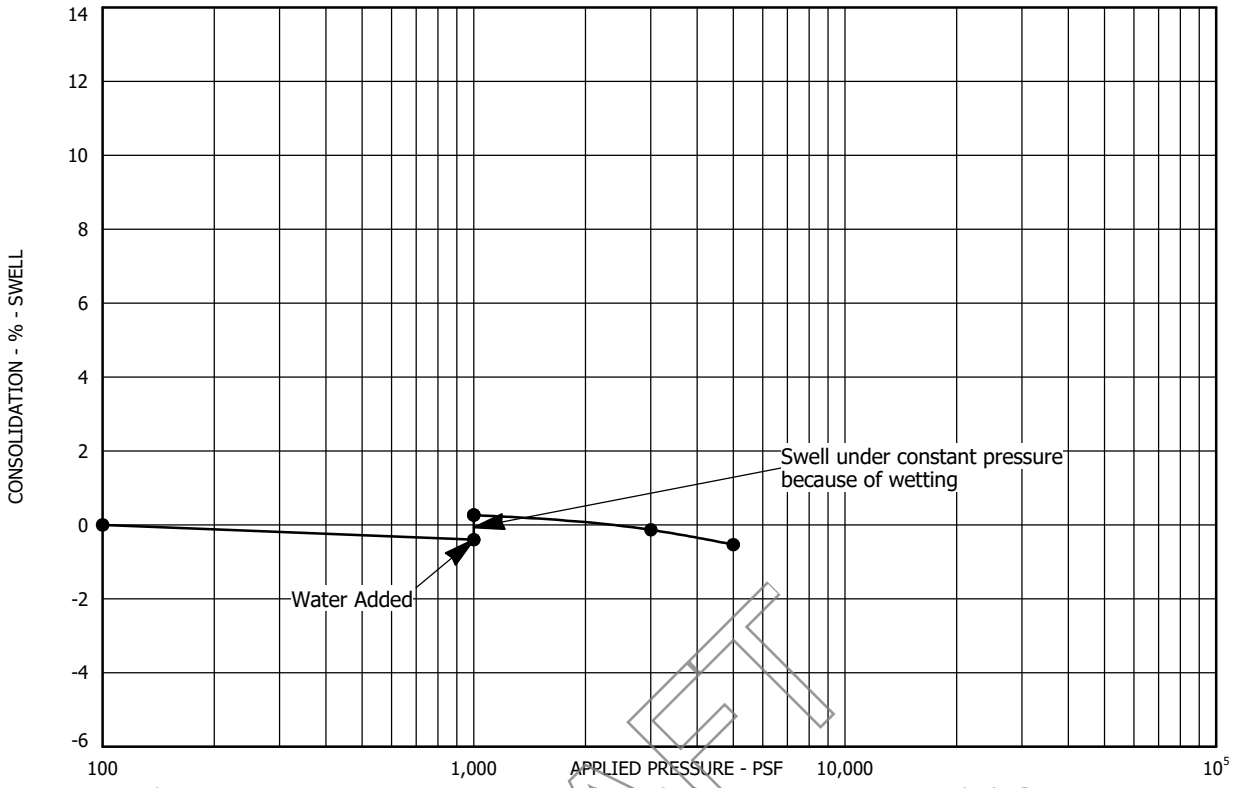
DRAFT



Sample Location: Test Boring No. 53 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 14

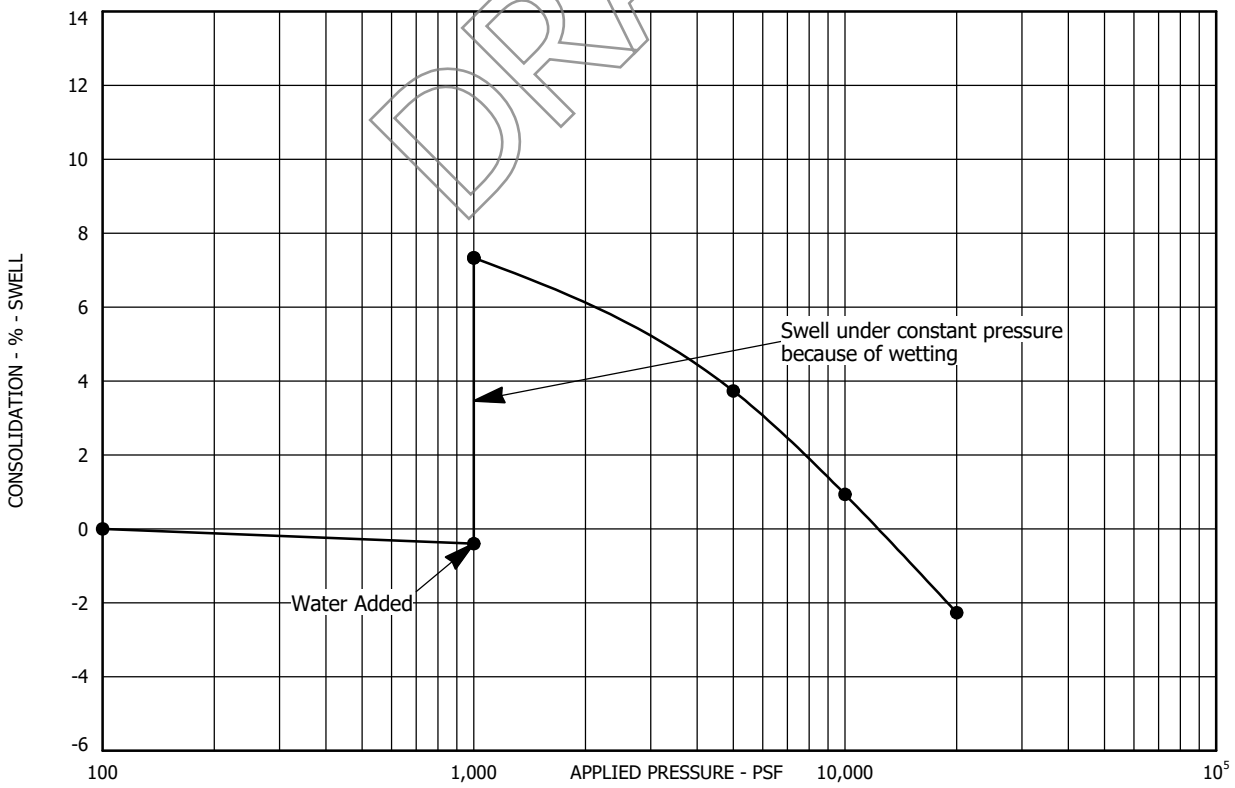
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-68
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 53 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 19

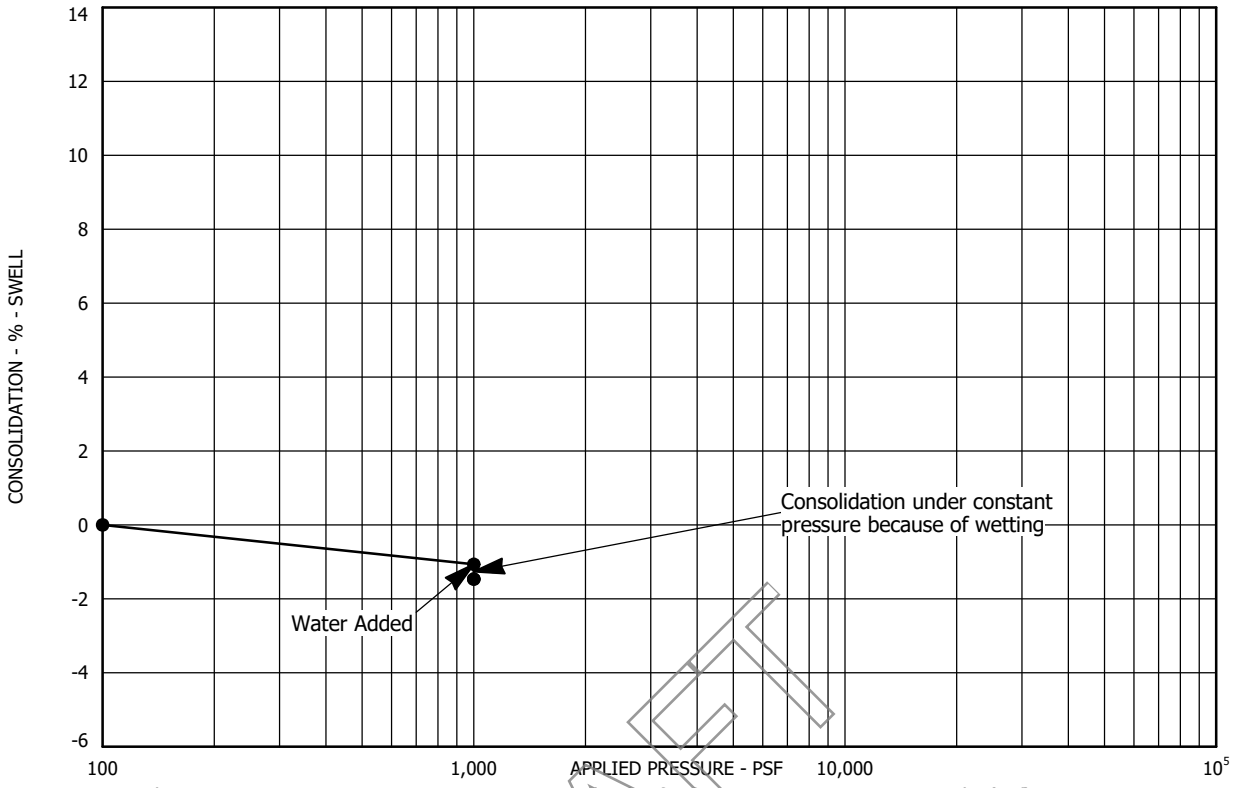
DRAFT



Sample Location: Test Boring No. 53 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 20

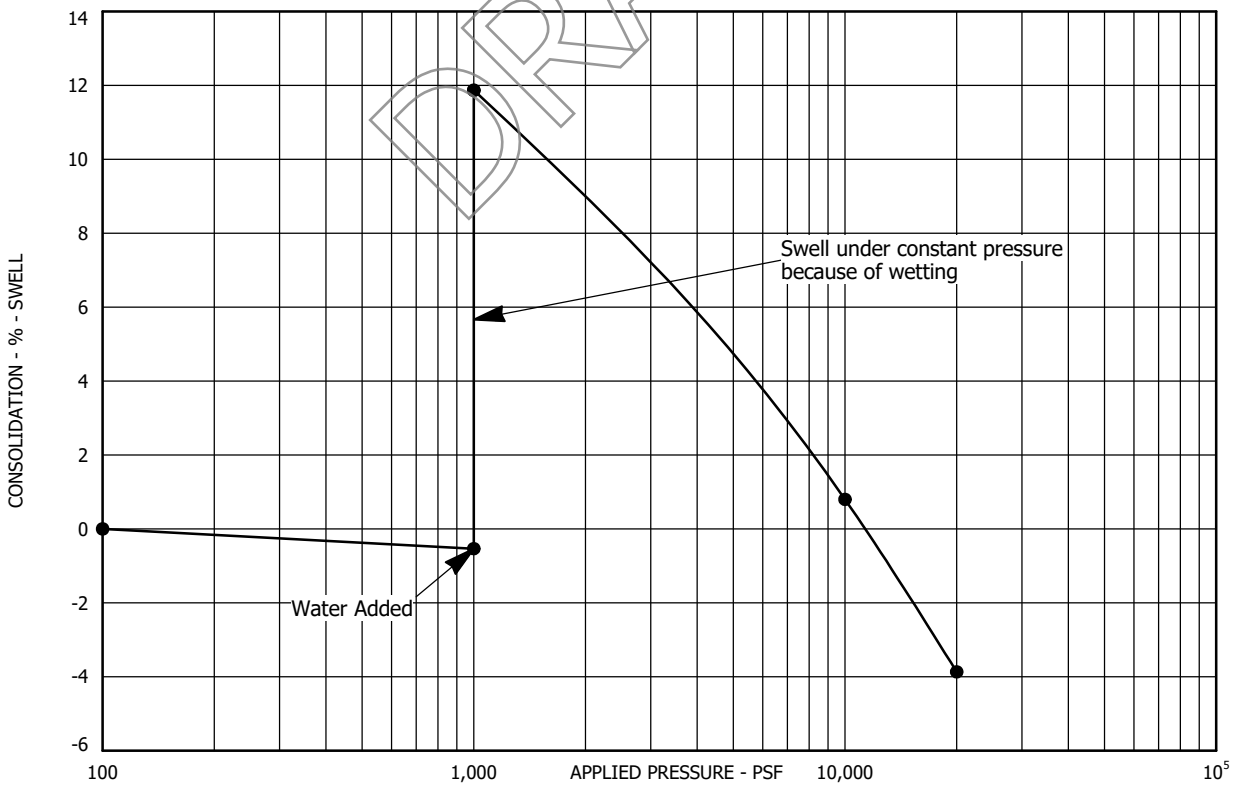
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-69
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 54 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

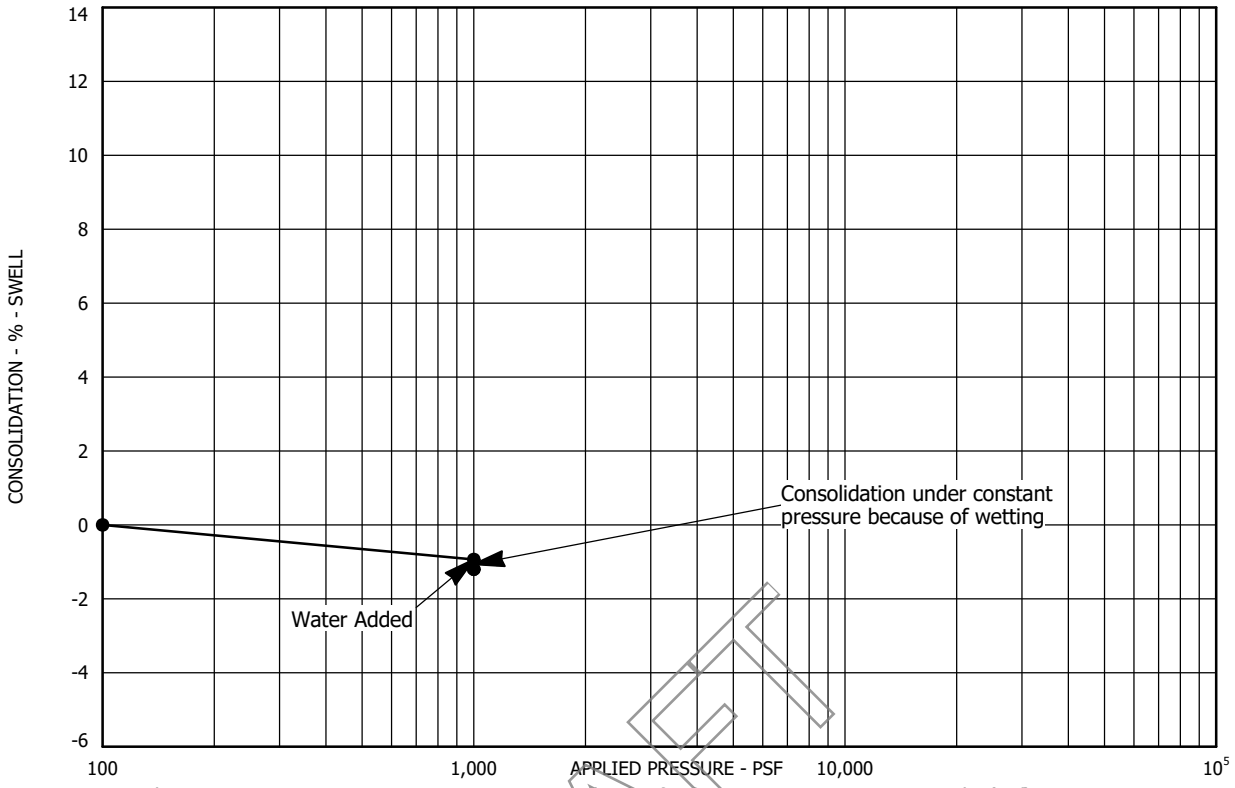
DRAFT



Sample Location: Test Boring No. 54 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 16

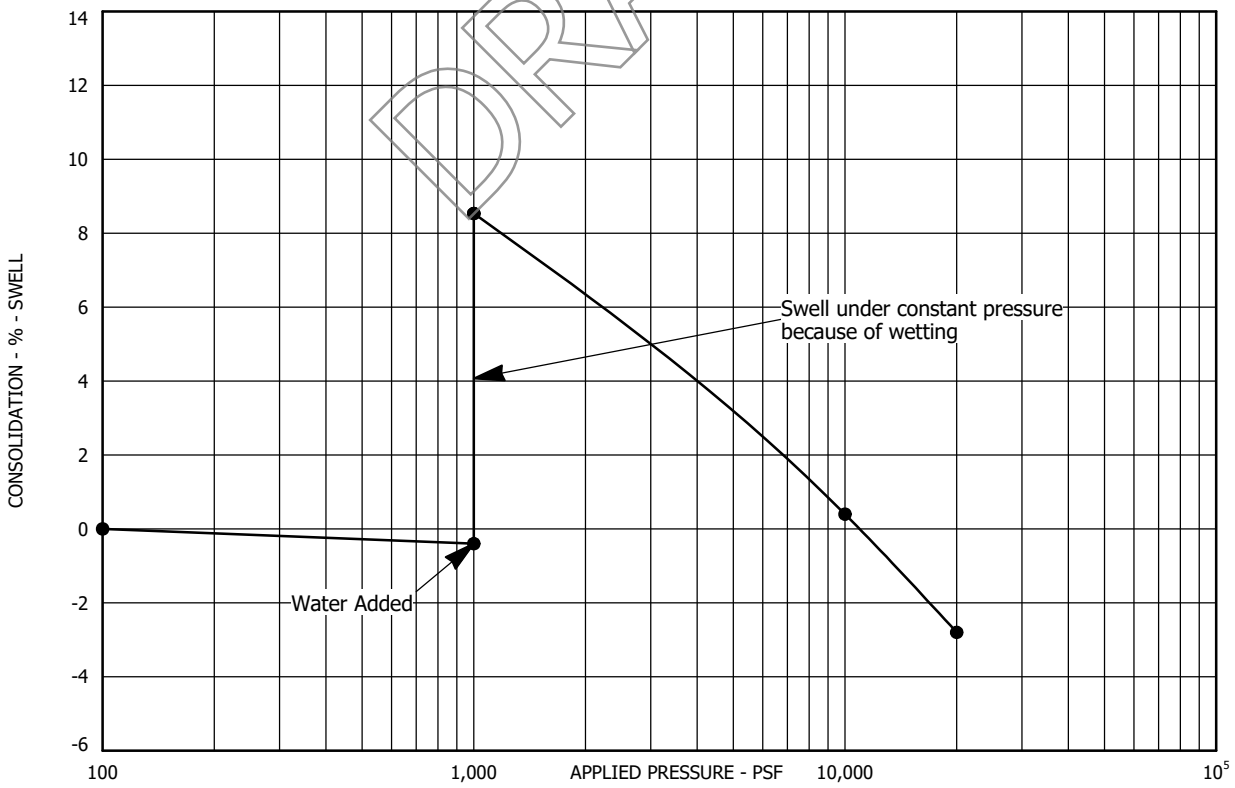
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-70
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 55 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 91
Moisture Content (%): 39

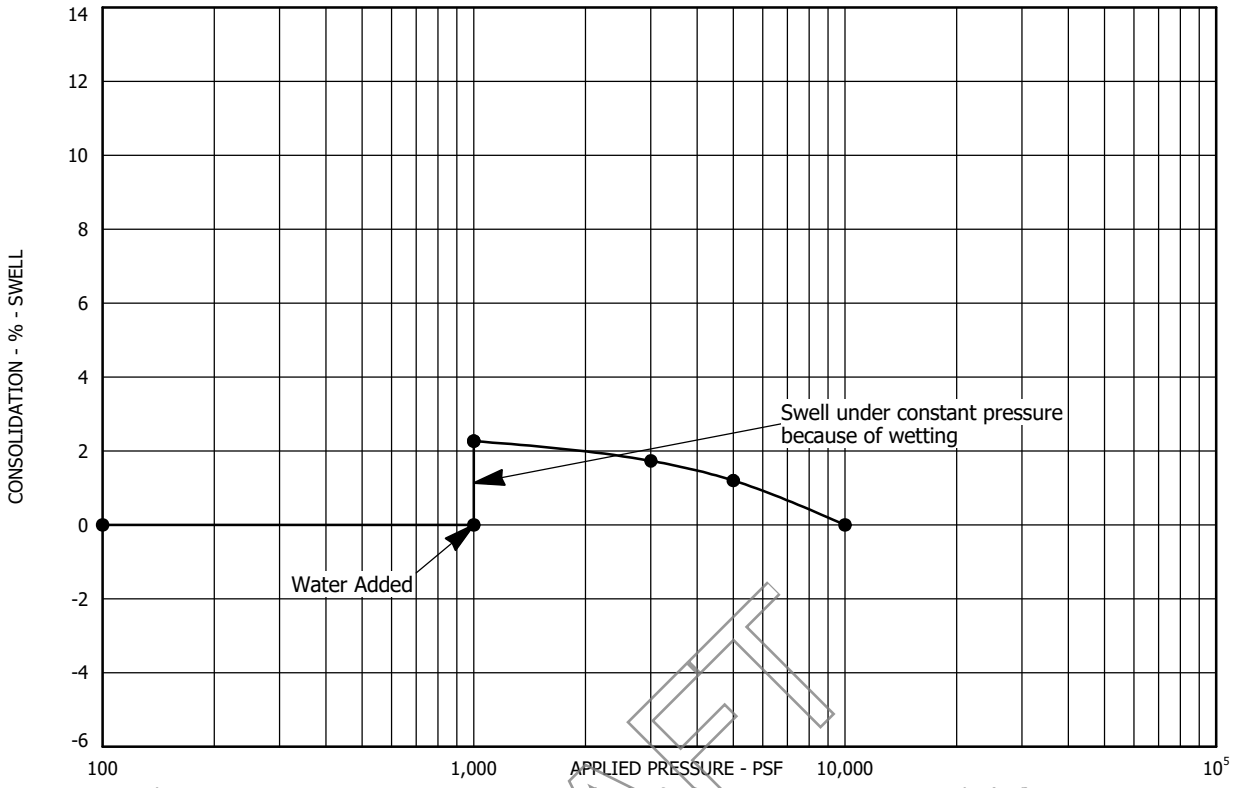
DRAFT



Sample Location: Test Boring No. 55 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 15

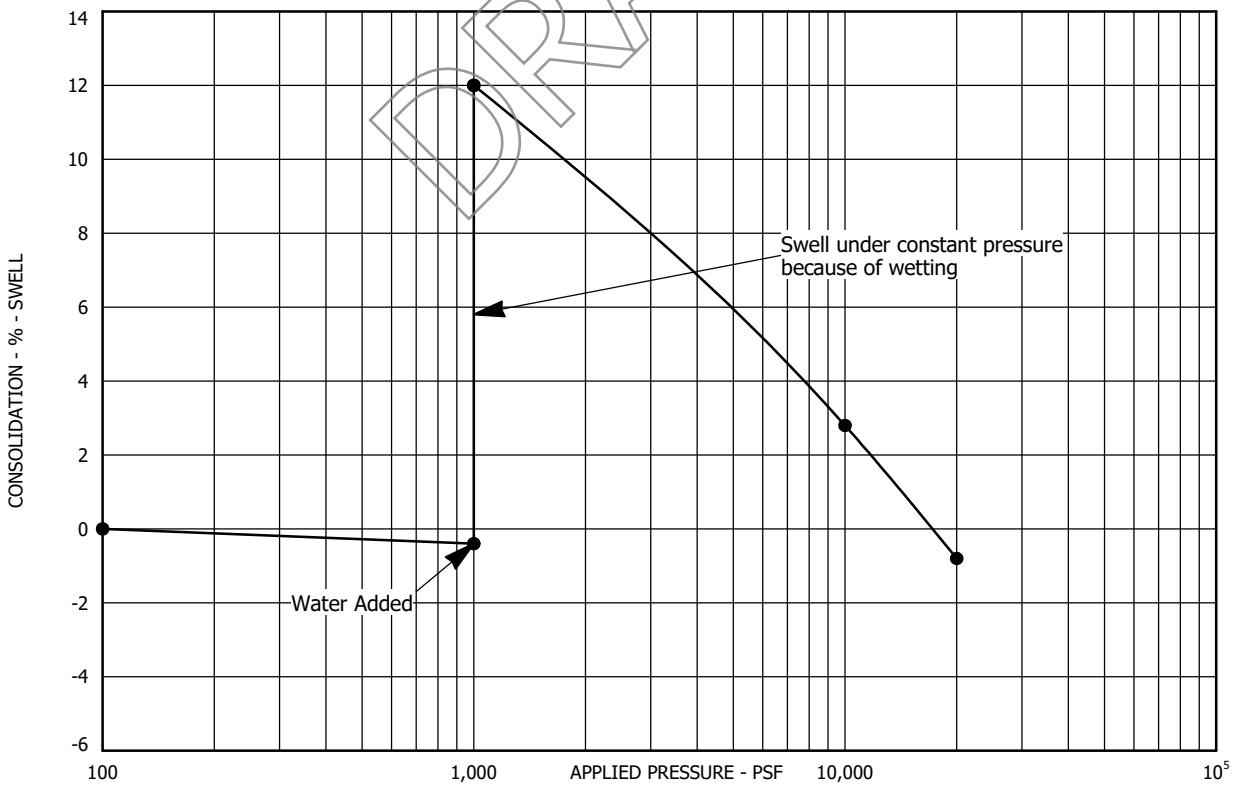
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-71
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 56 at a depth of 7 feet
Sample Description: Clay, very sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 15

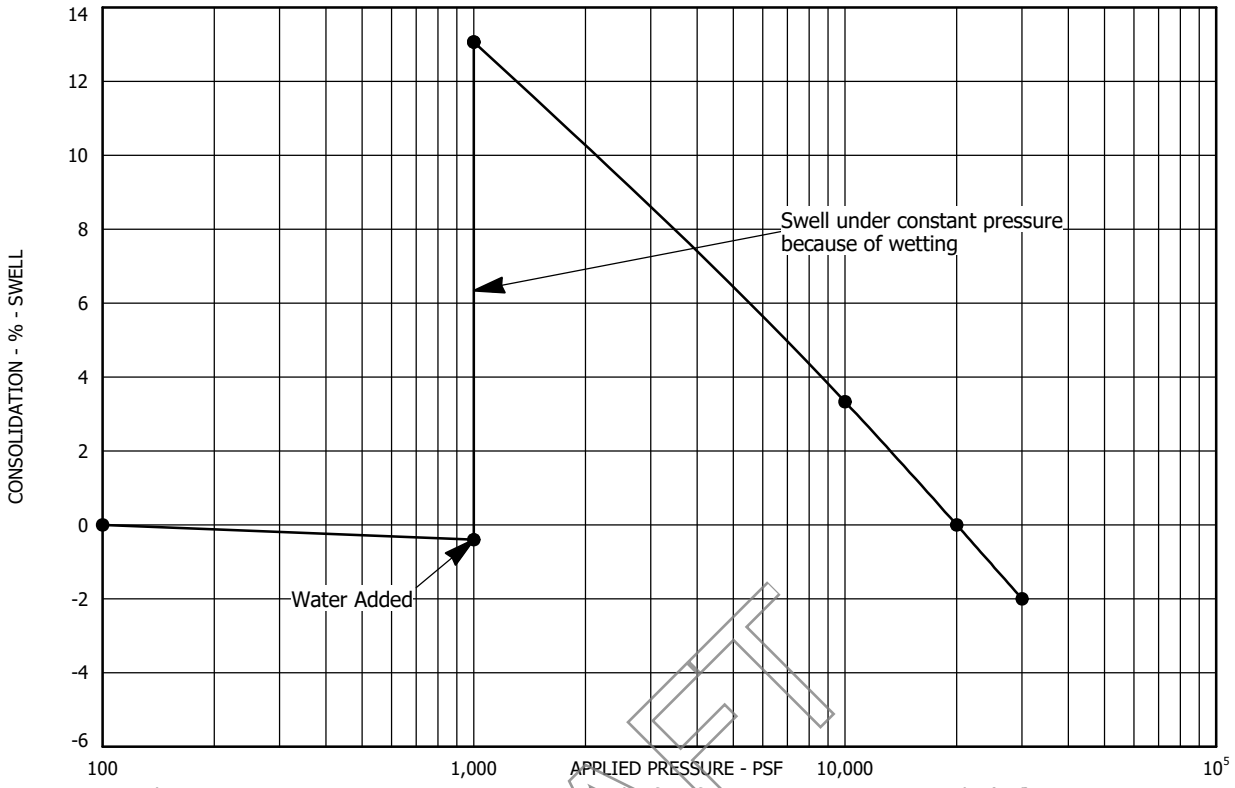
DRAFT



Sample Location: Test Boring No. 56 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 18

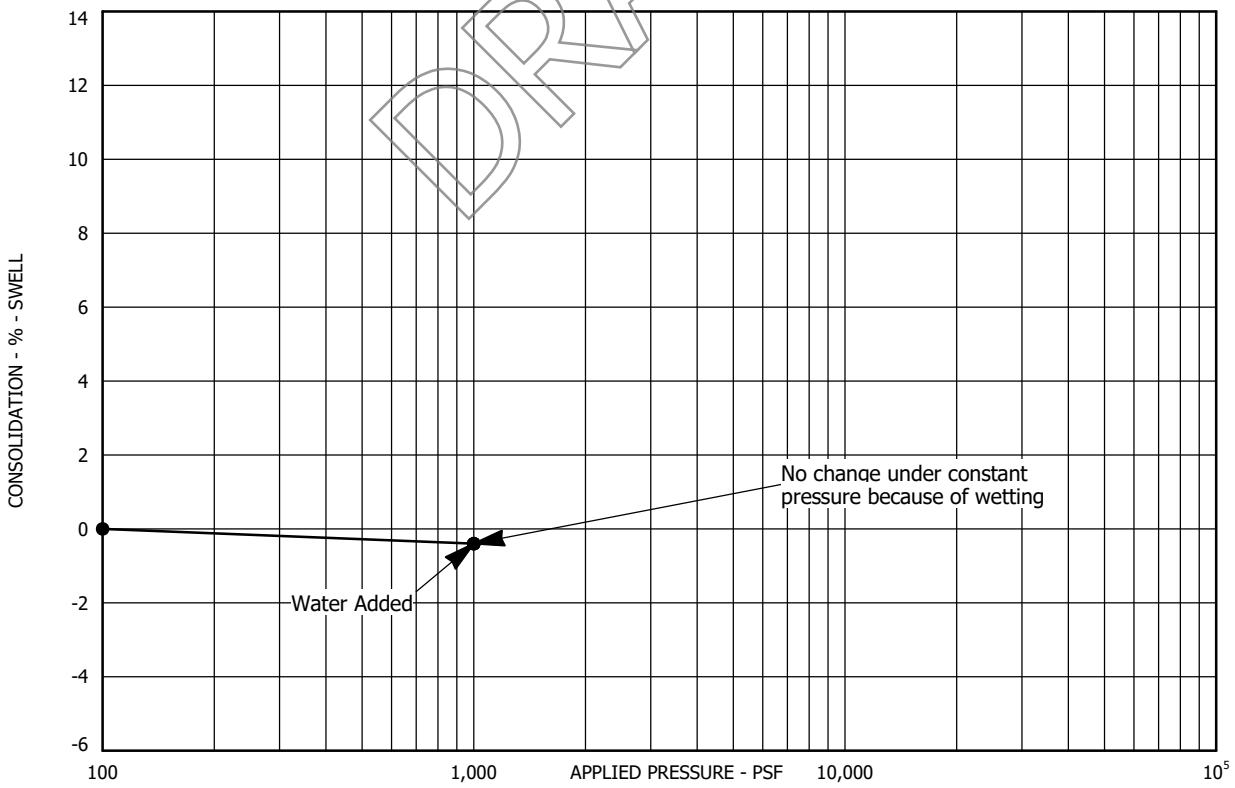
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-72
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 56 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 15

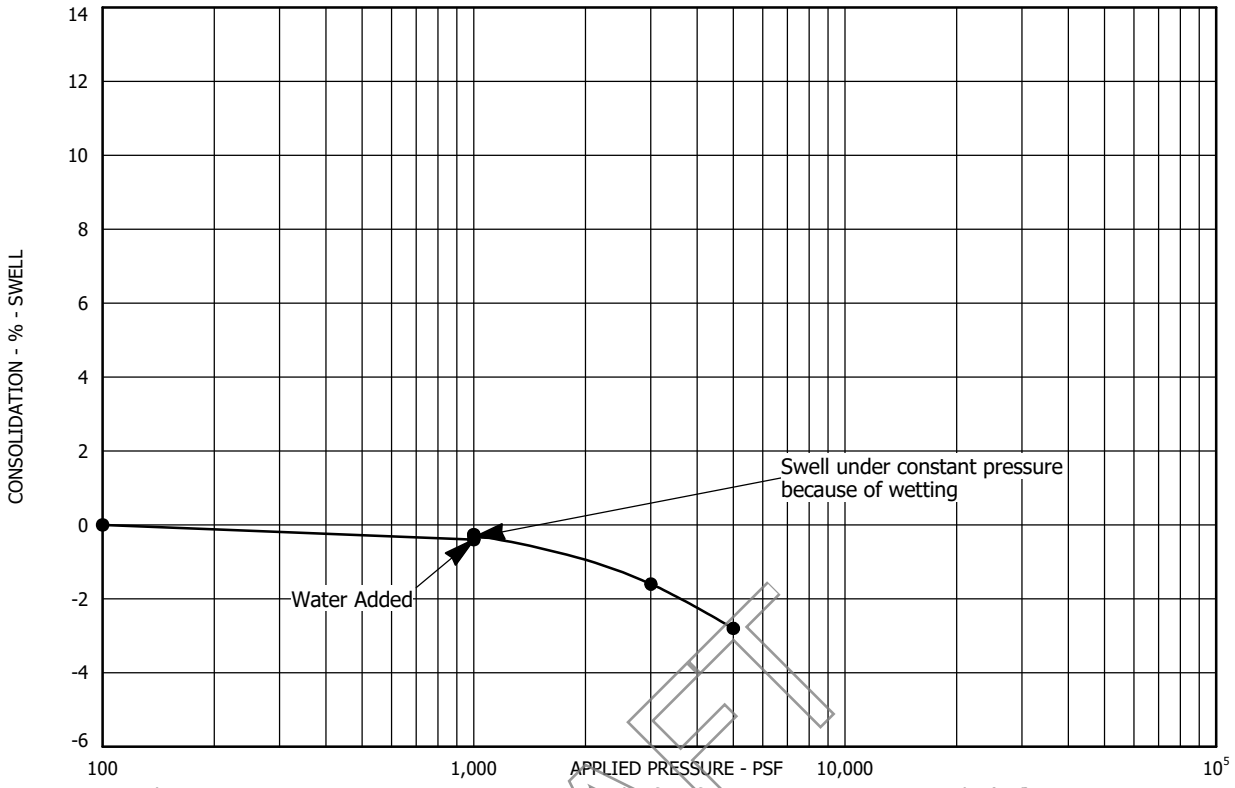
DRAFT



Sample Location: Test Boring No. 57 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 14

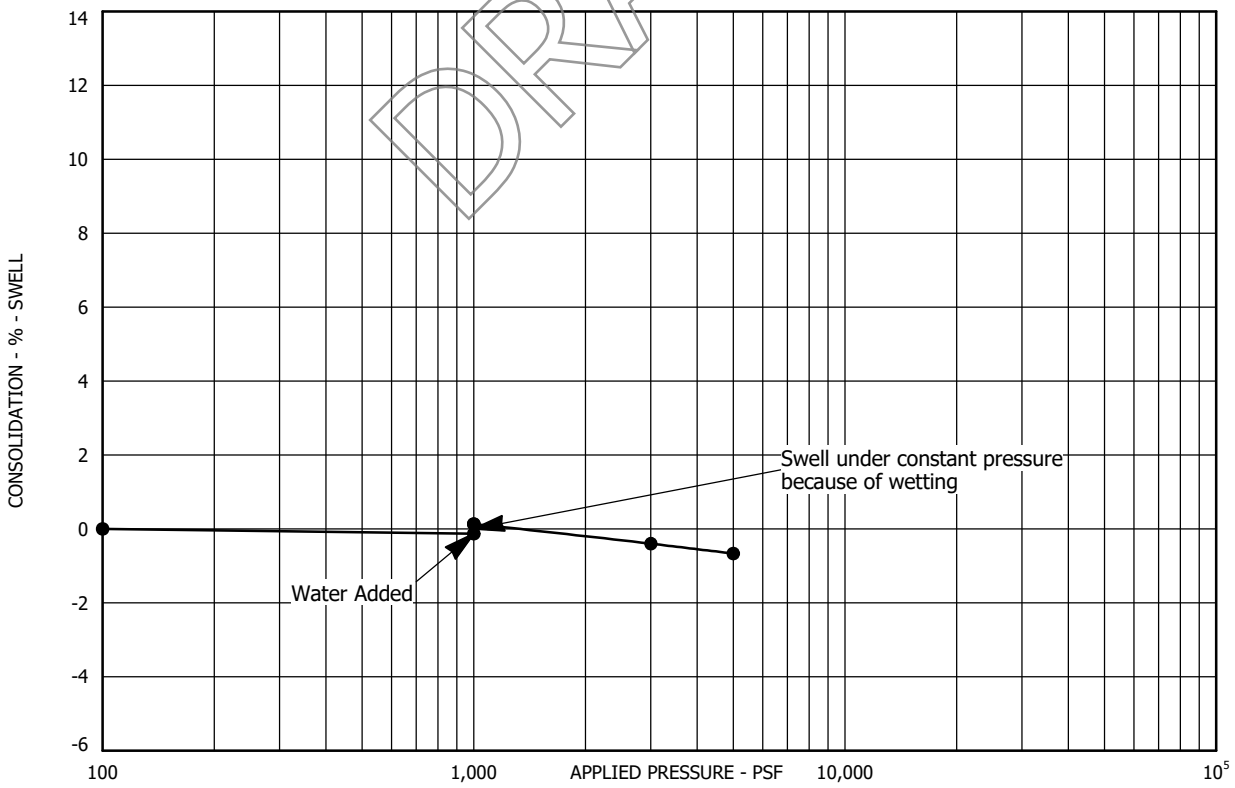
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-73
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 57 at a depth of 19 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 19

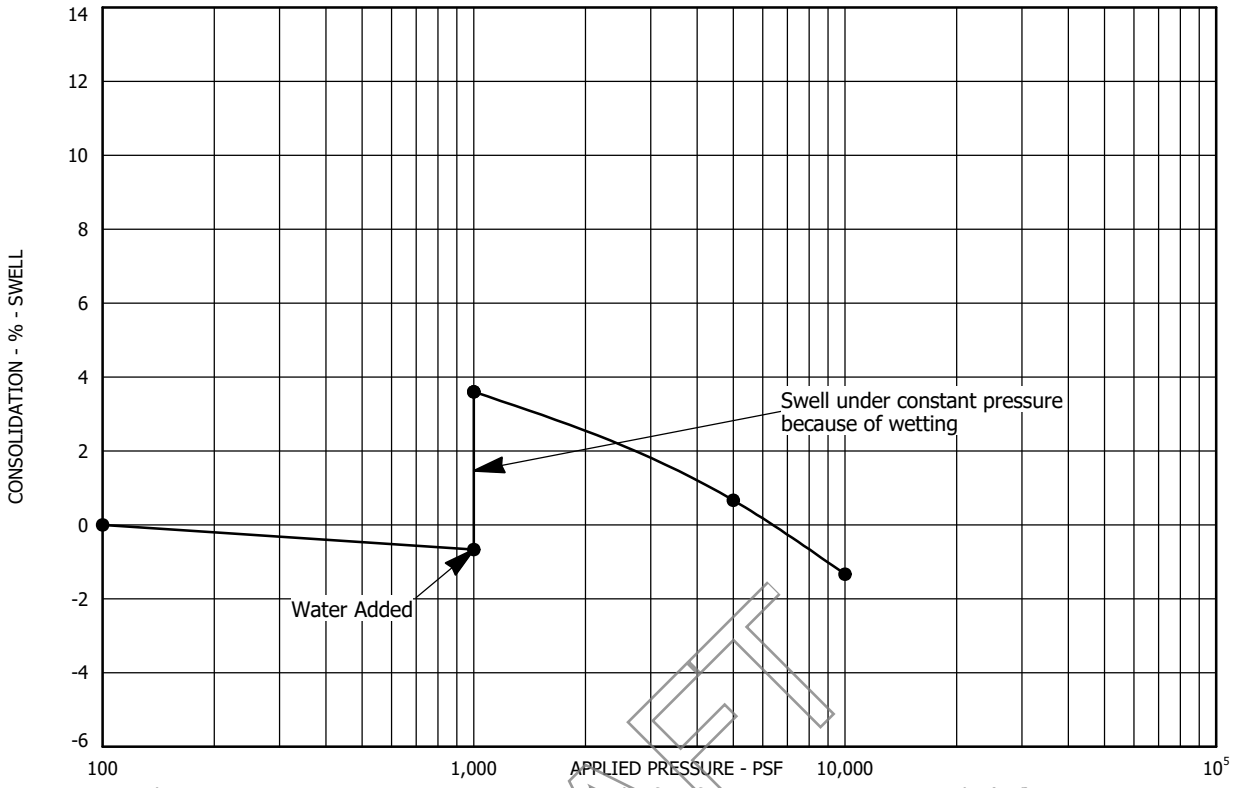
DRAFT



Sample Location: Test Boring No. 58 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 13

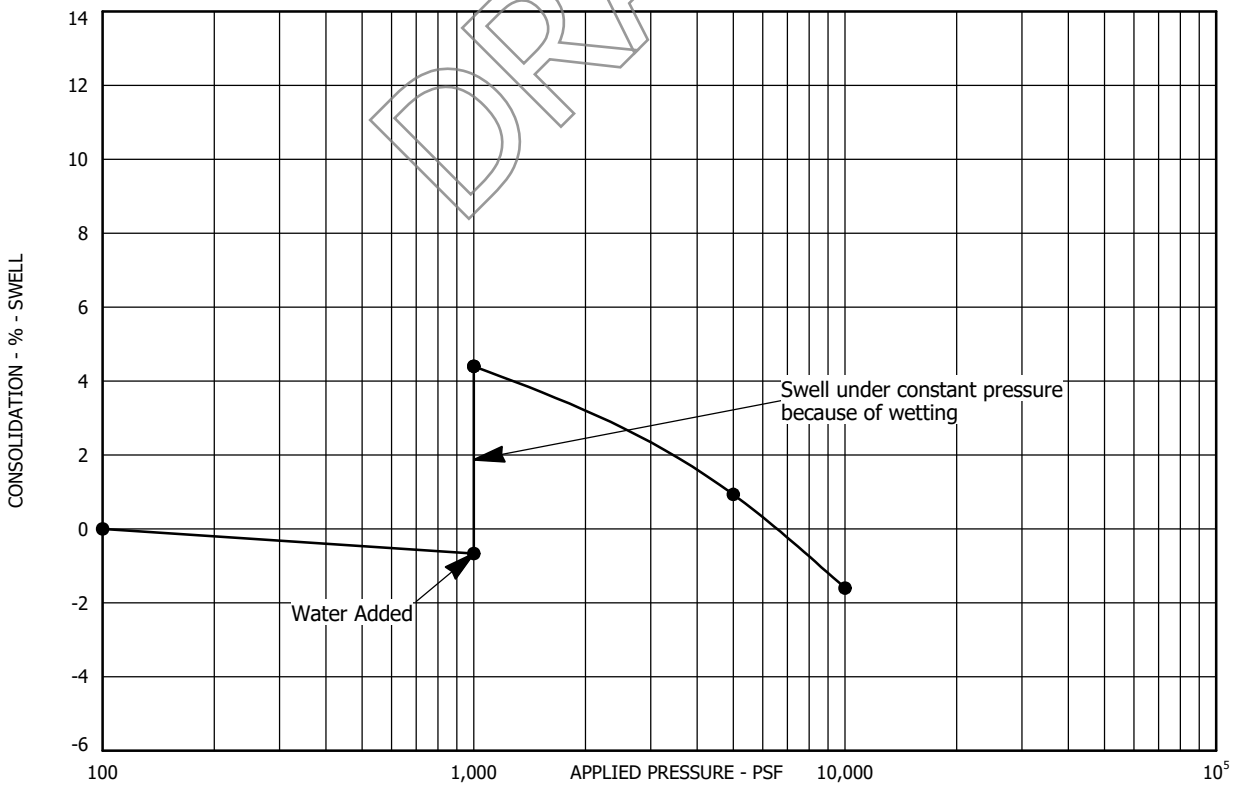
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-74
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 58 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 18

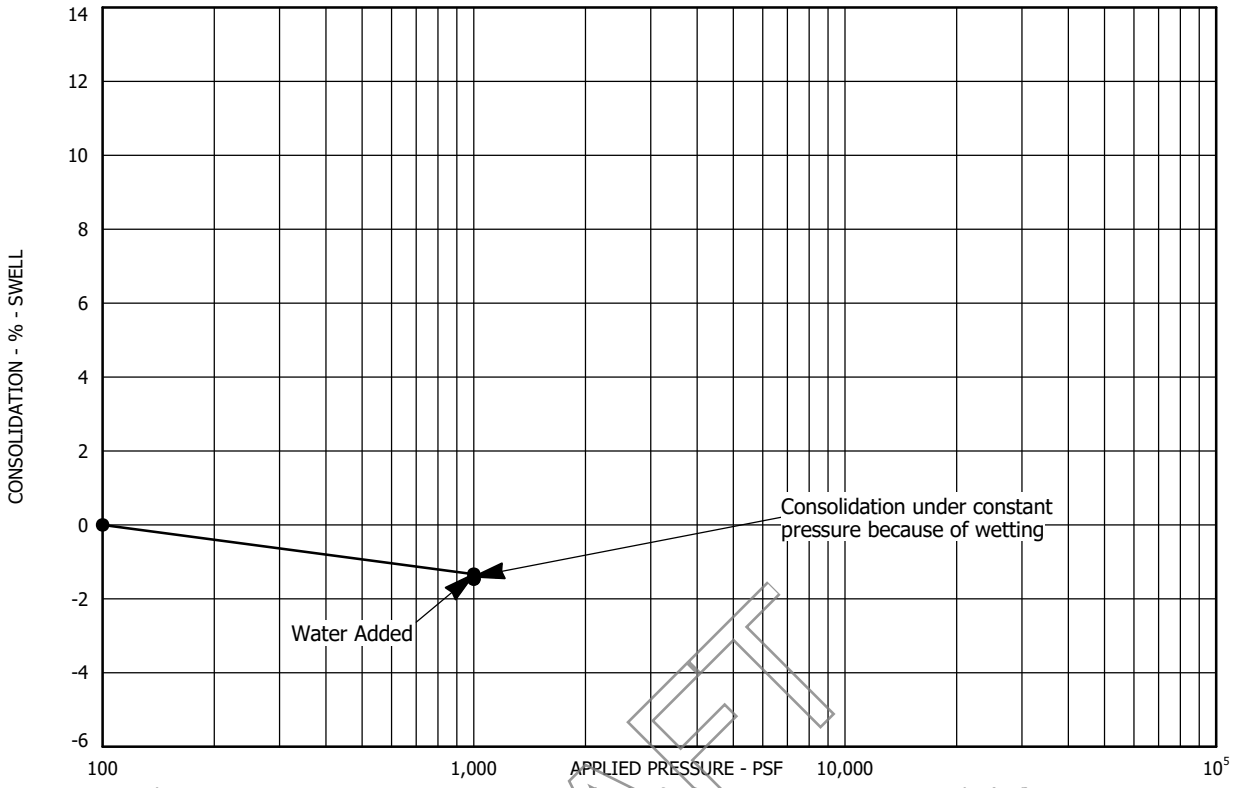
DRAFT



Sample Location: Test Boring No. 58 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

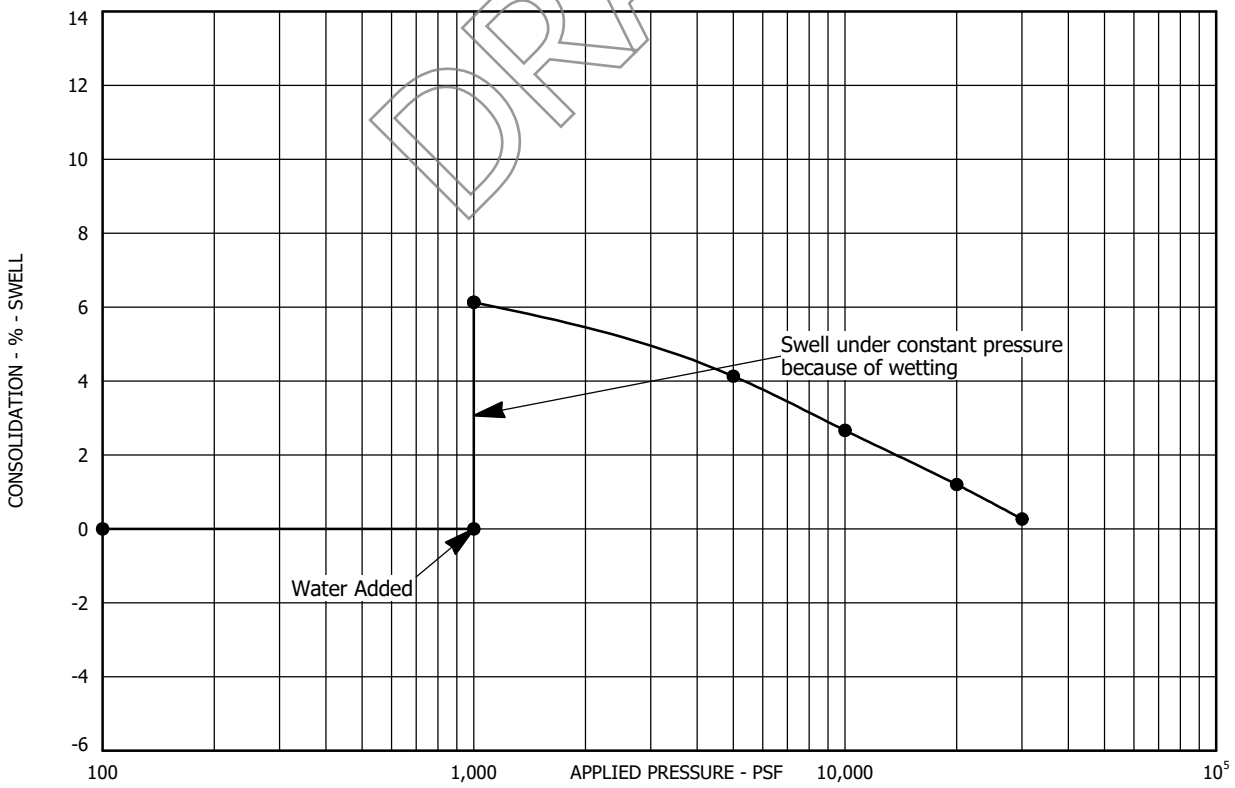
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-75
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 59 at a depth of 9 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 22

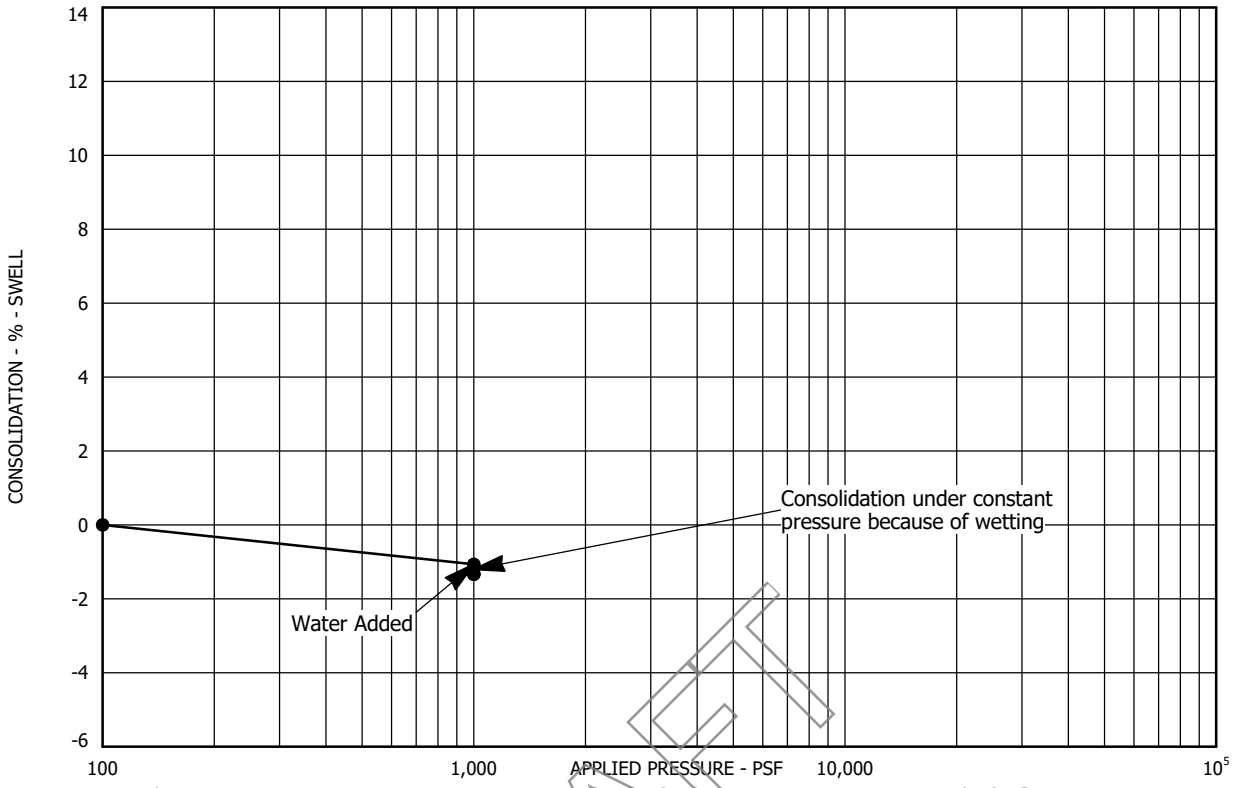
DRAFT



Sample Location: Test Boring No. 59 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 17

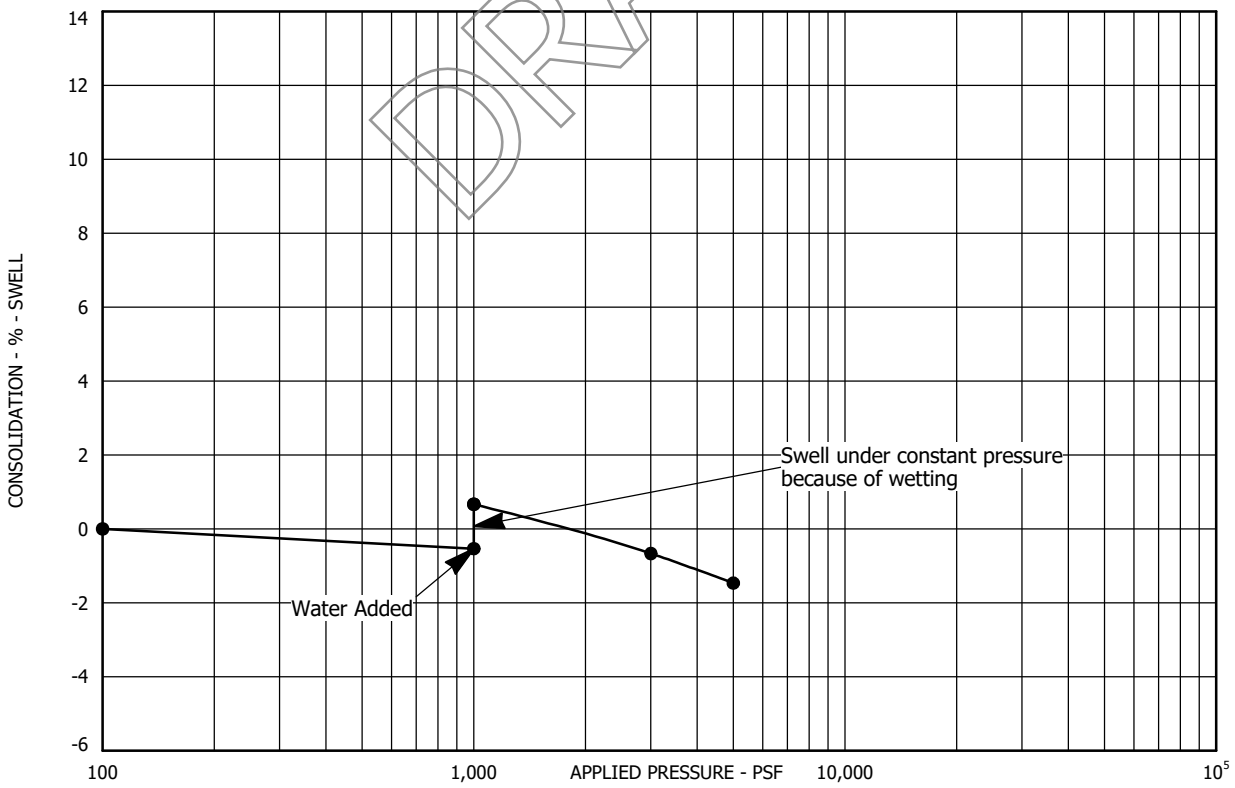
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-76
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 60 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 19

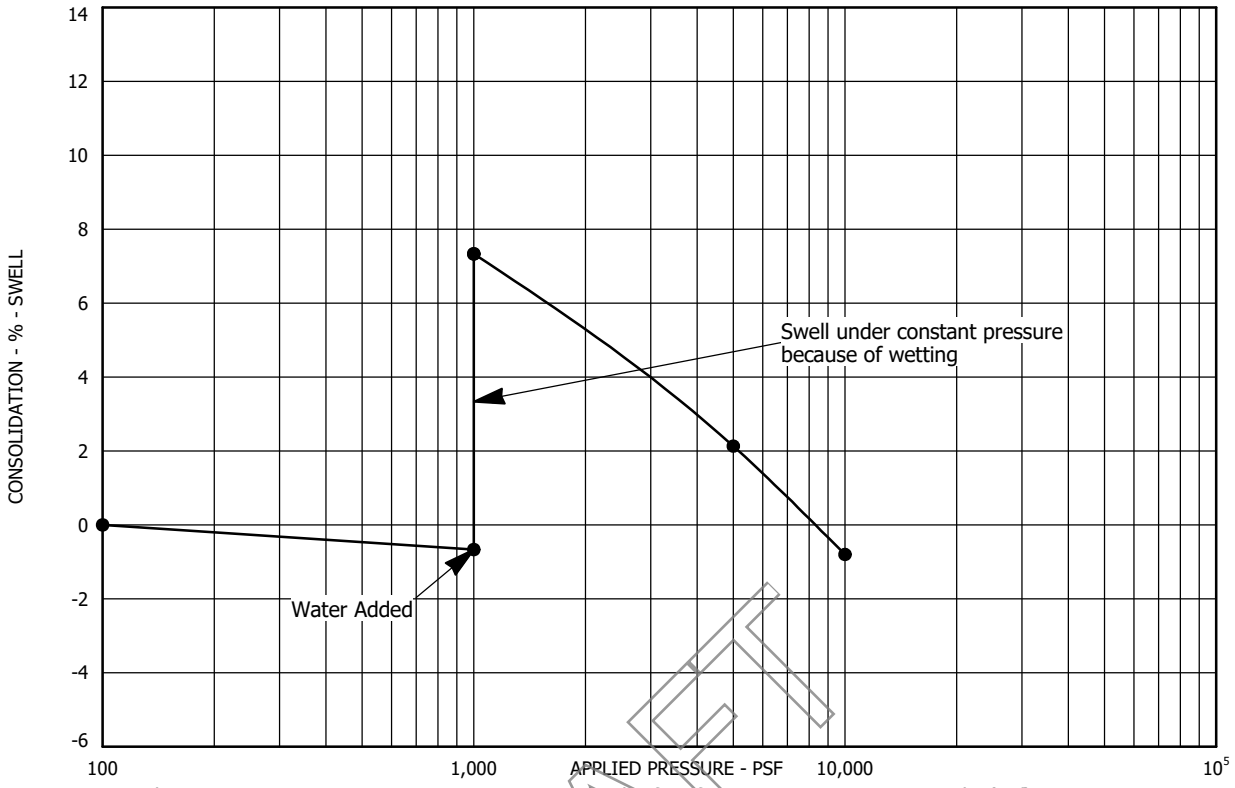
DRAFT



Sample Location: Test Boring No. 60 at a depth of 9 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 20

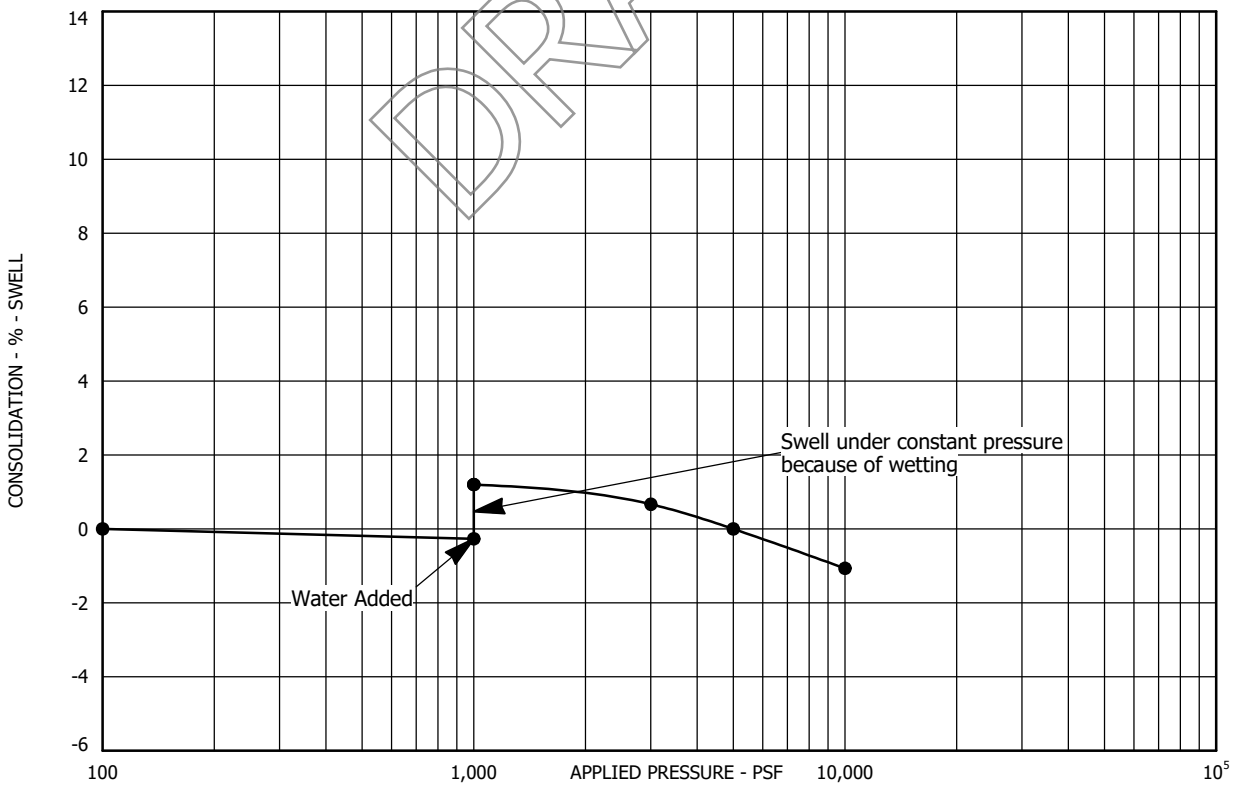
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-77
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 60 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 19

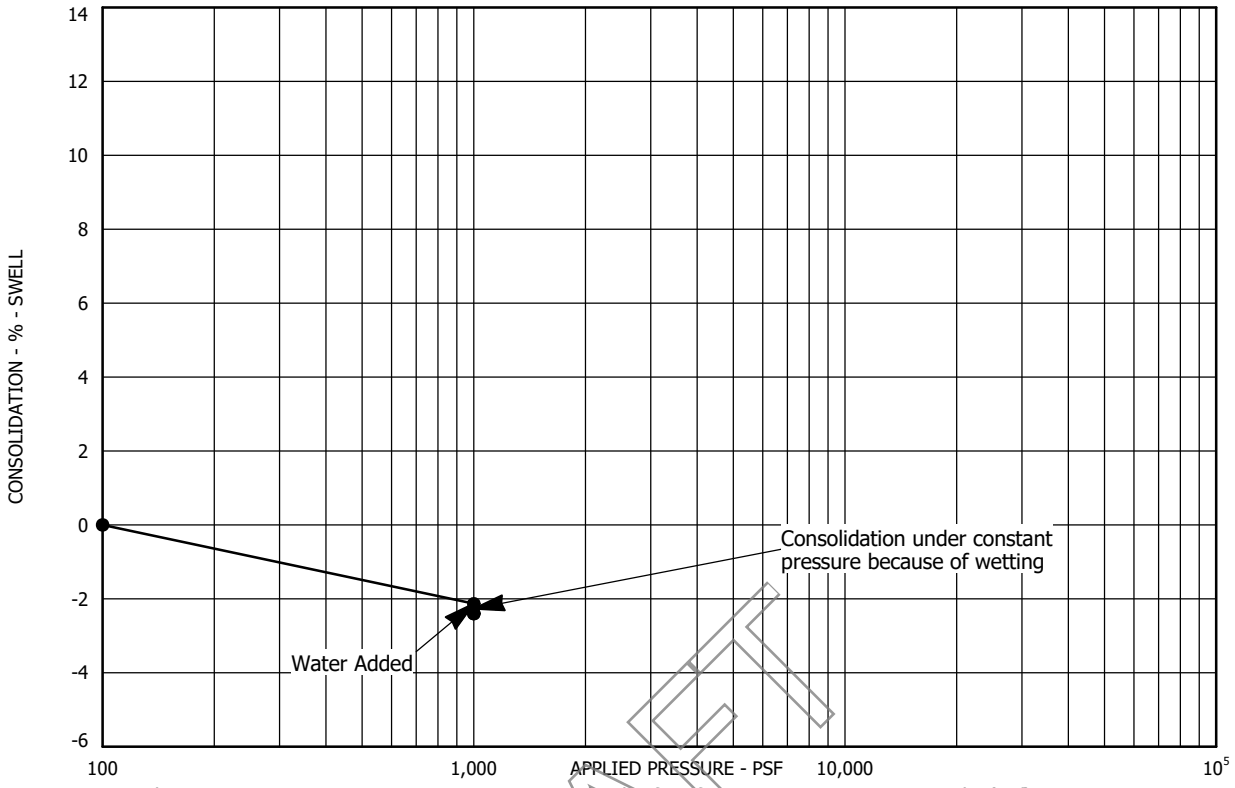
DRAFT



Sample Location: Test Boring No. 61 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 13

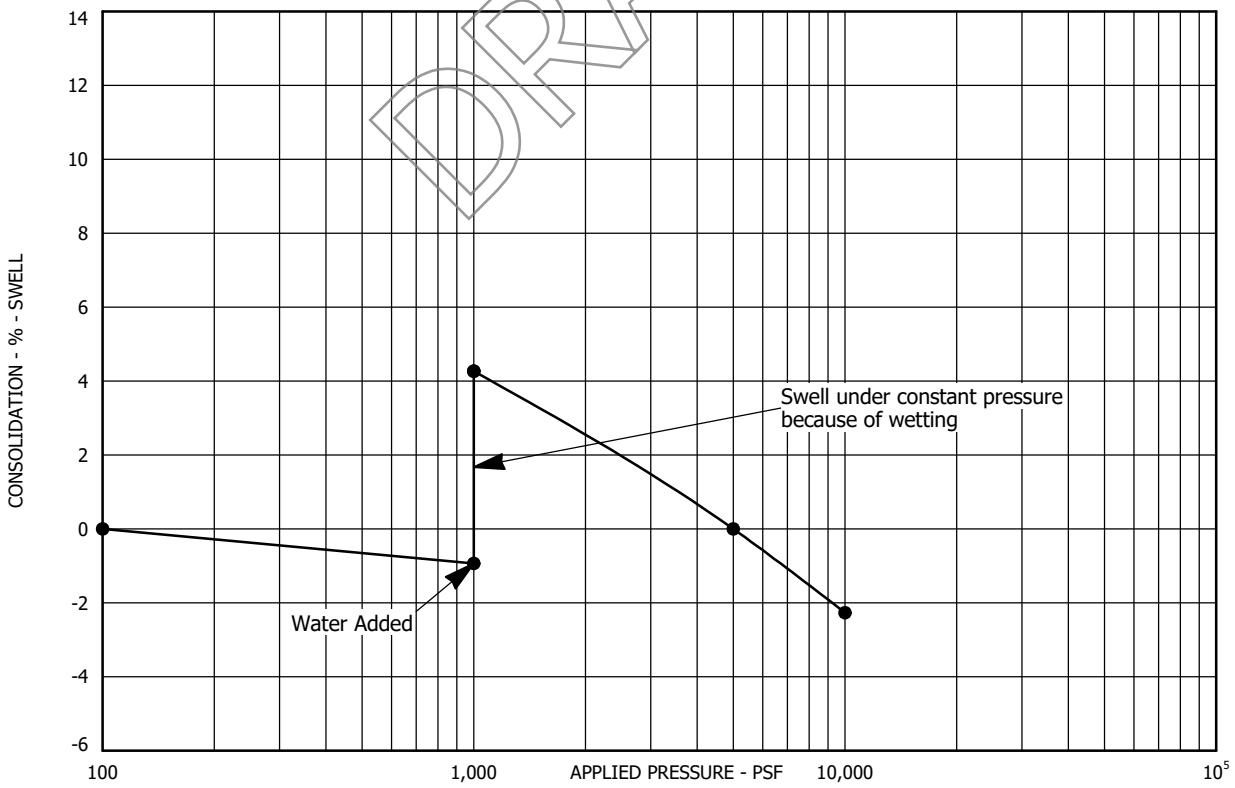
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-78
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 61 at a depth of 14 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 16

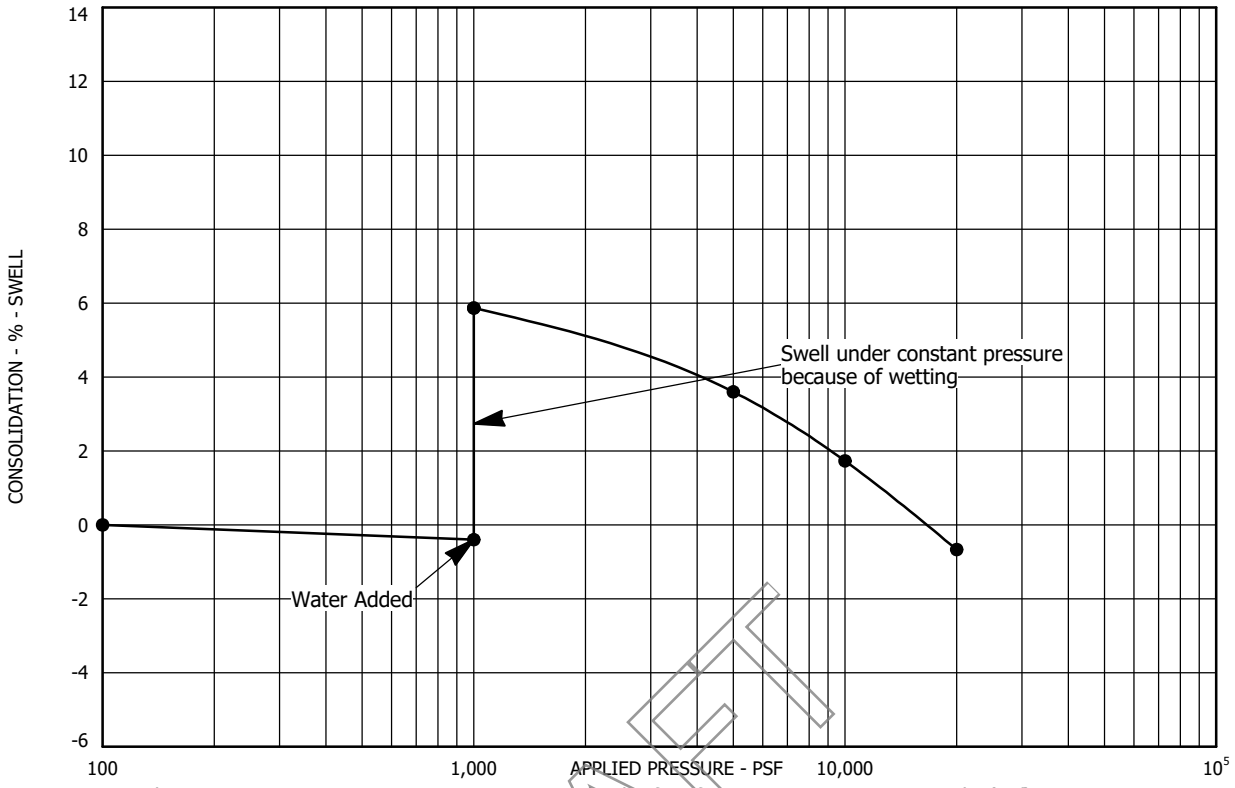
DRAFT



Sample Location: Test Boring No. 61 at a depth of 24 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 14

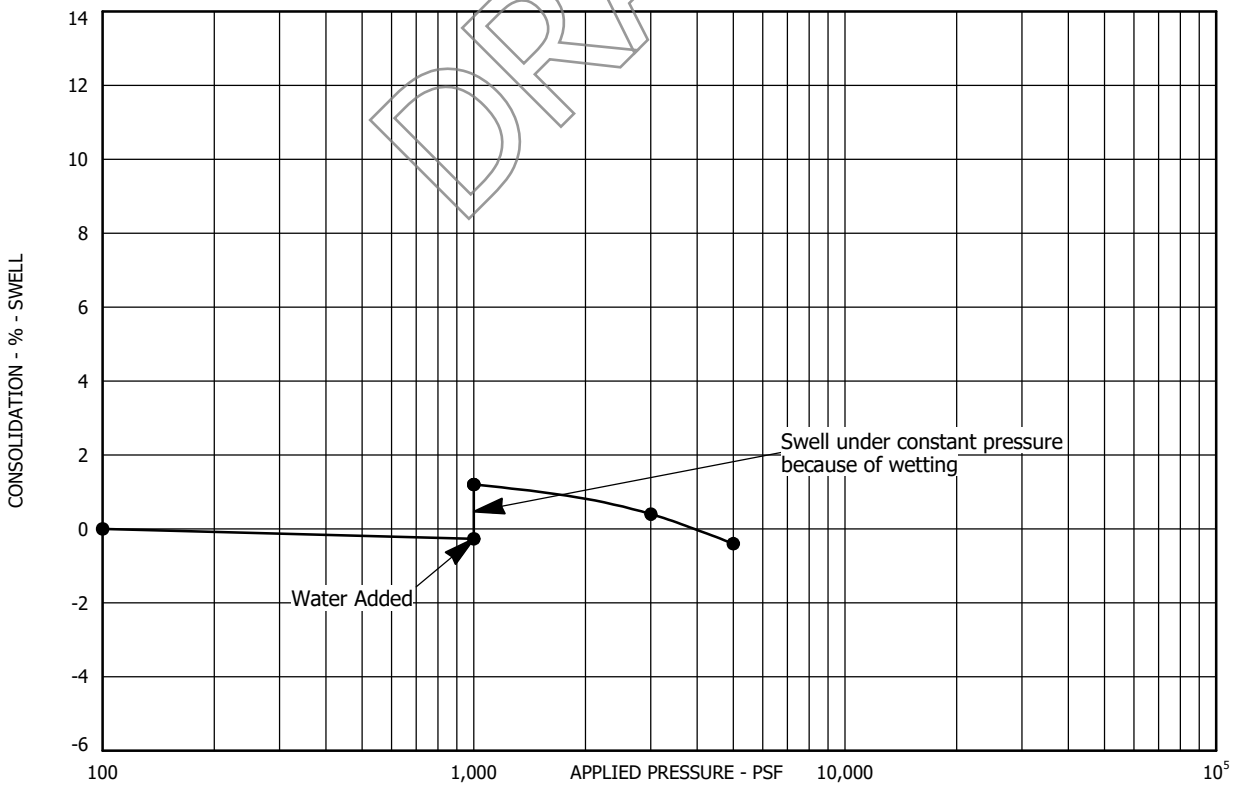
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-79
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 61 at a depth of 44 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 17

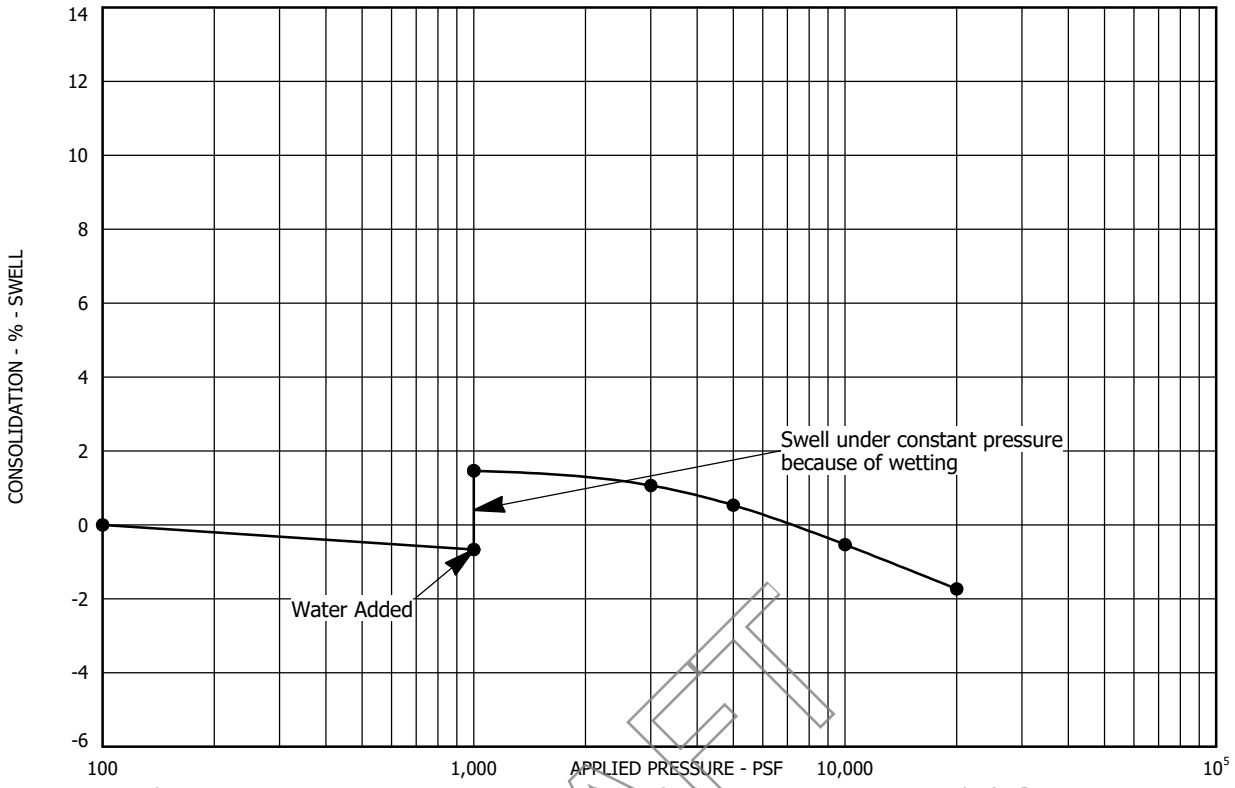
DRAFT



Sample Location: Test Boring No. 62 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 8

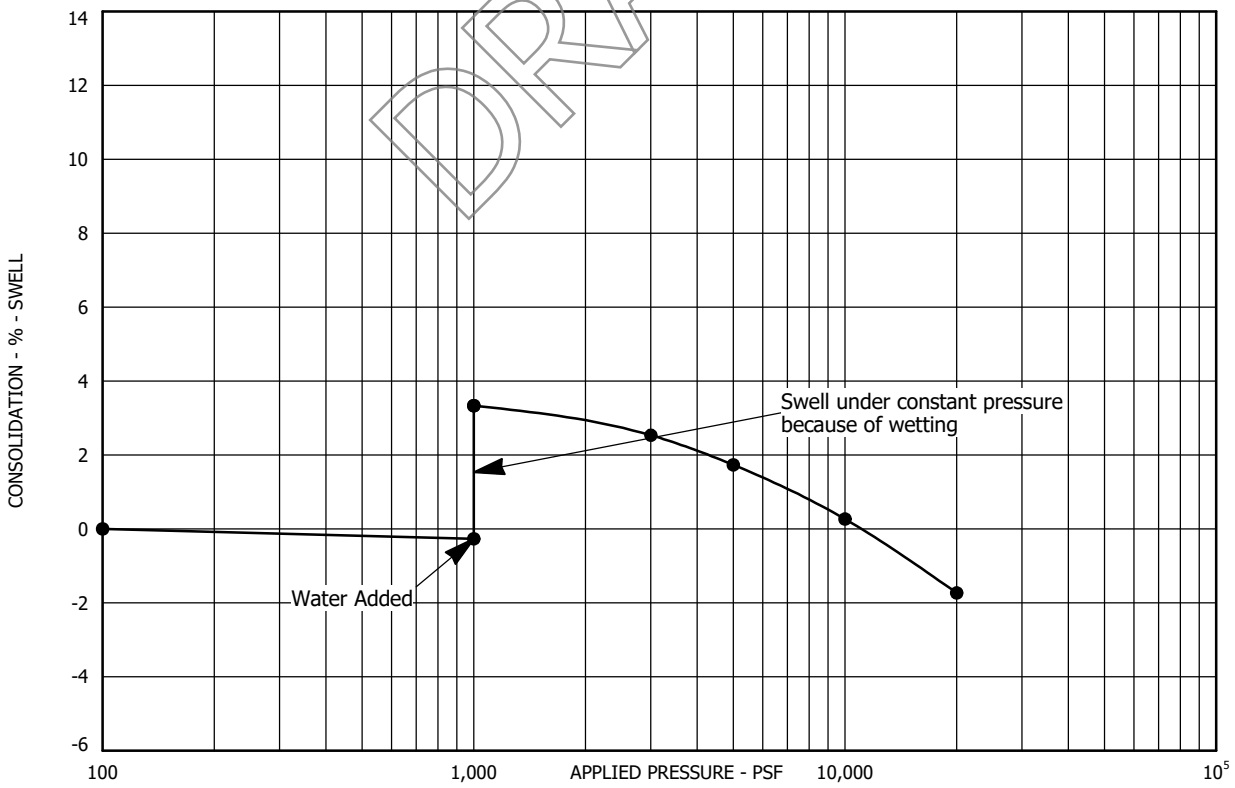
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-80
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 62 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 11

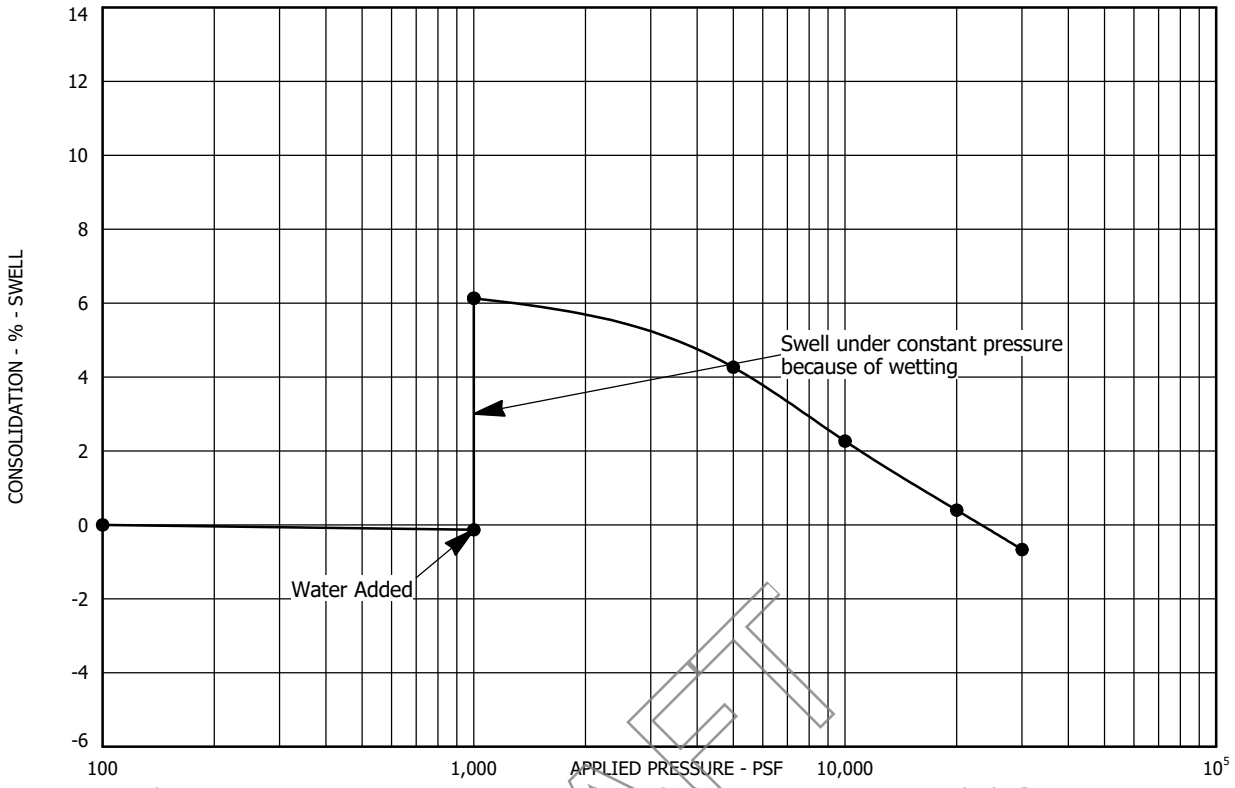
DRAFT



Sample Location: Test Boring No. 63 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 10

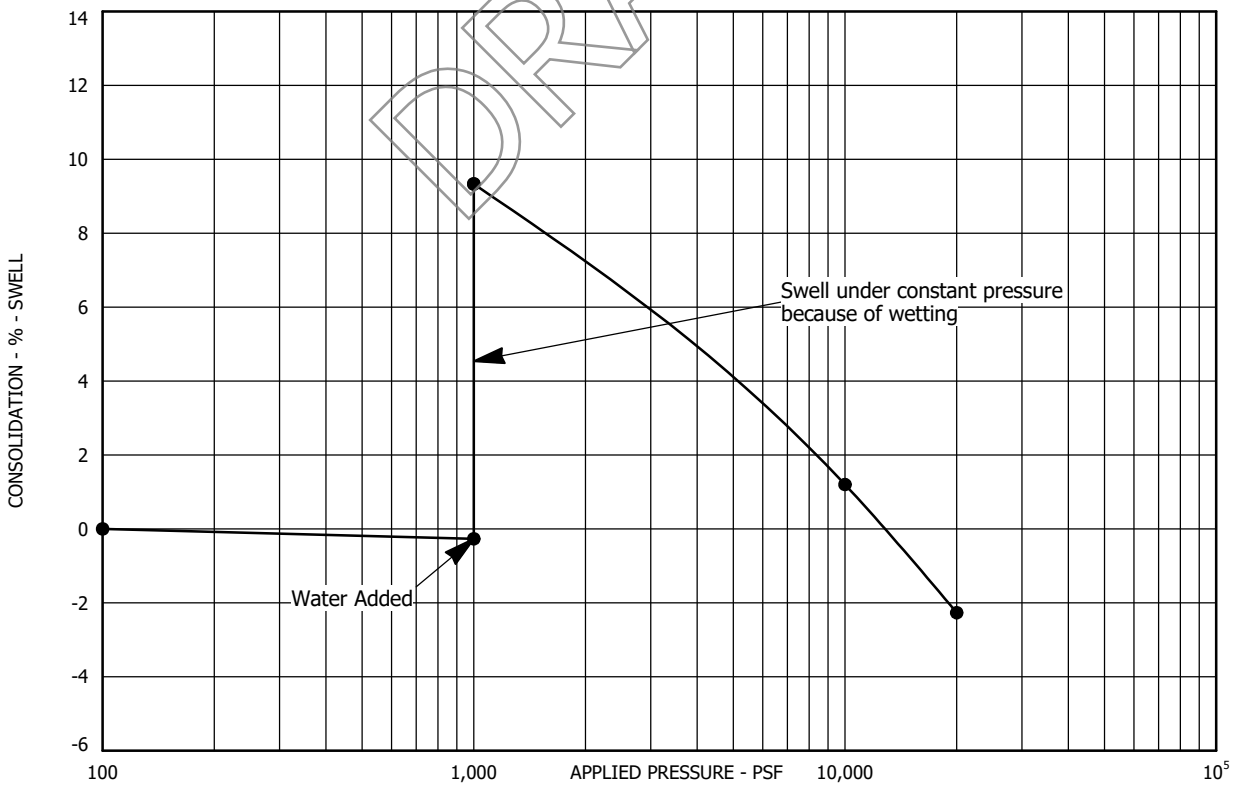
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-81
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 63 at a depth of 7 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 10

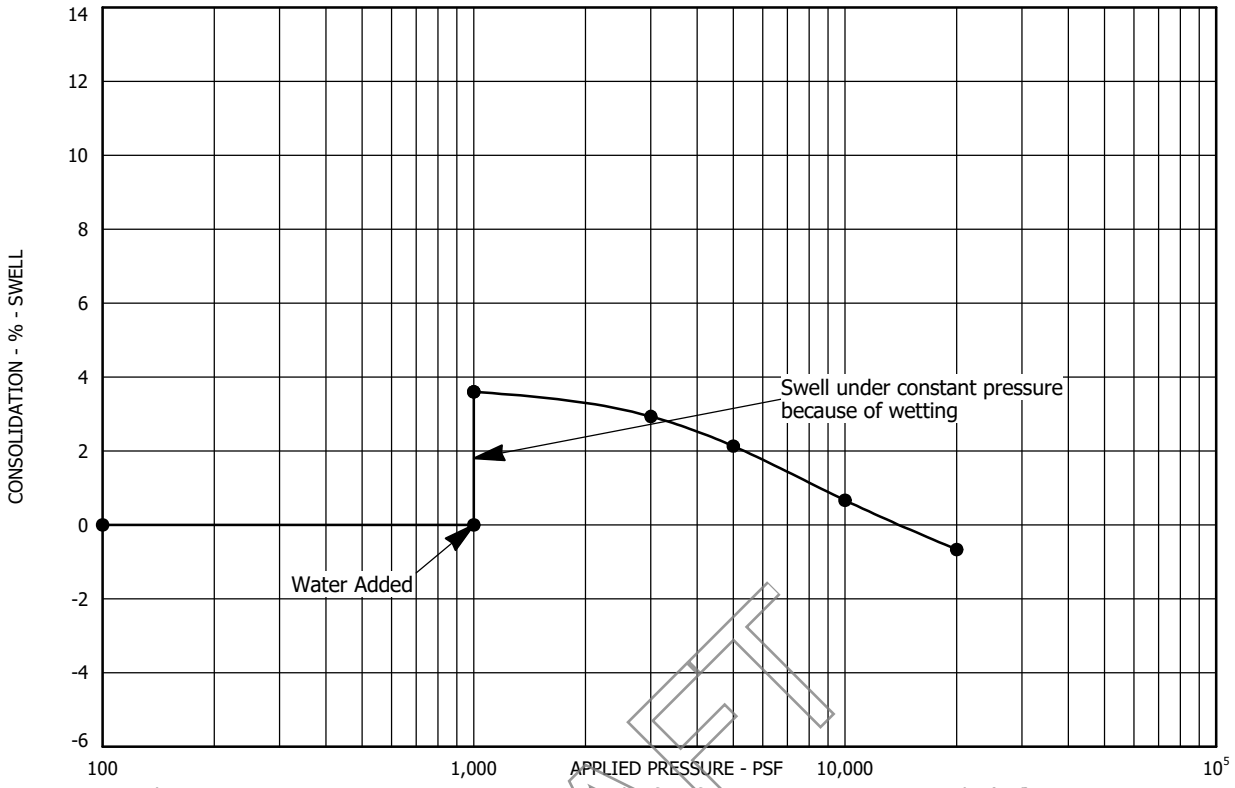
DRAFT



Sample Location: Test Boring No. 63 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 15

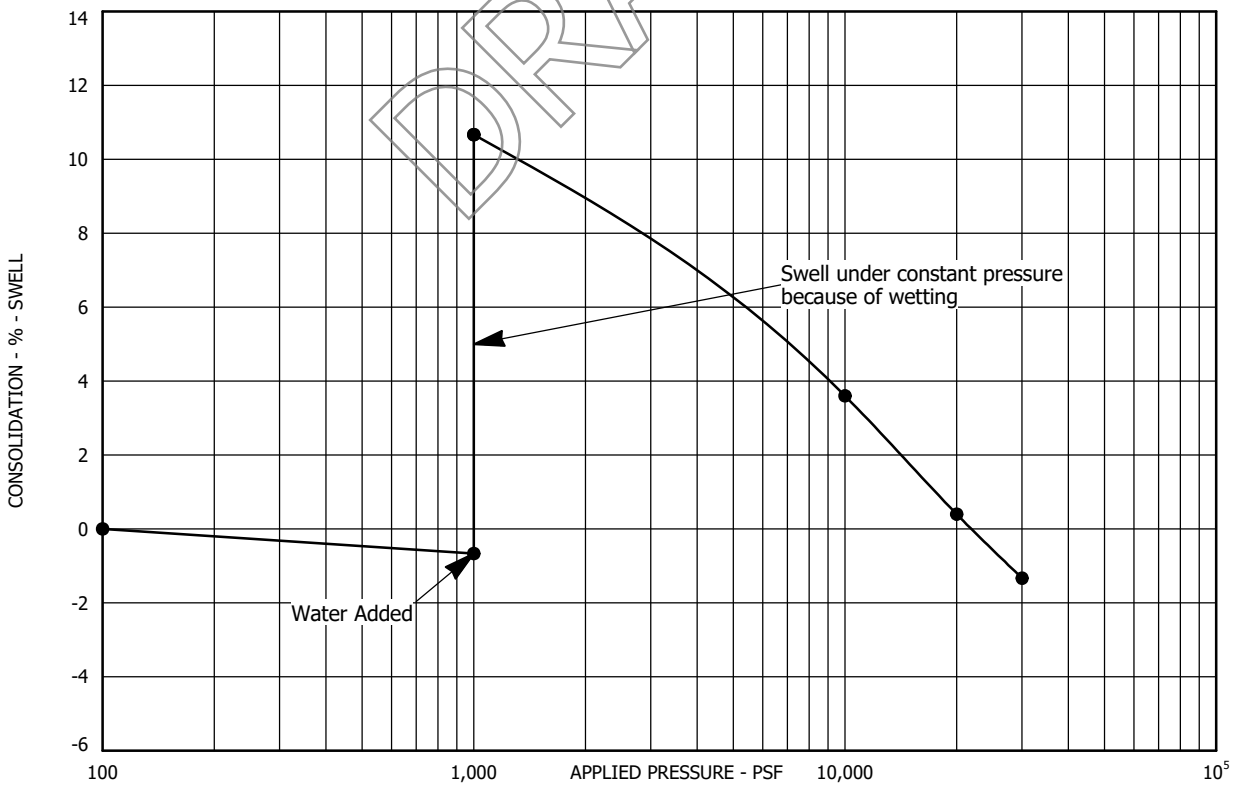
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-82
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 64 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 9

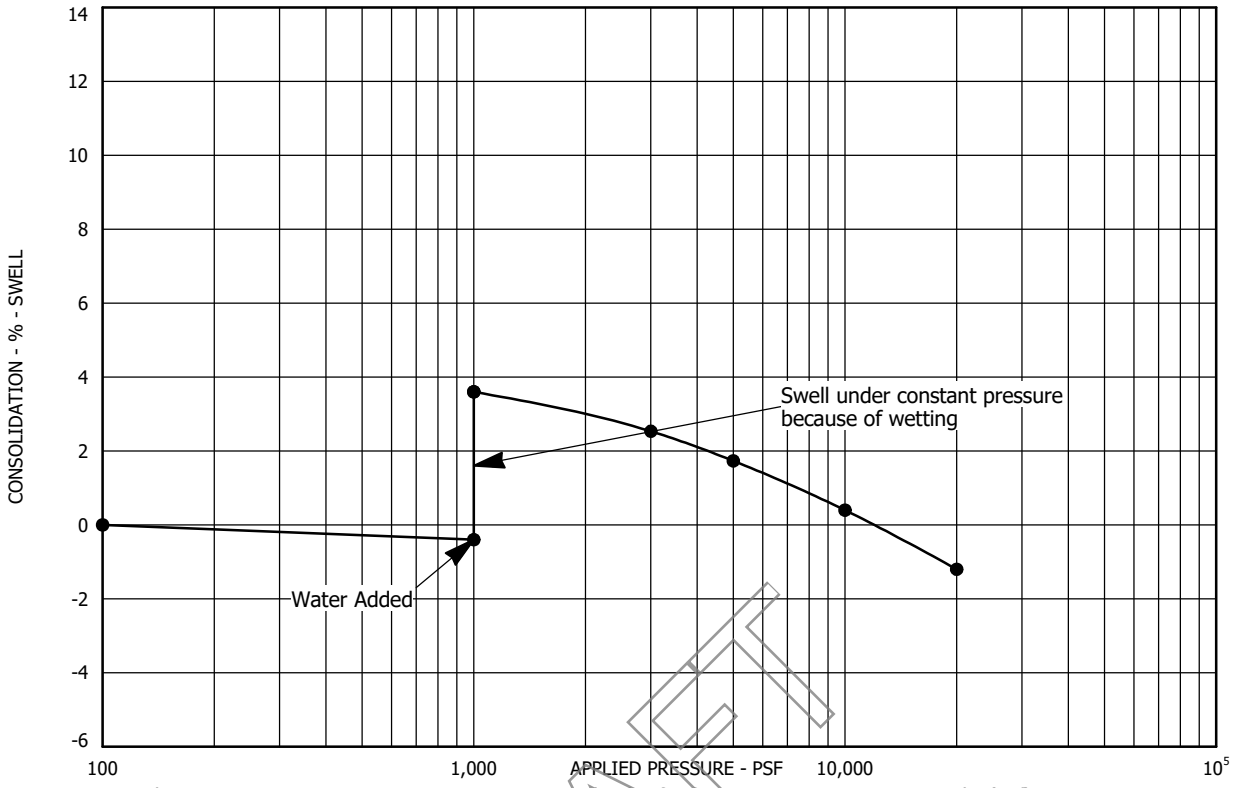
DRAFT



Sample Location: Test Boring No. 64 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 15

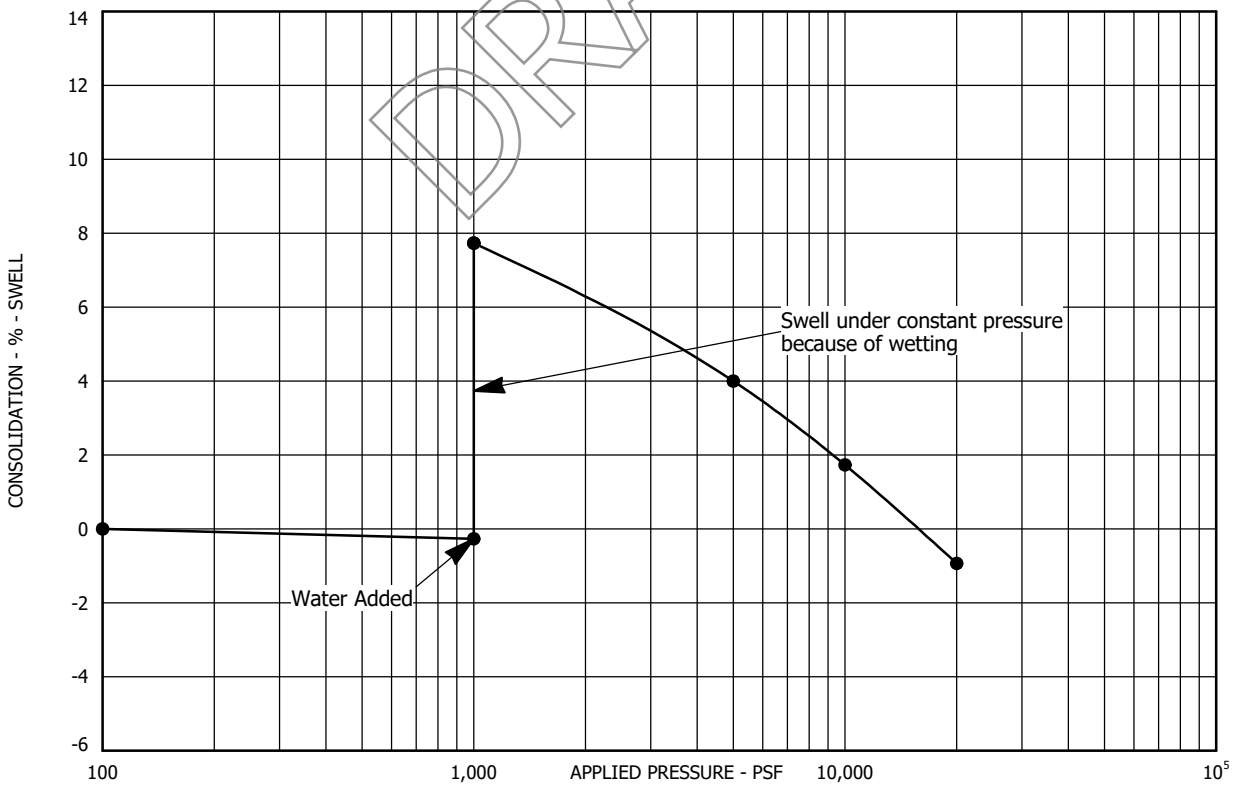
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-83
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 65 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 128
Moisture Content (%): 10

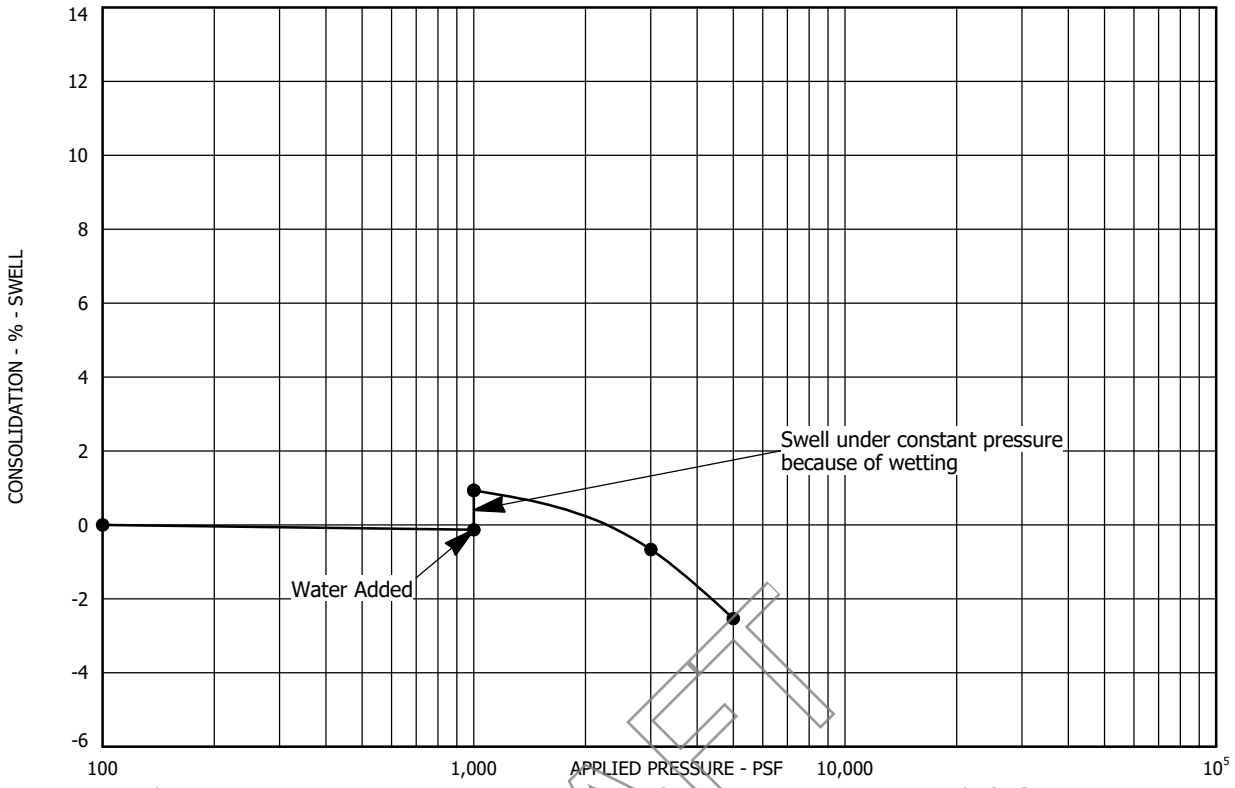
DRAFT



Sample Location: Test Boring No. 65 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 13

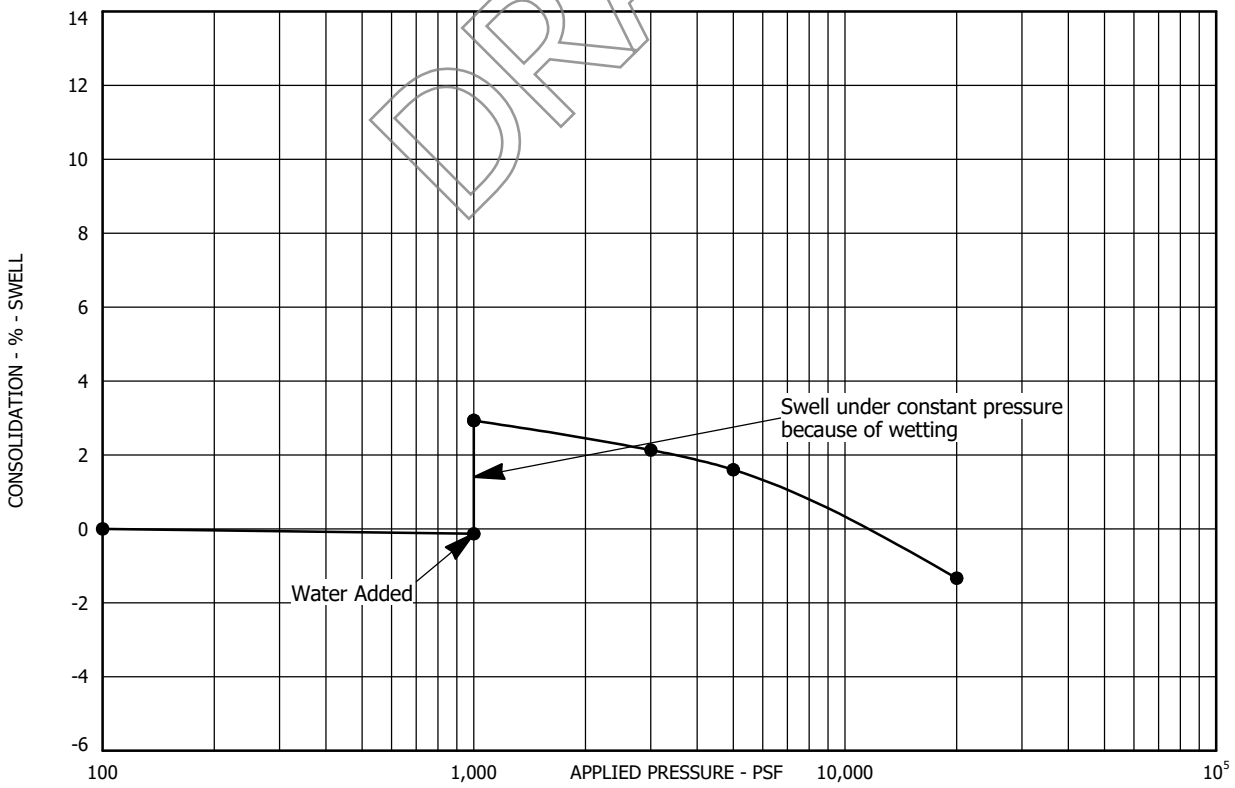
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-84
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 66 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 10

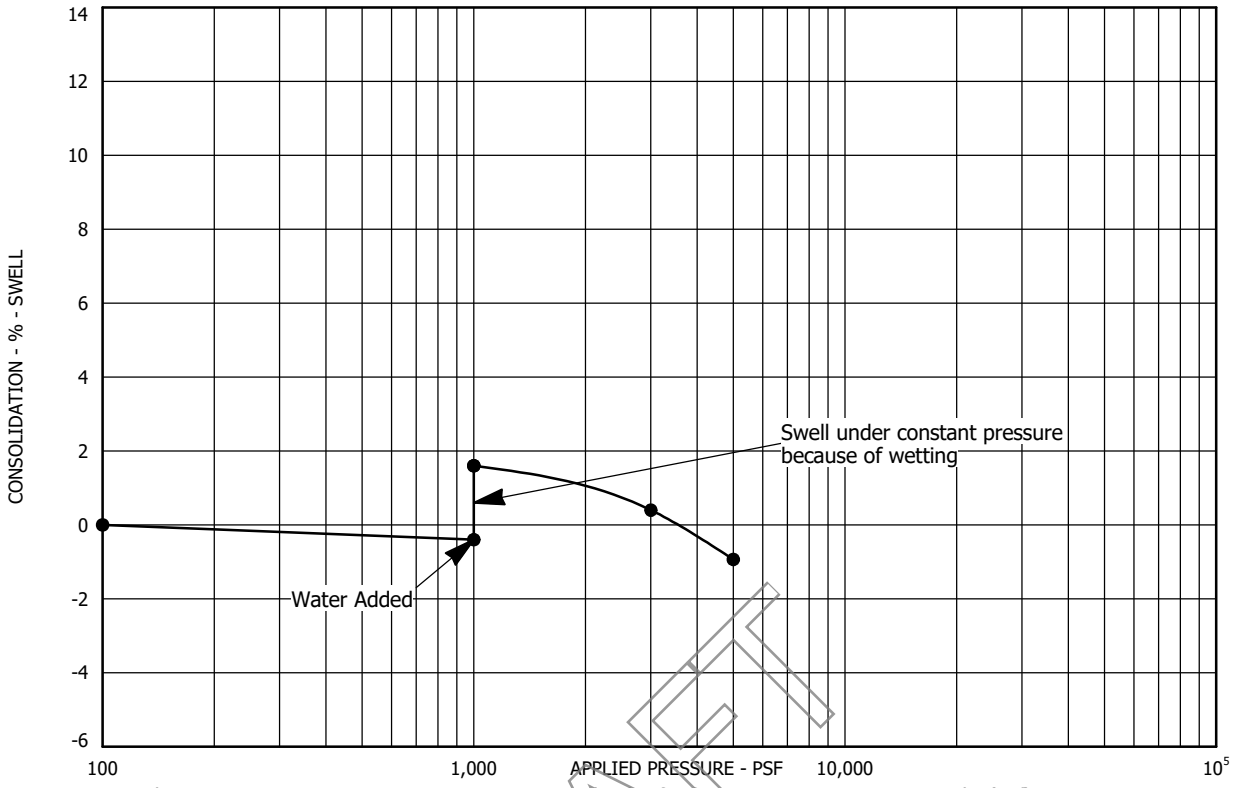
DRAFT



Sample Location: Test Boring No. 66 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 129
Moisture Content (%): 11

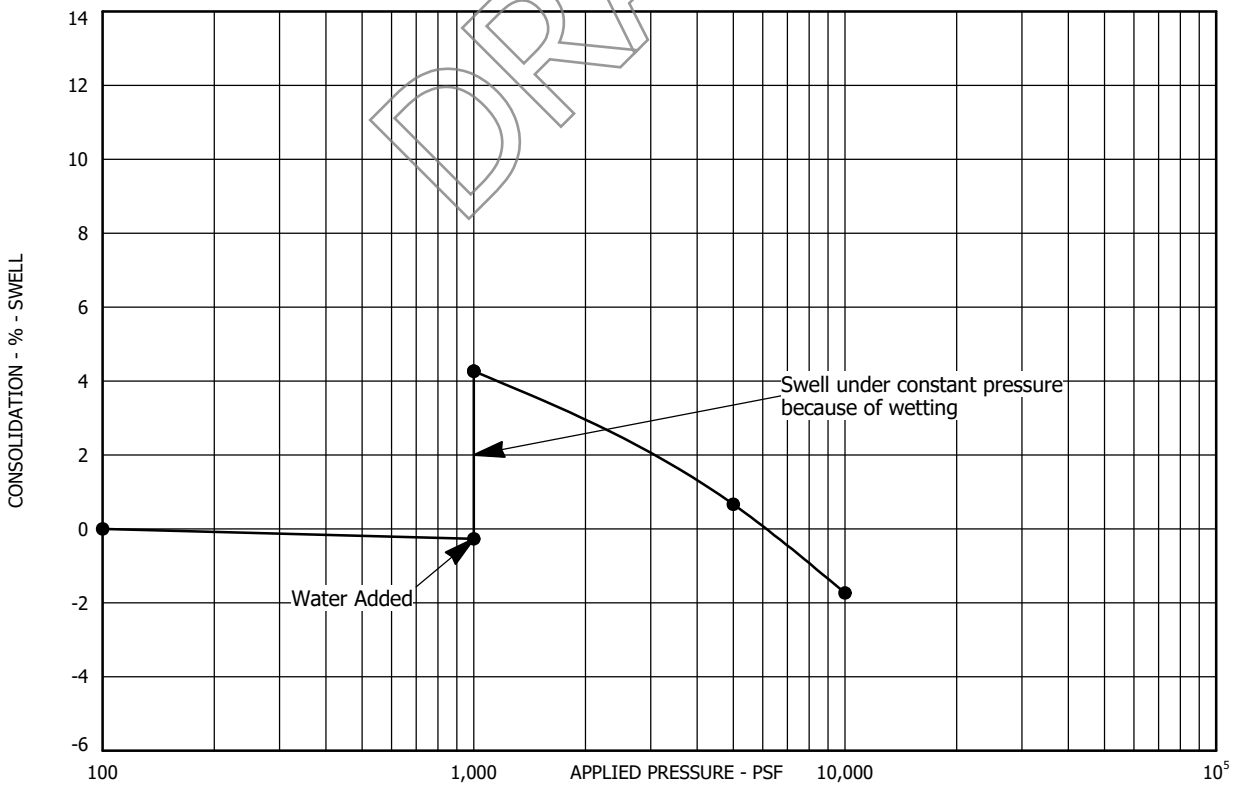
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-85
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 67 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 10

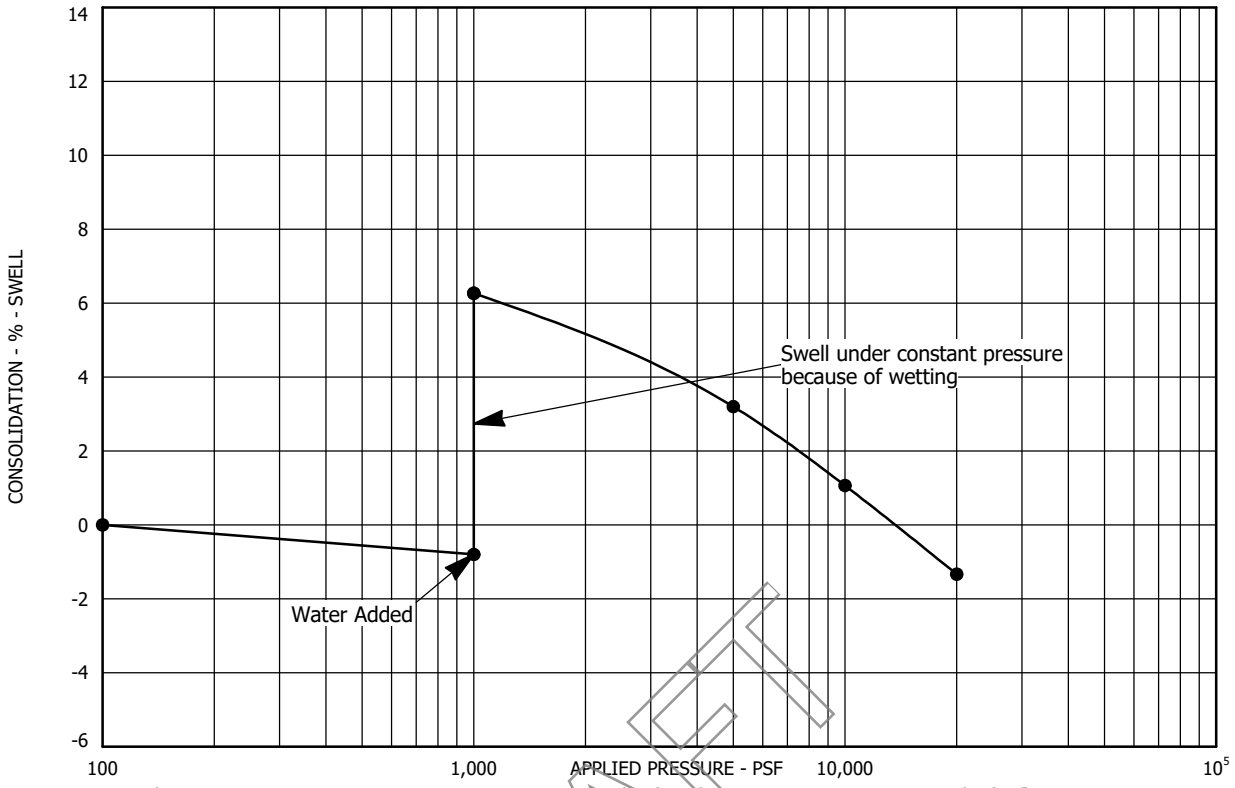
DRAFT



Sample Location: Test Boring No. 67 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 7

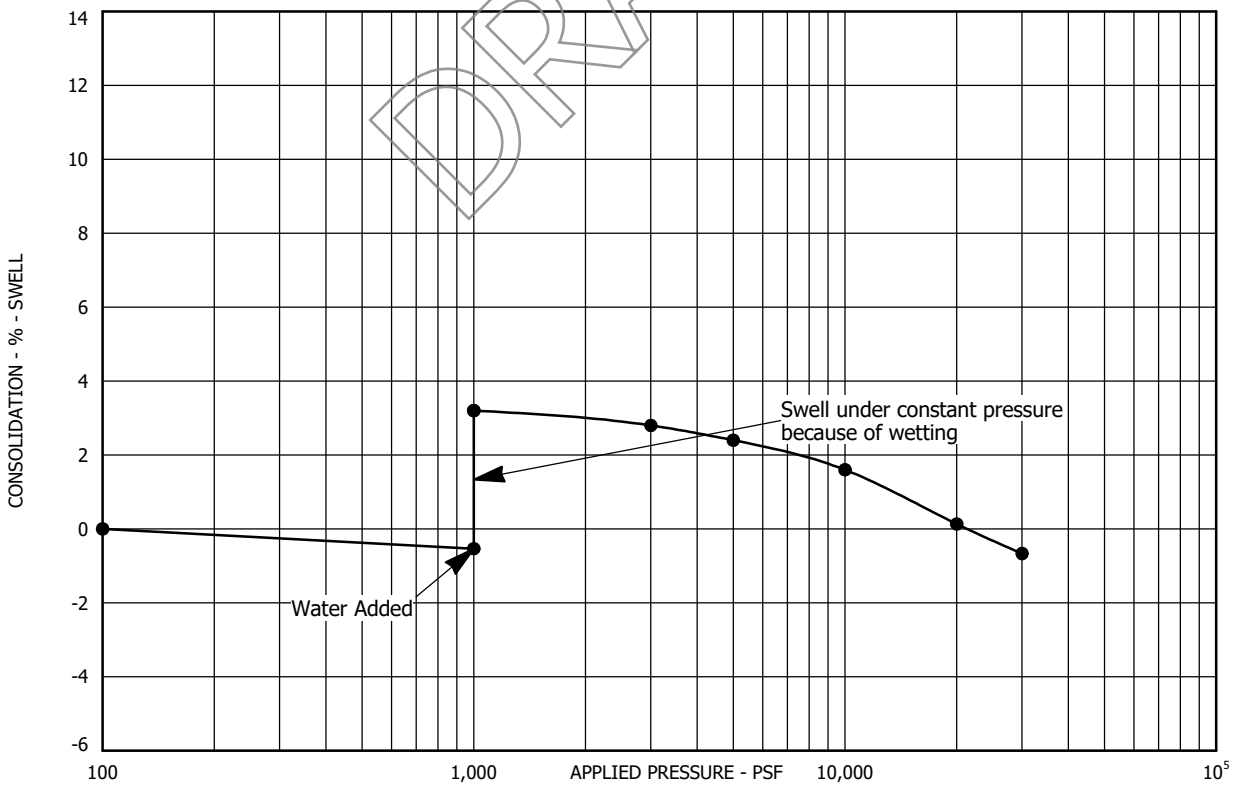
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-86
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 68 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 14

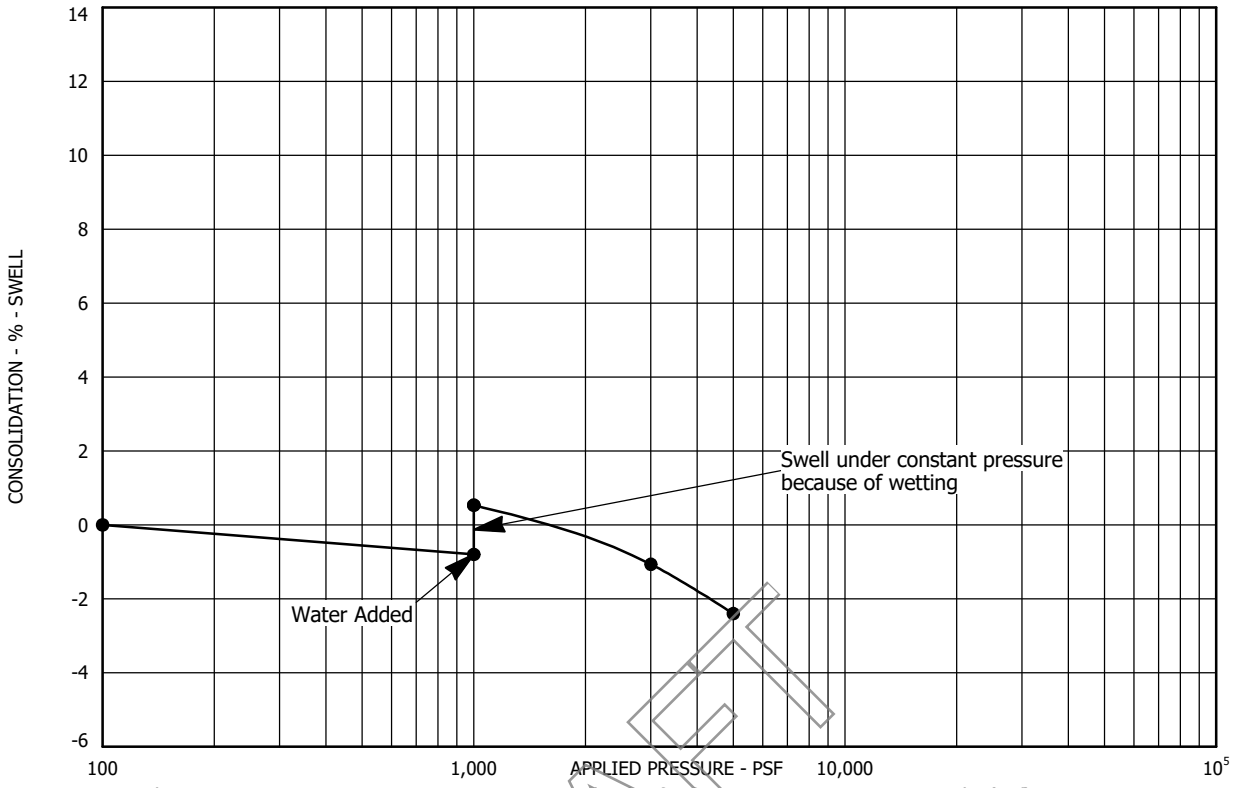
DRAFT



Sample Location: Test Boring No. 68 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 13

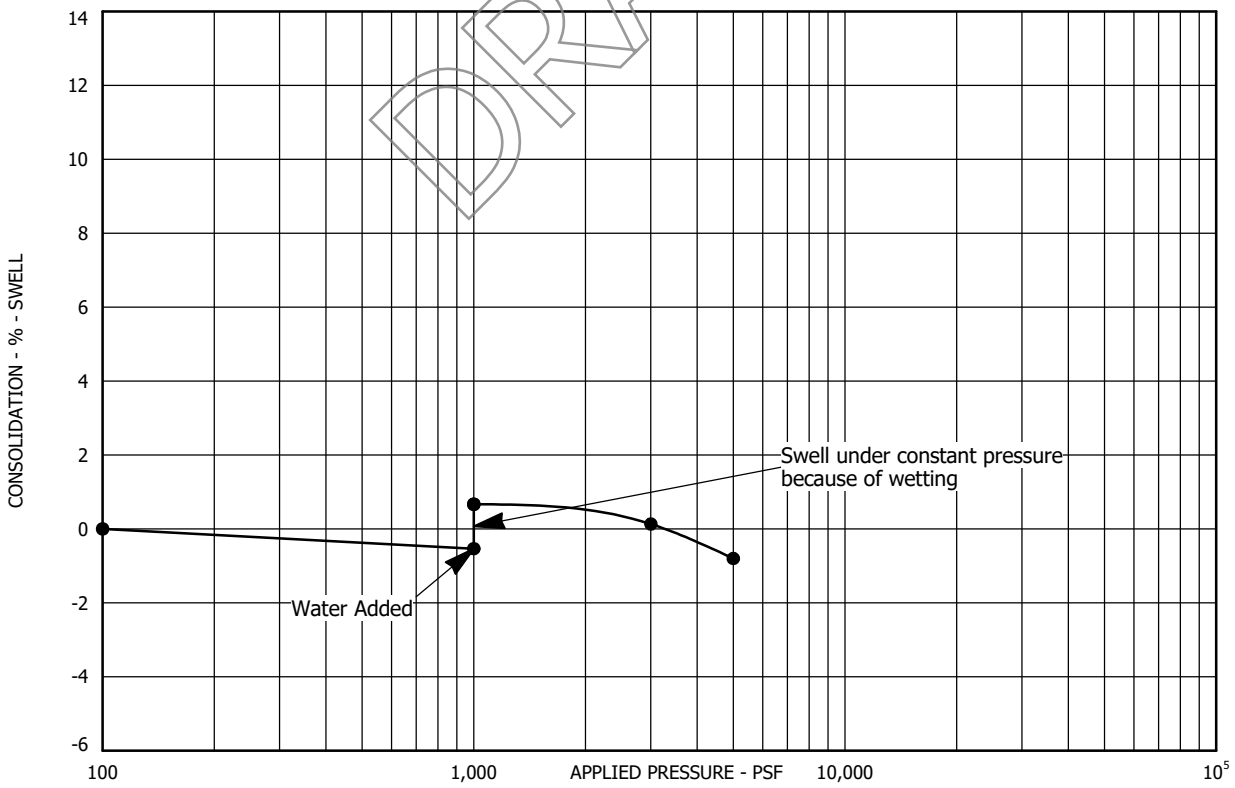
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-87
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 69 at a depth of 9 feet
Sample Description: Clay, trace sand
Dry Unit Weight (pcf): 108
Moisture Content (%): 20

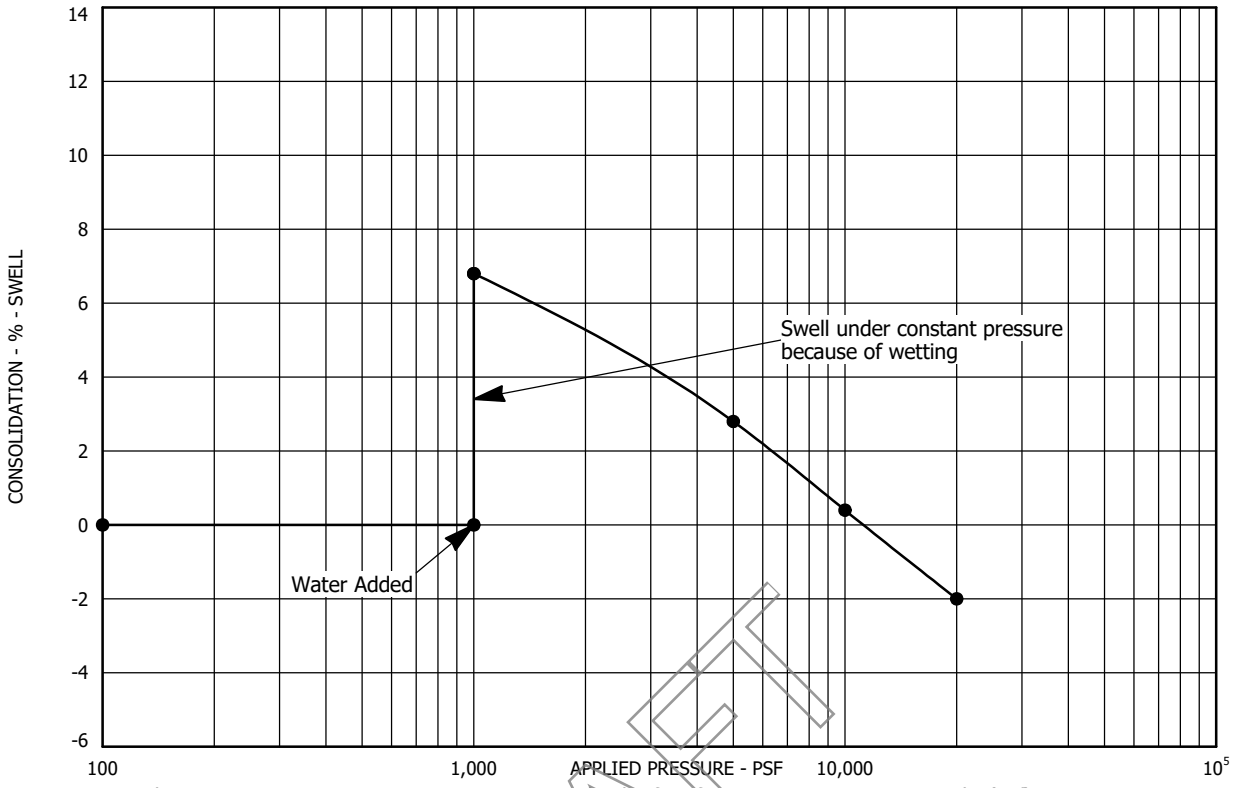
DRAFT



Sample Location: Test Boring No. 69 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 18

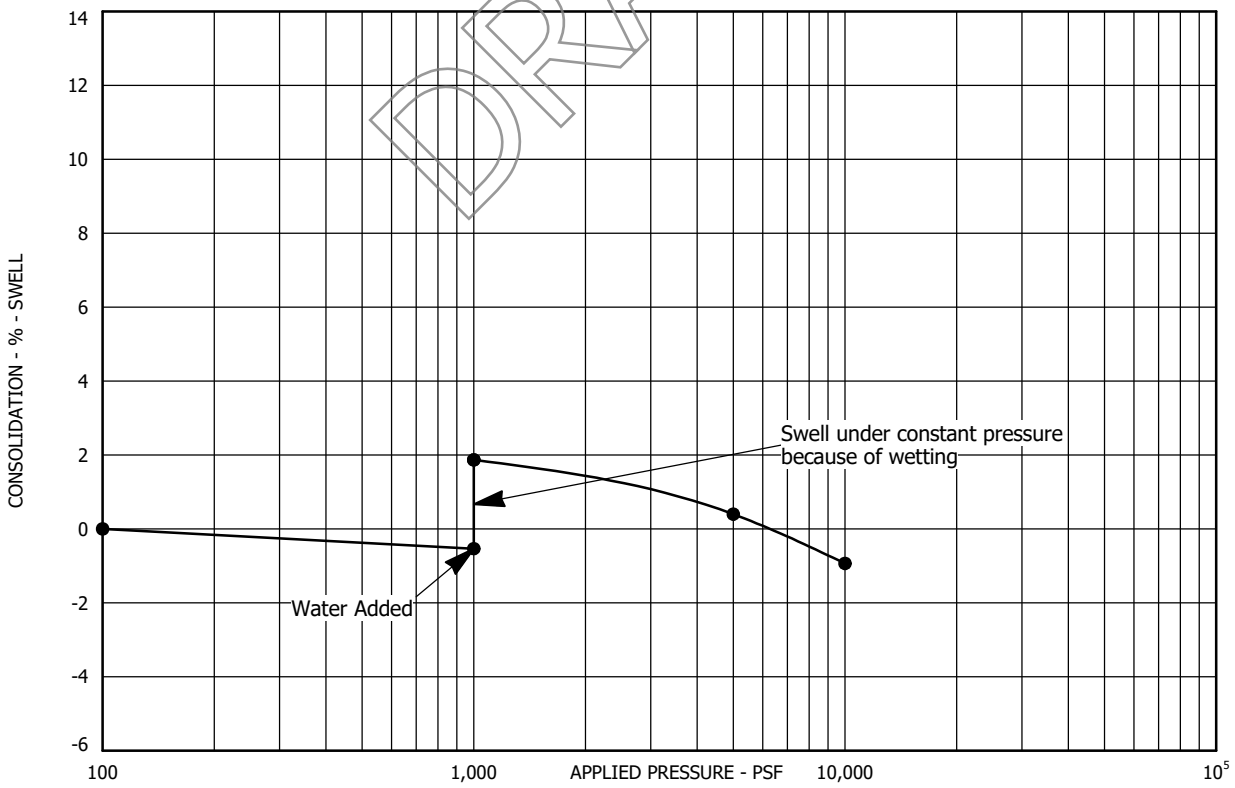
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-88
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 70 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 13

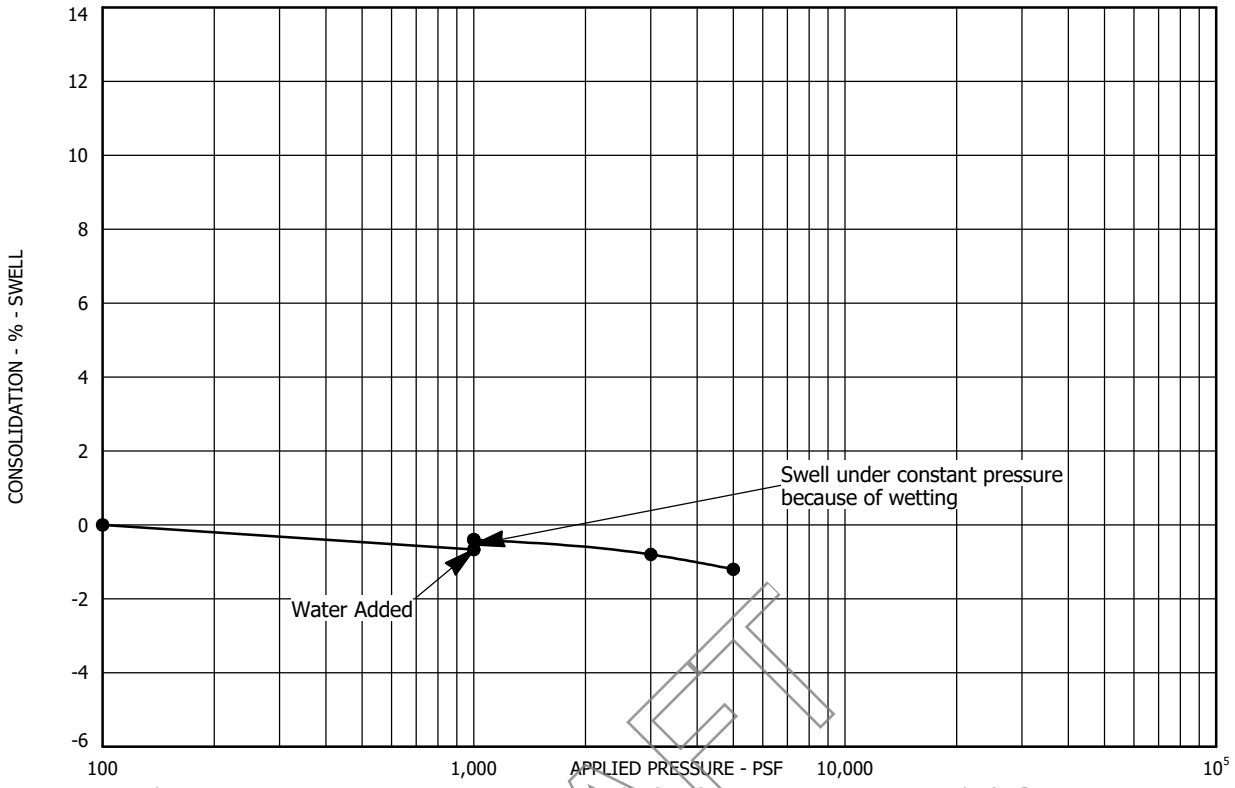
DRAFT



Sample Location: Test Boring No. 71 at a depth of 14 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 12

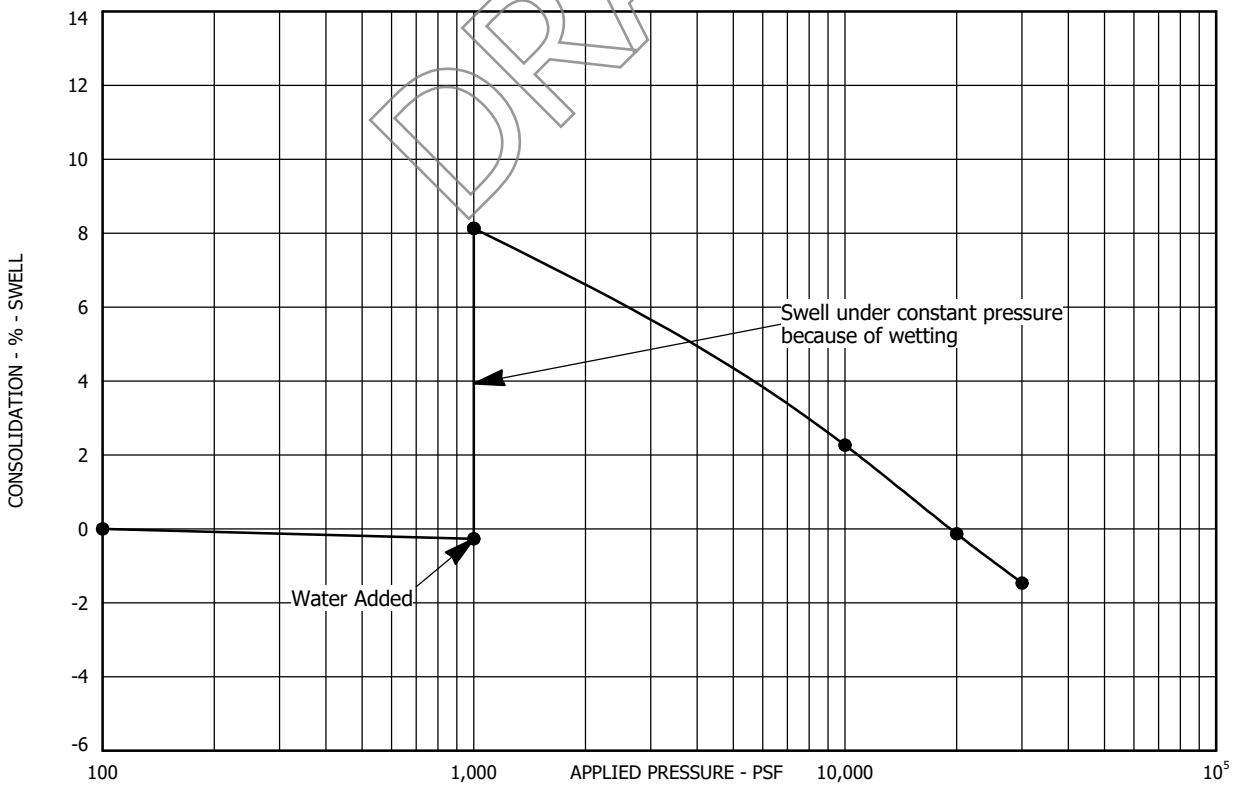
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-89
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 71 at a depth of 24 feet
Sample Description: Sandstone, clayey
Dry Unit Weight (pcf): 123
Moisture Content (%): 12

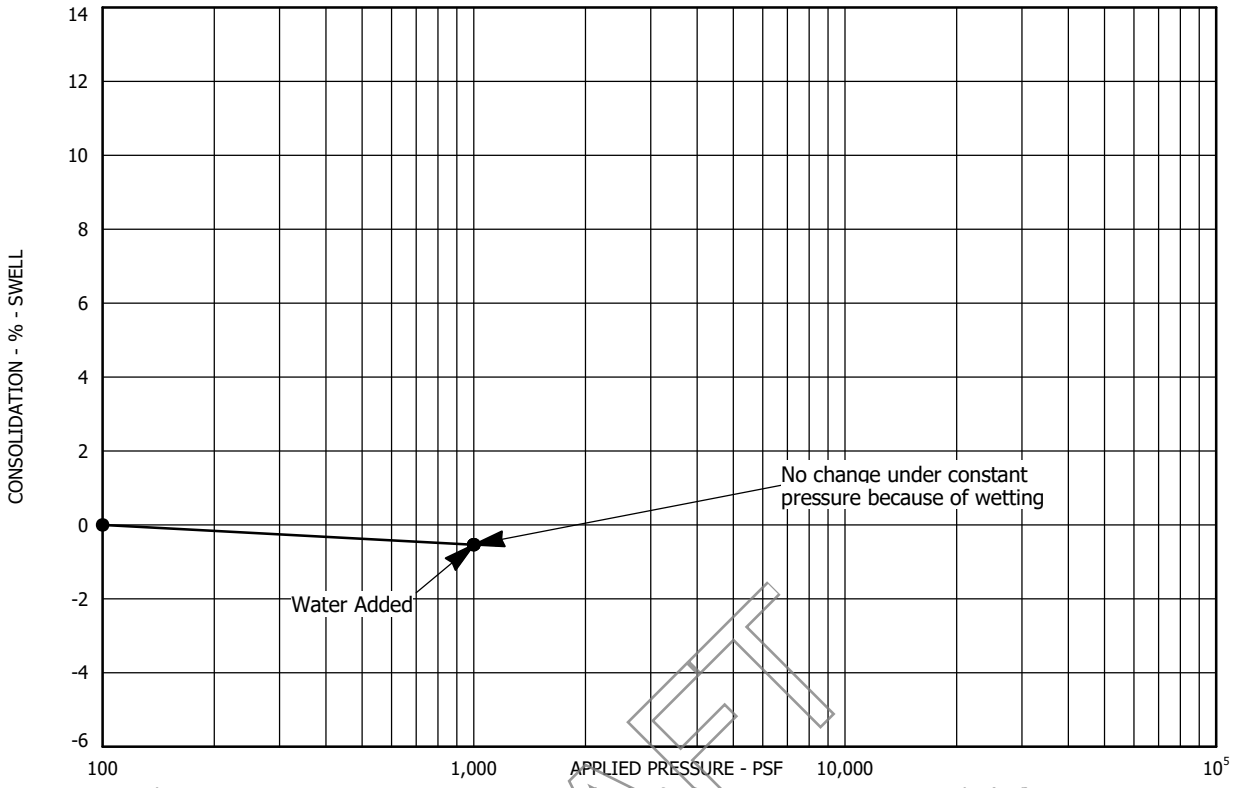
DRAFT



Sample Location: Test Boring No. 71 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 10

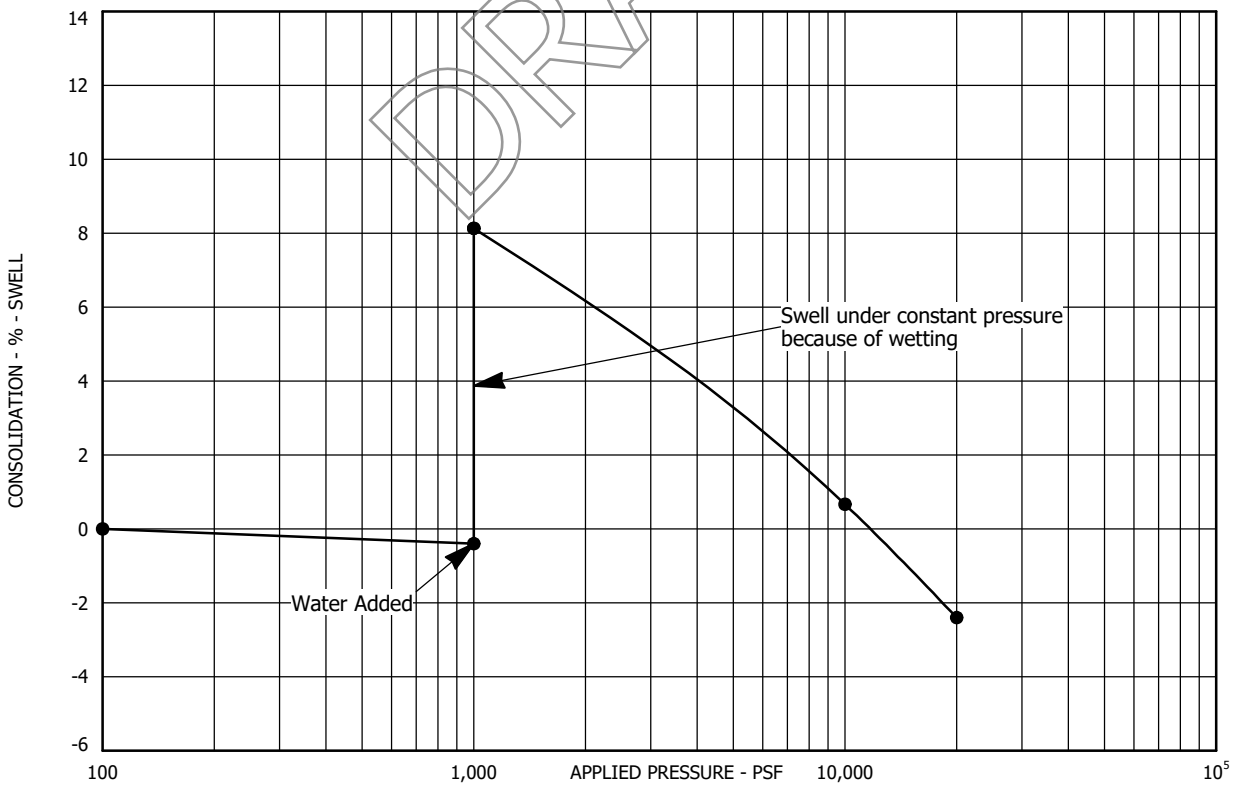
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-90
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 72 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 15

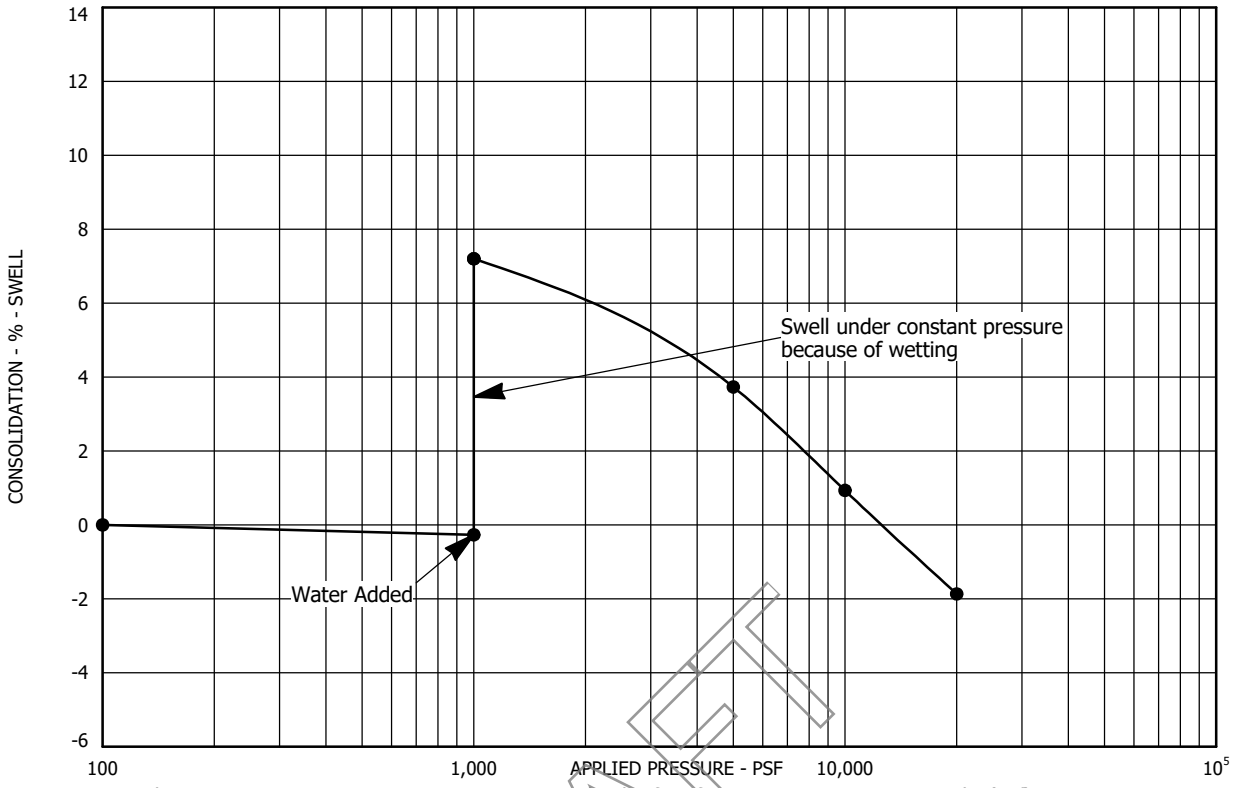
DRAFT



Sample Location: Test Boring No. 72 at a depth of 19 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 114
Moisture Content (%): 18

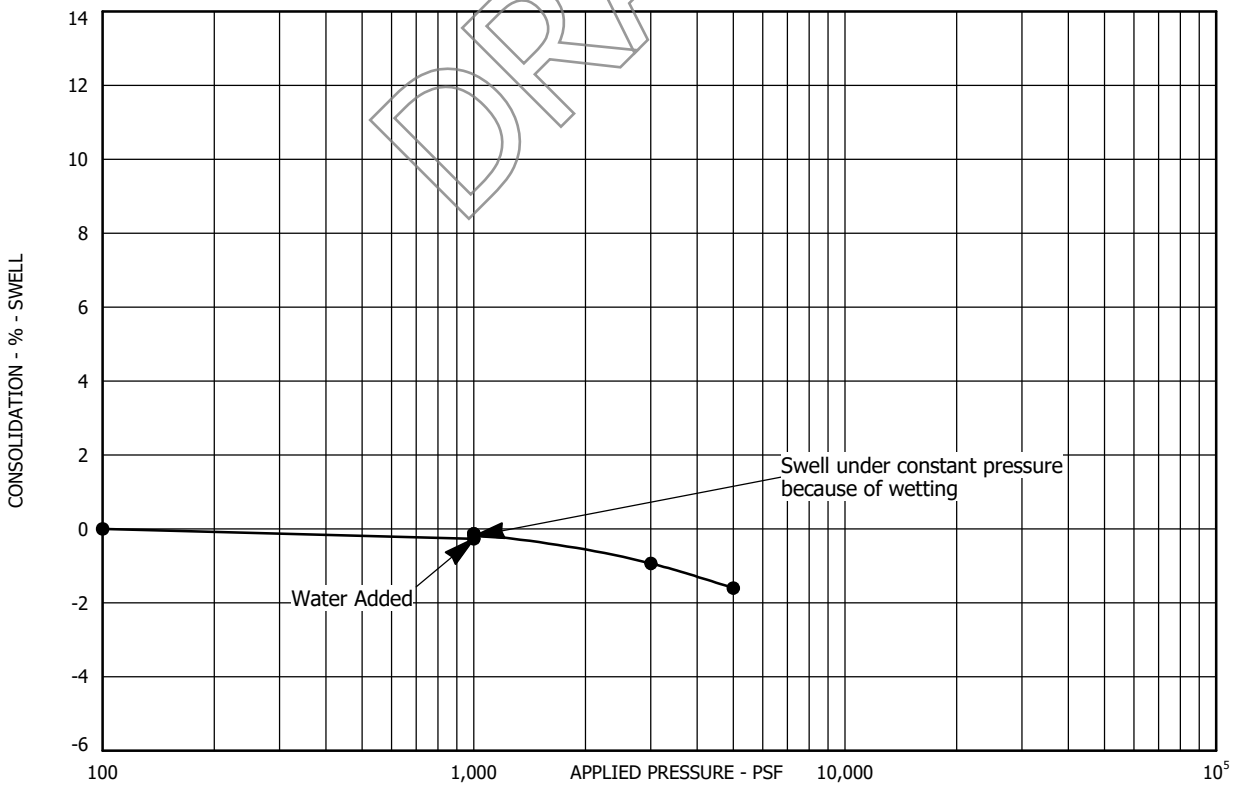
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-91
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 72 at a depth of 29 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 116
Moisture Content (%): 15

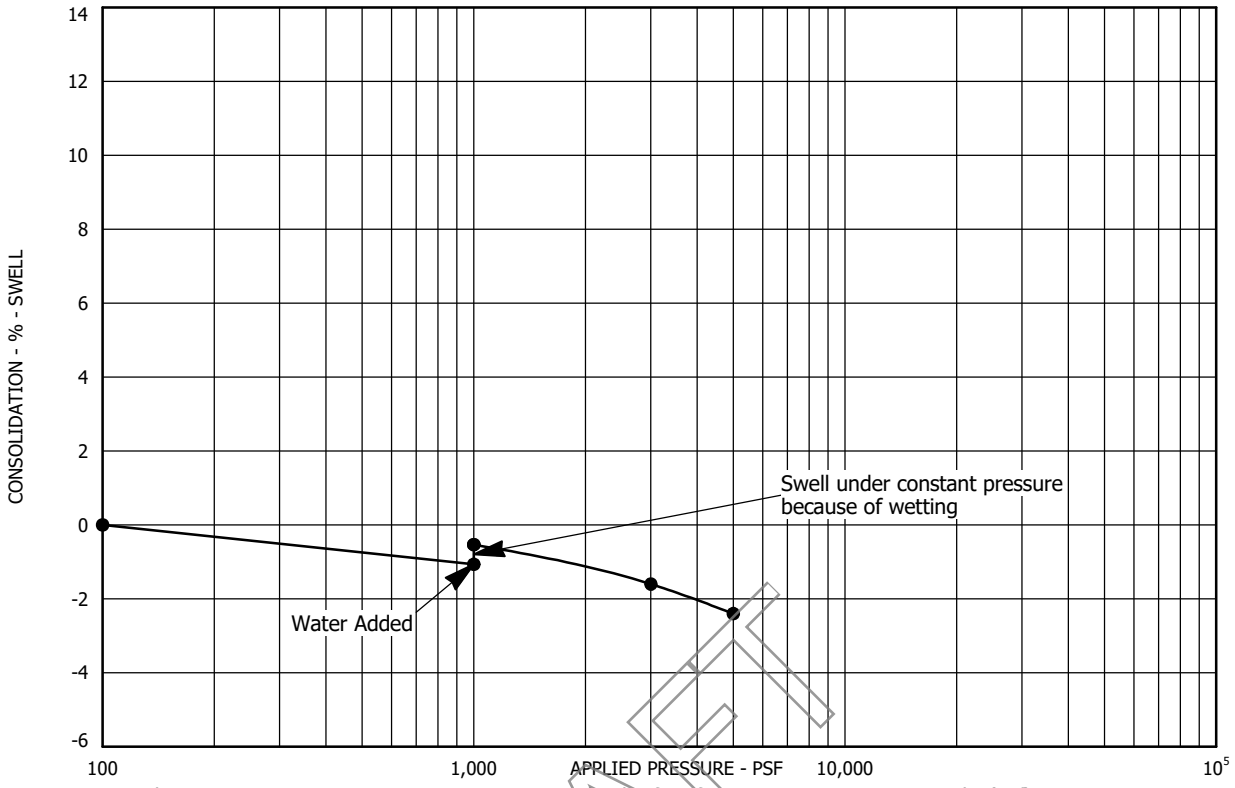
DRAFT



Sample Location: Test Boring No. 73 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 15

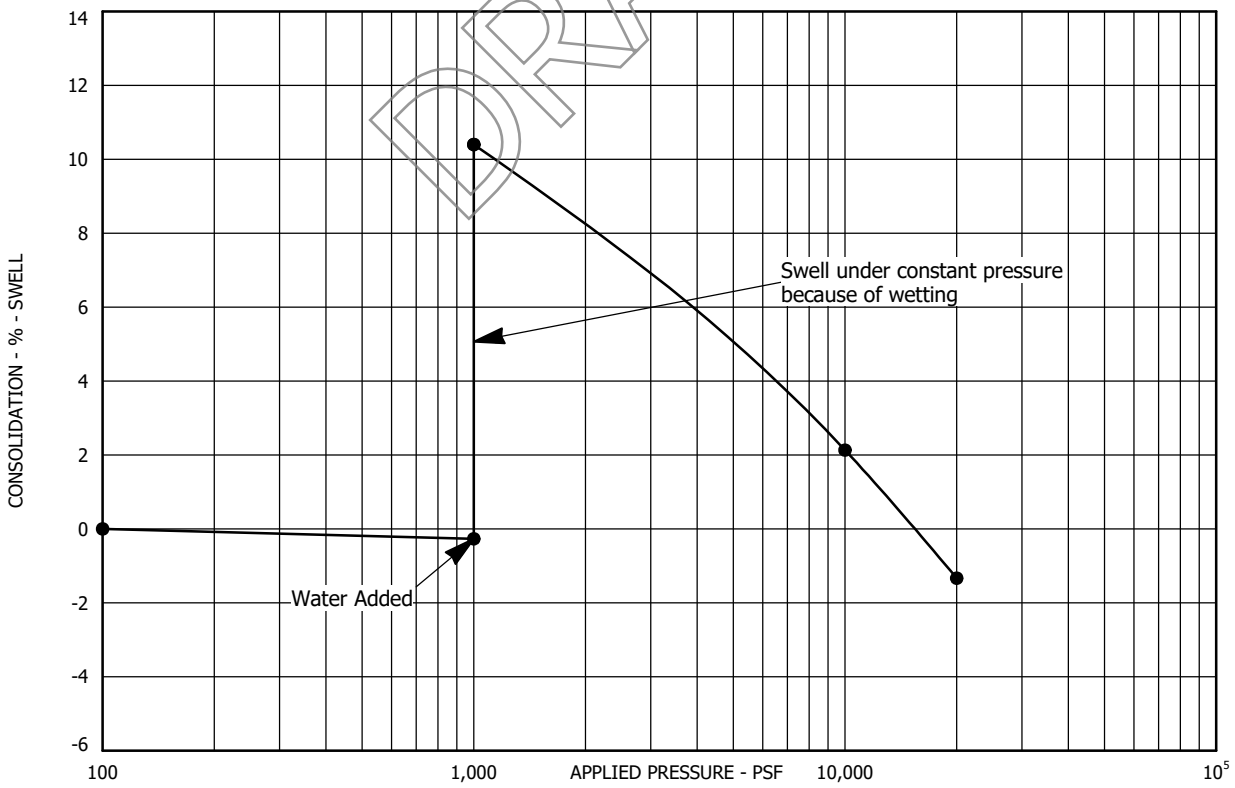
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-92
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 73 at a depth of 14 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

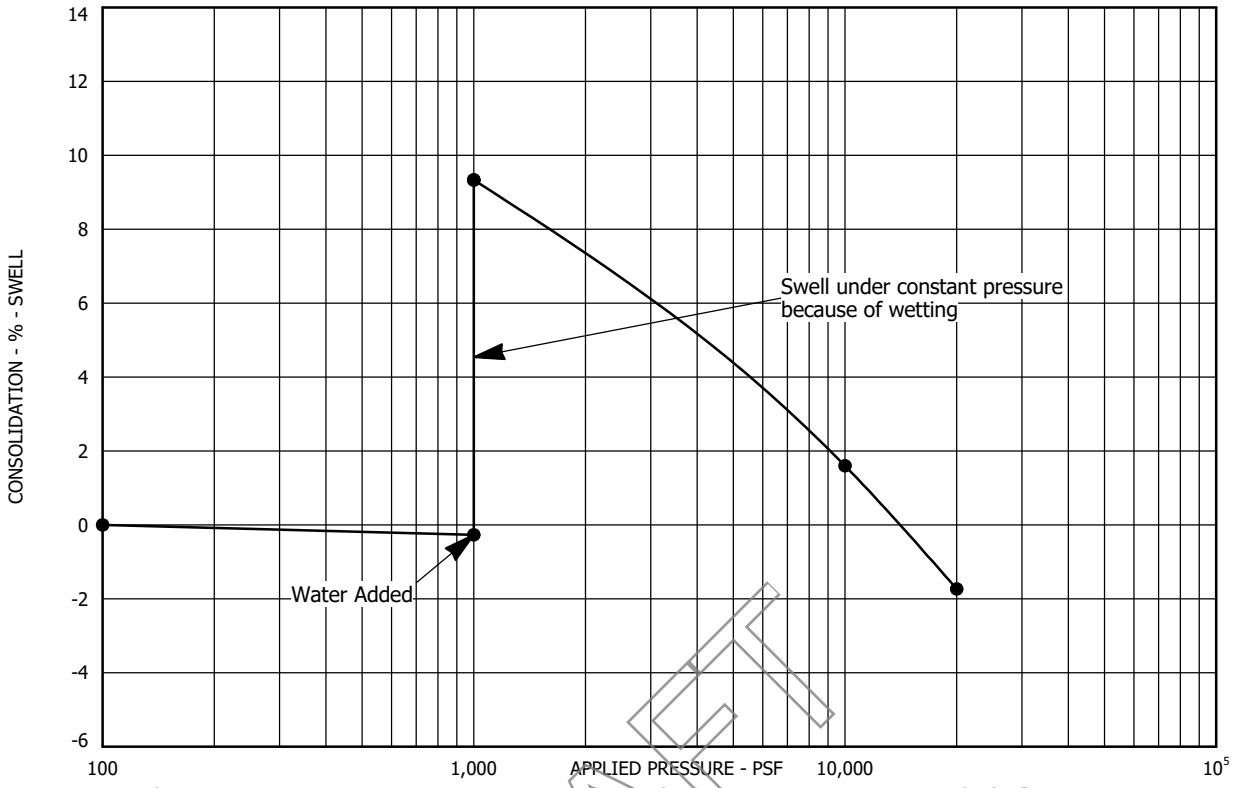
DRAFT



Sample Location: Test Boring No. 73 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 19

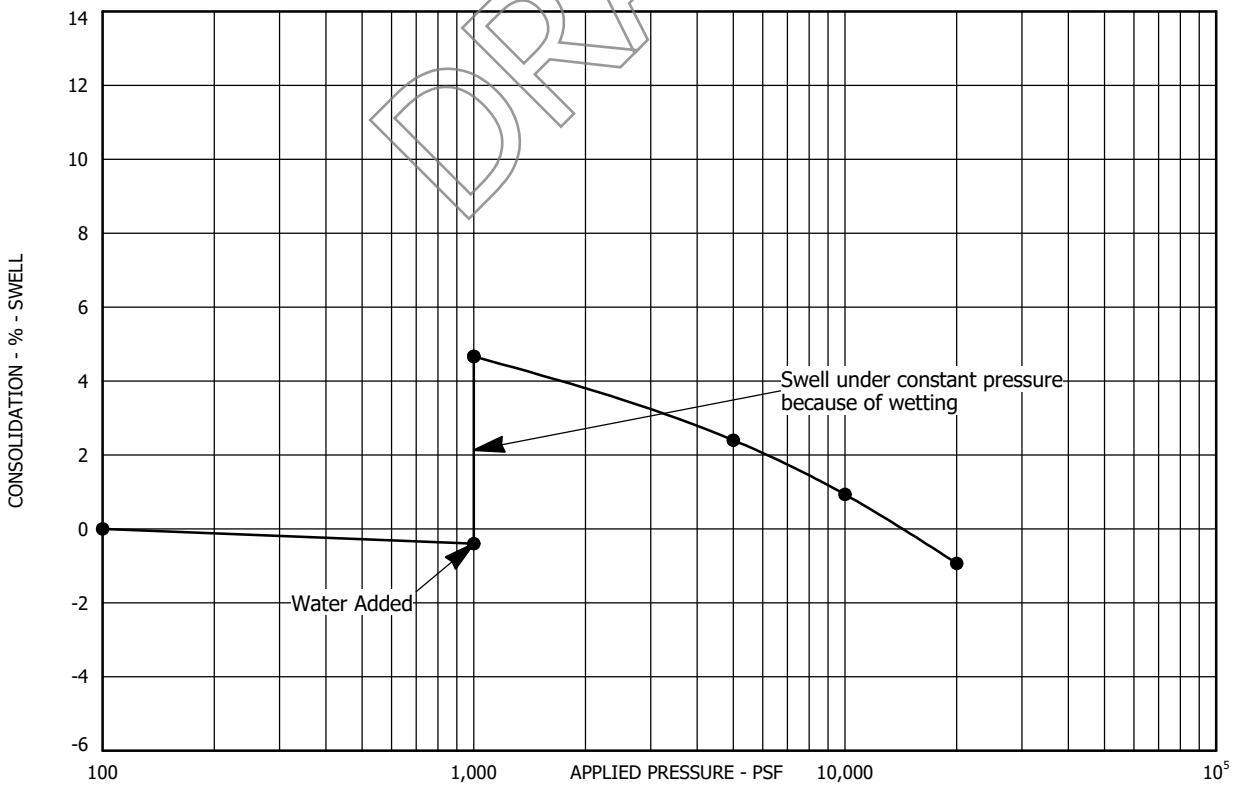
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-93
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 74 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 16

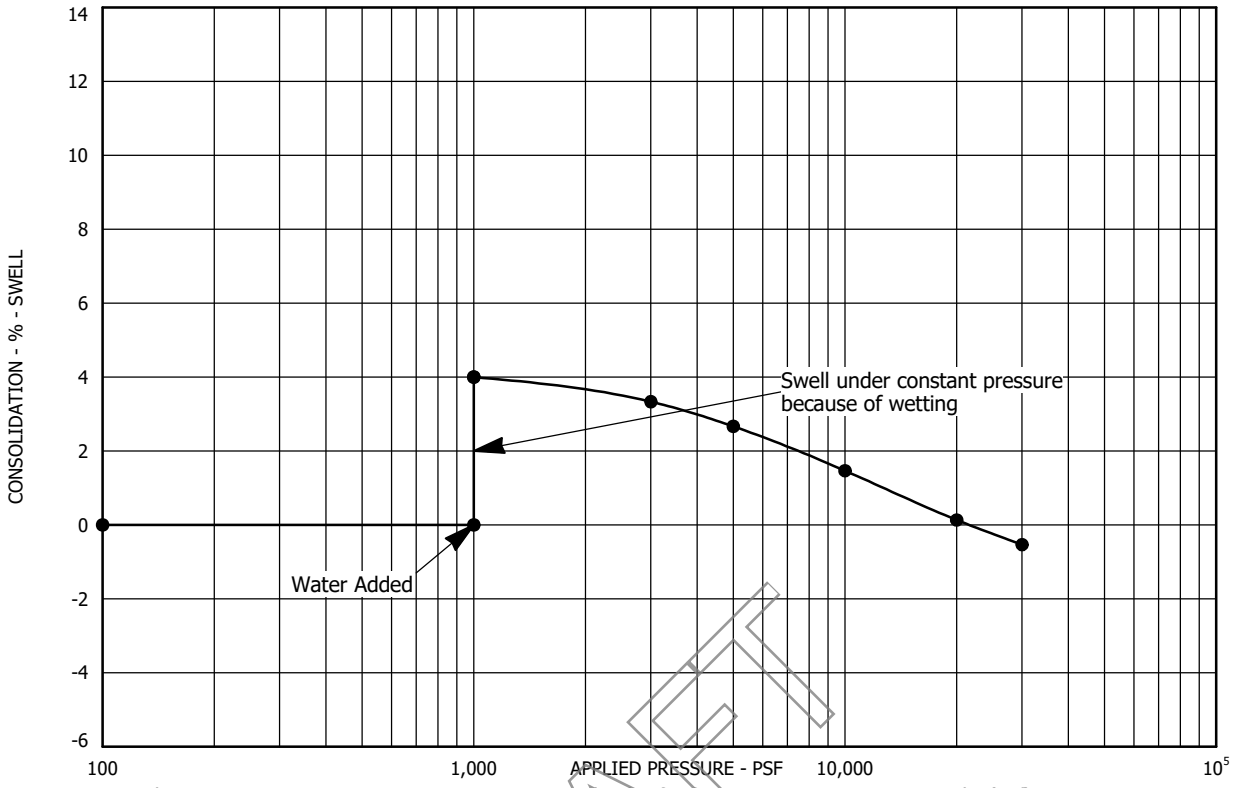
DRAFT



Sample Location: Test Boring No. 74 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 13

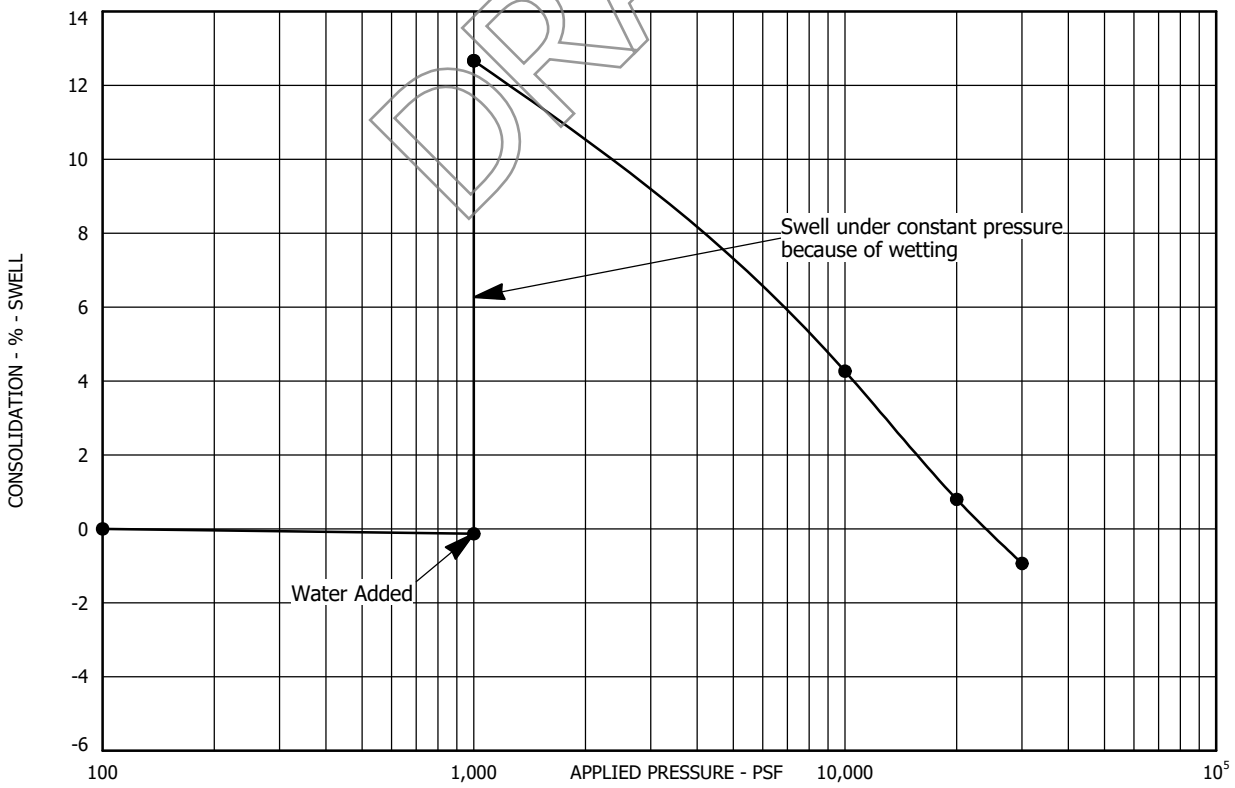
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-94
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 75 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 125
Moisture Content (%): 10

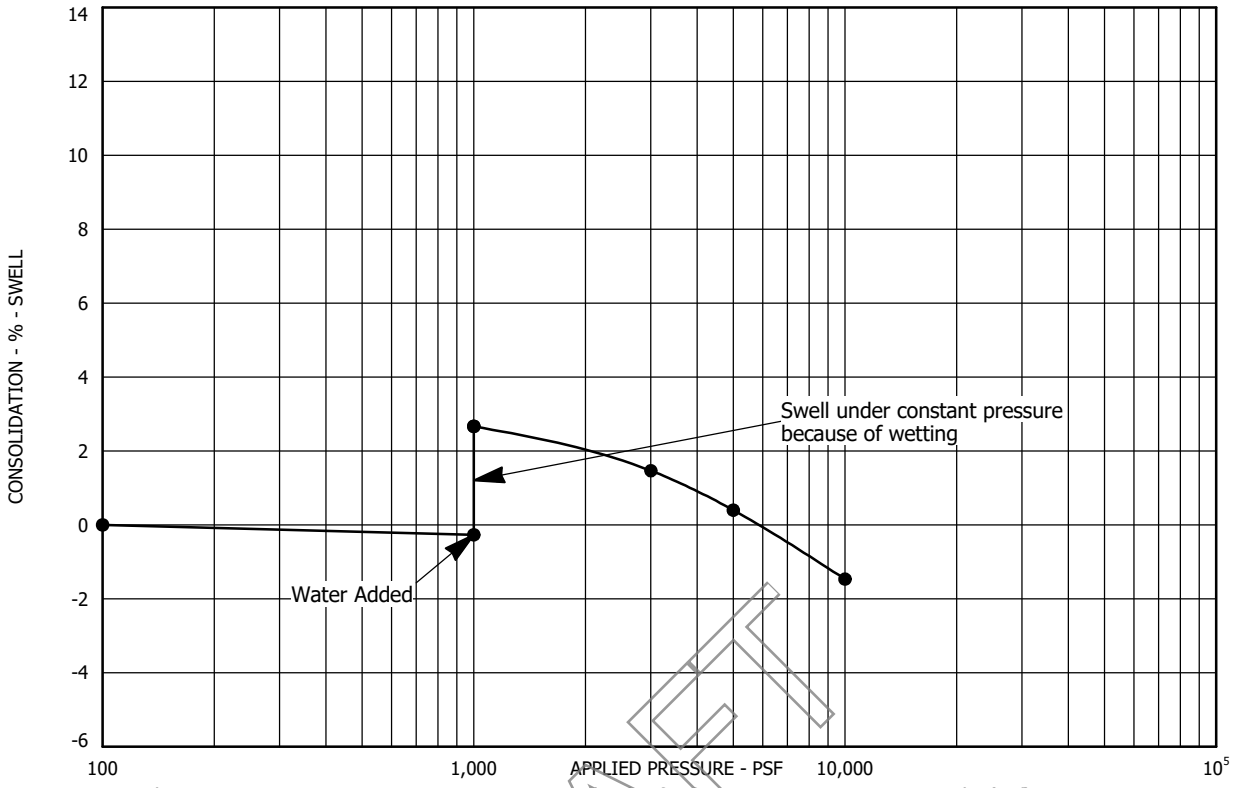
DRAFT



Sample Location: Test Boring No. 75 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 12

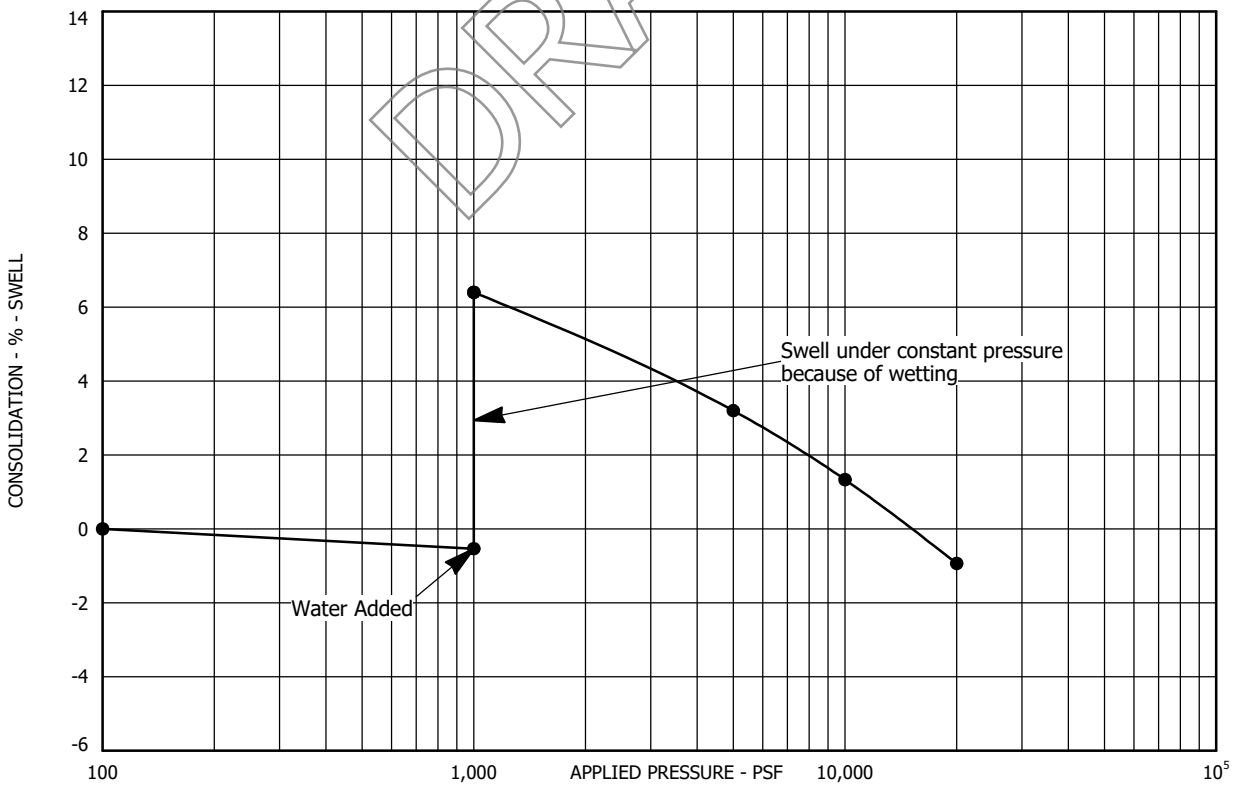
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-95
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 76 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 9

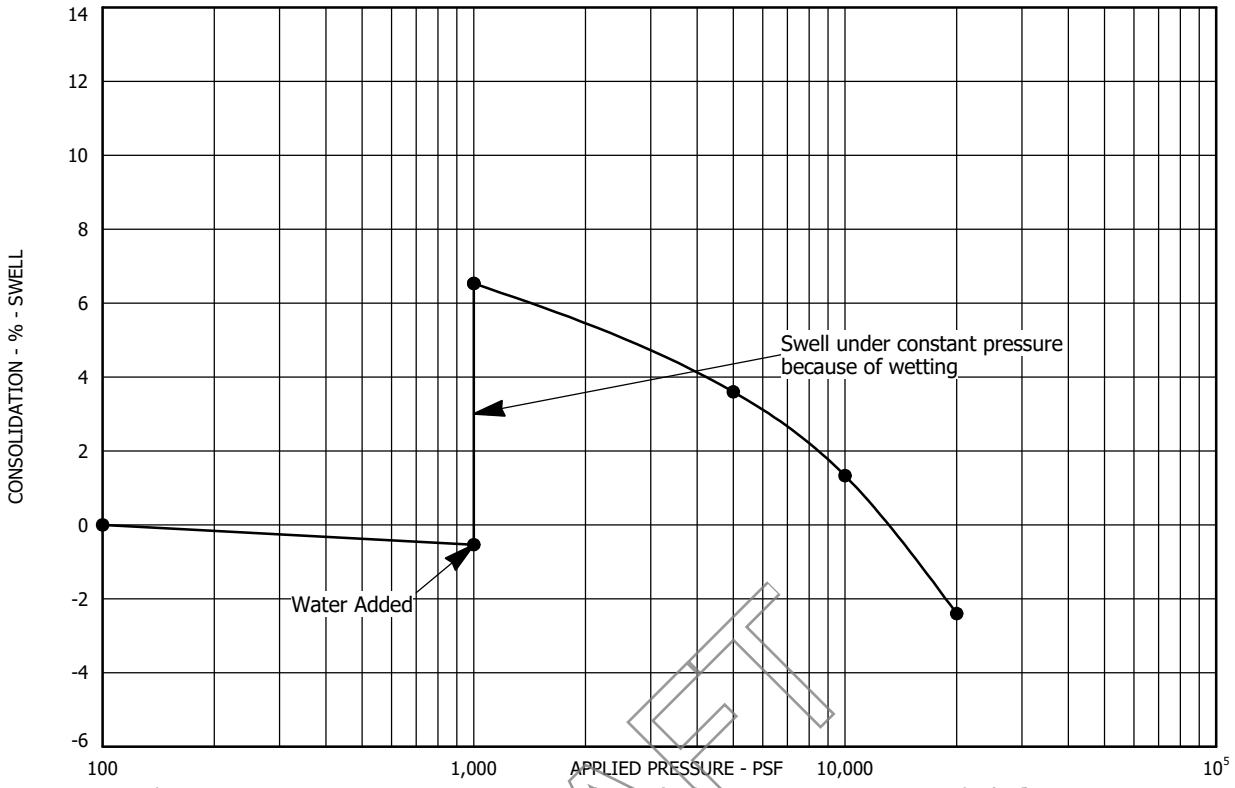
DRAFT



Sample Location: Test Boring No. 76 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

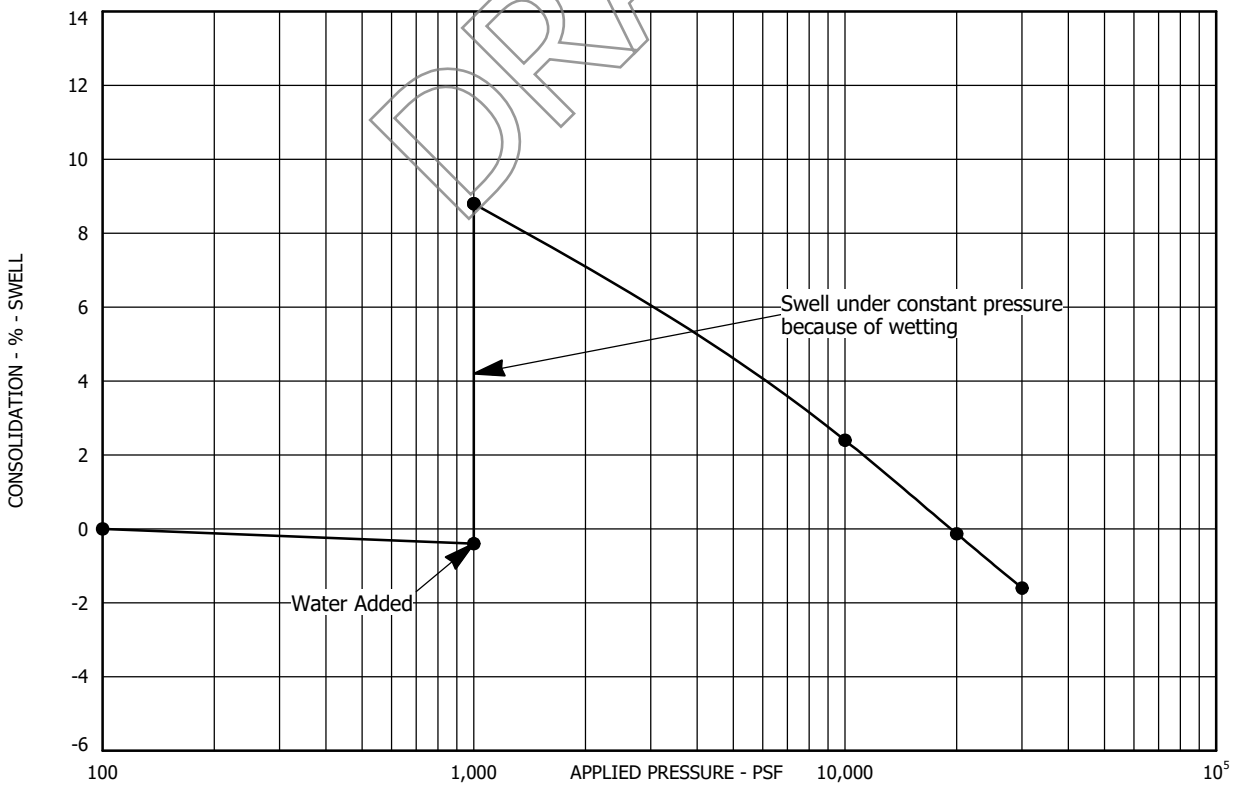
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-96
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 77 at a depth of 4 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 9

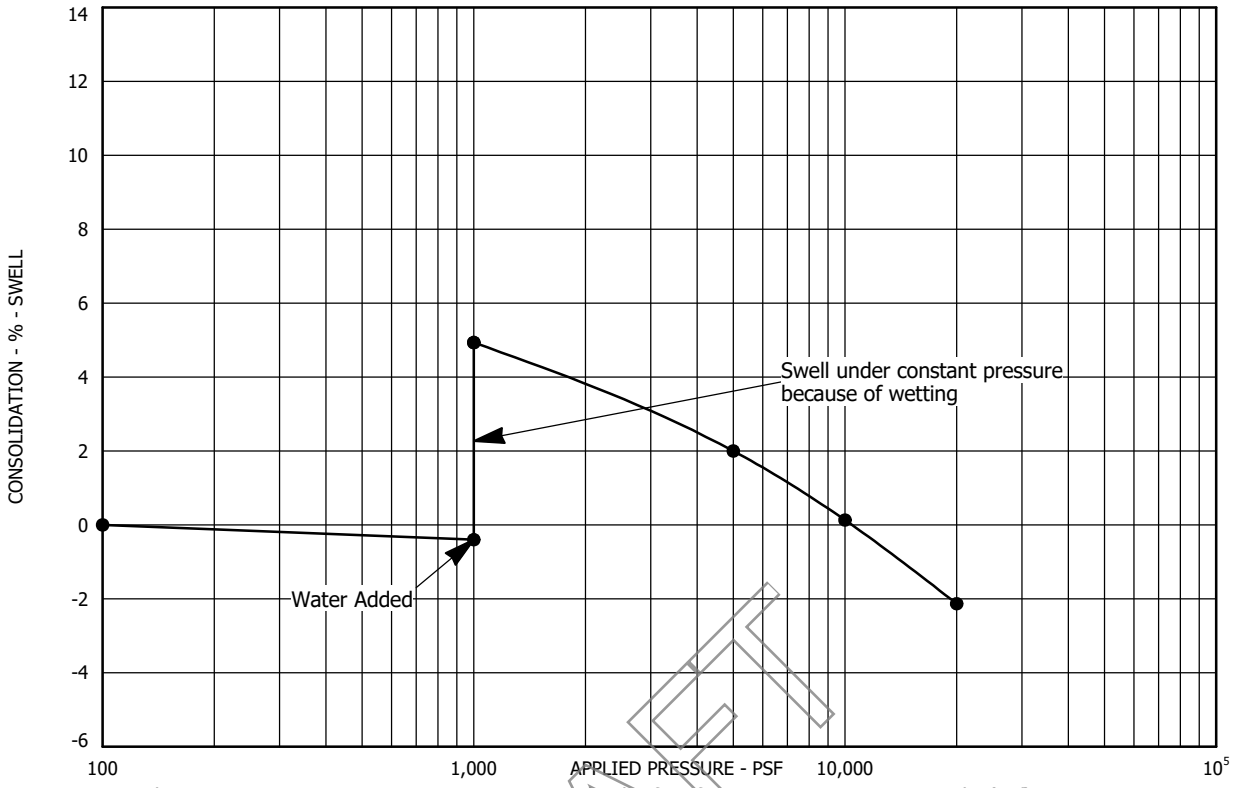
DRAFT



Sample Location: Test Boring No. 77 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 11

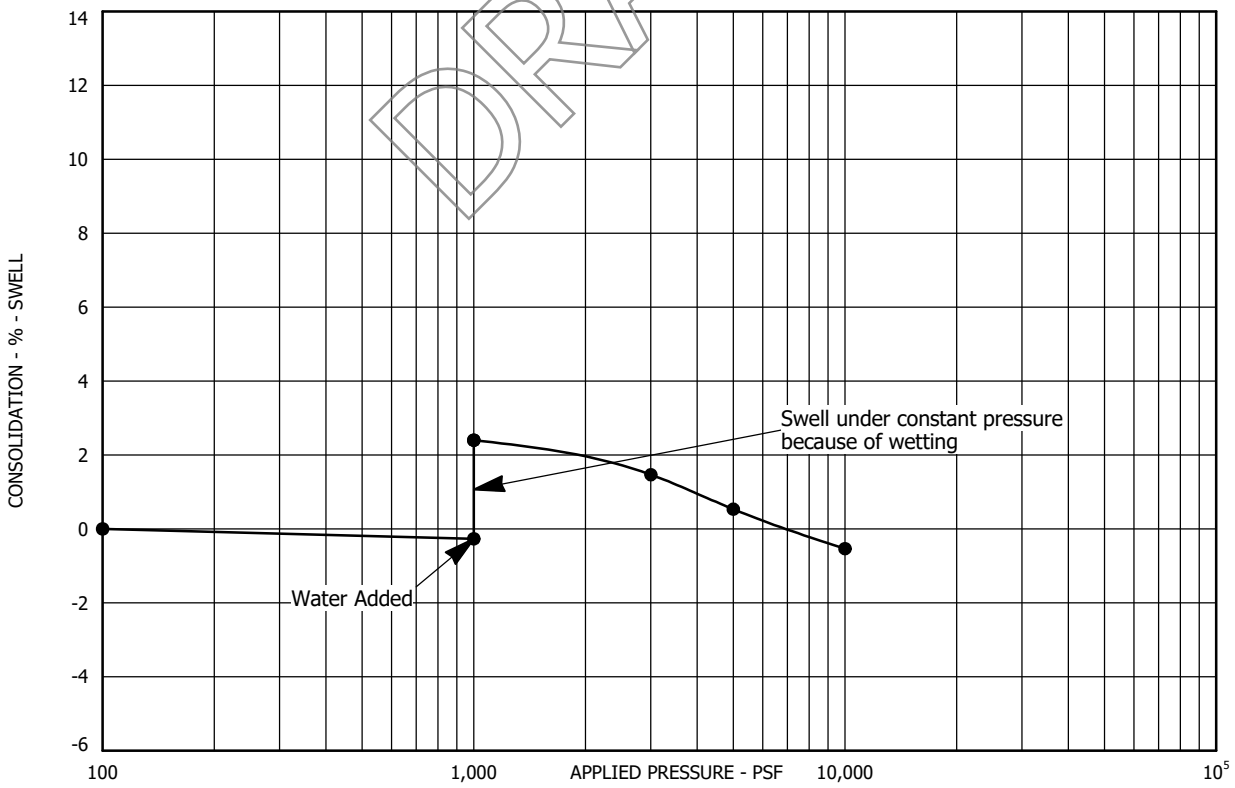
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-97
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 77 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 18

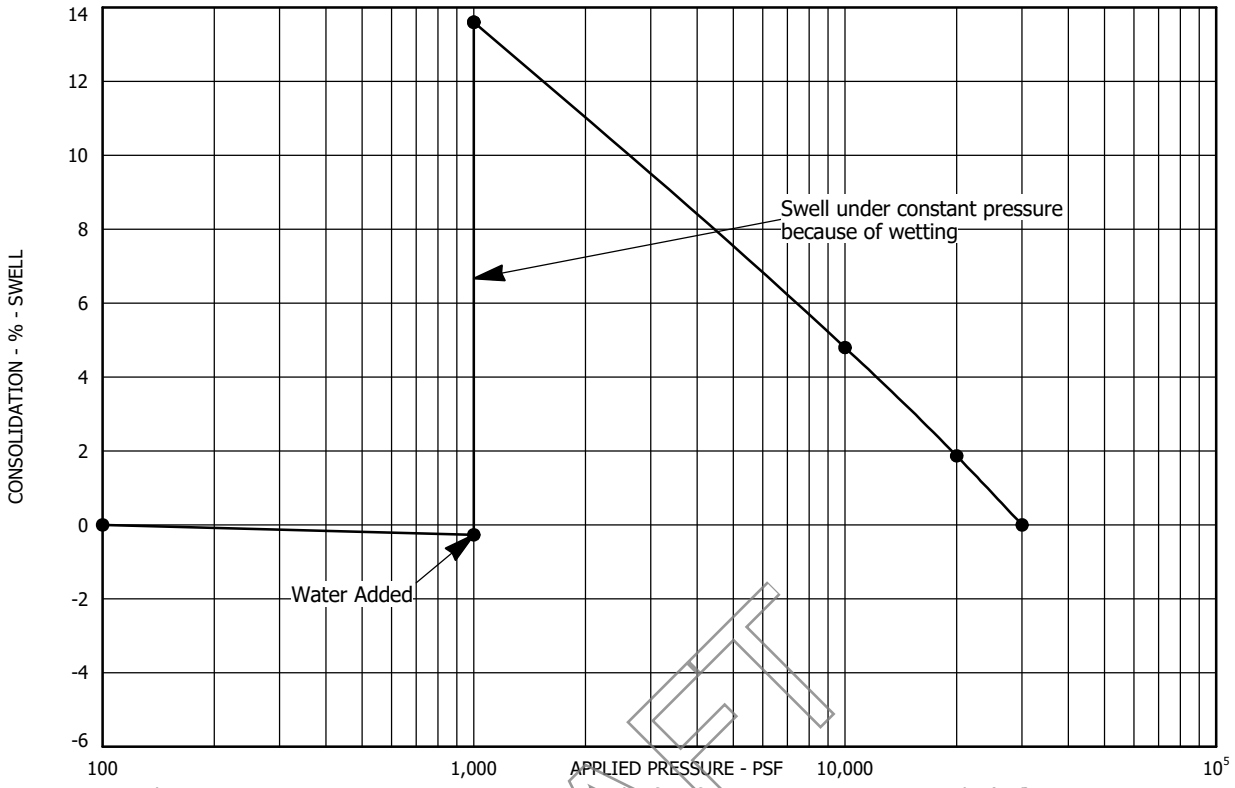
DRAFT



Sample Location: Test Boring No. 78 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 10

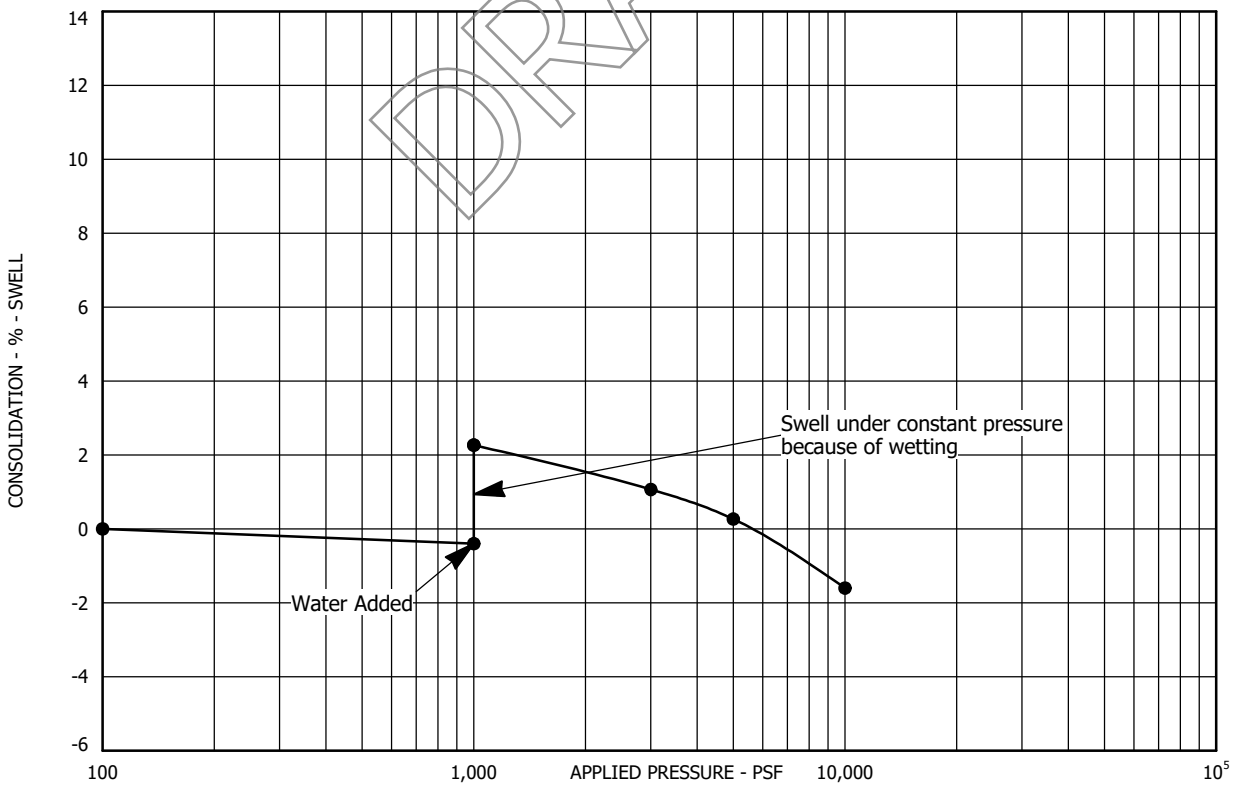
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-98
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 78 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 12

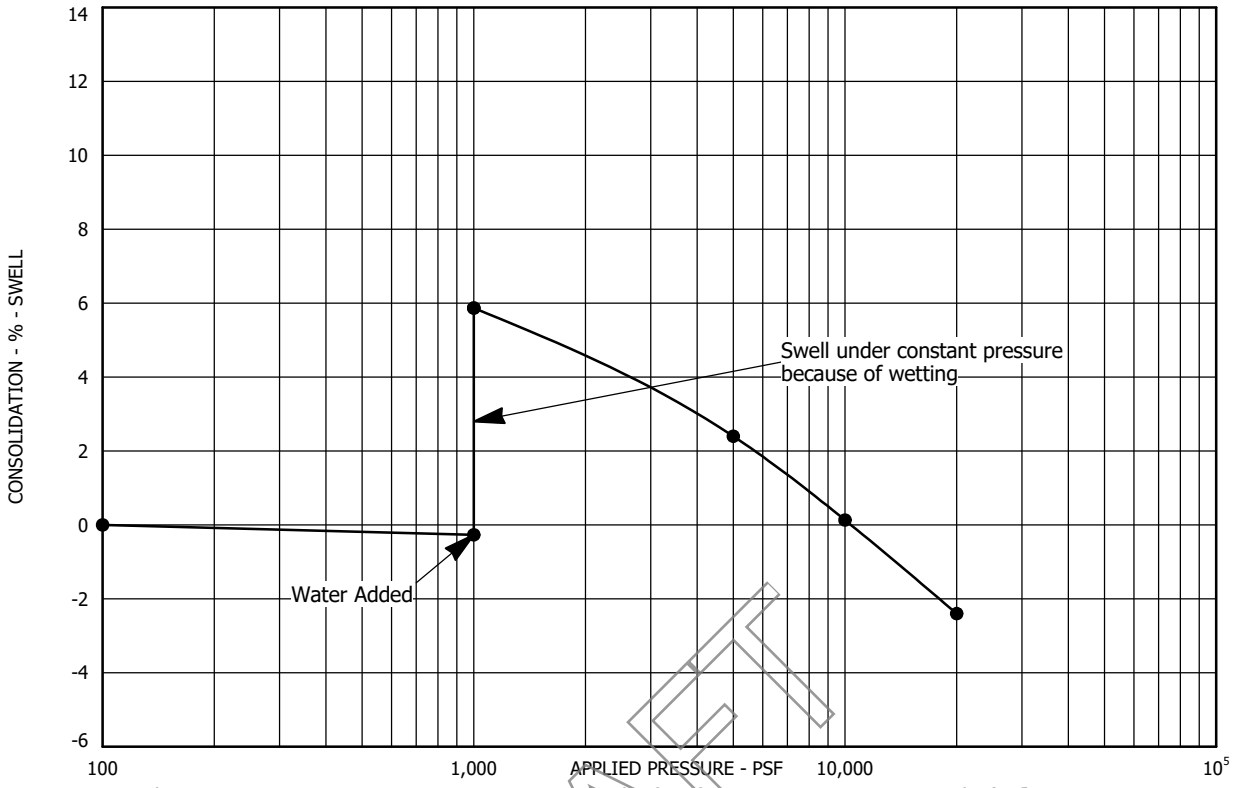
DRAFT



Sample Location: Test Boring No. 79 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 9

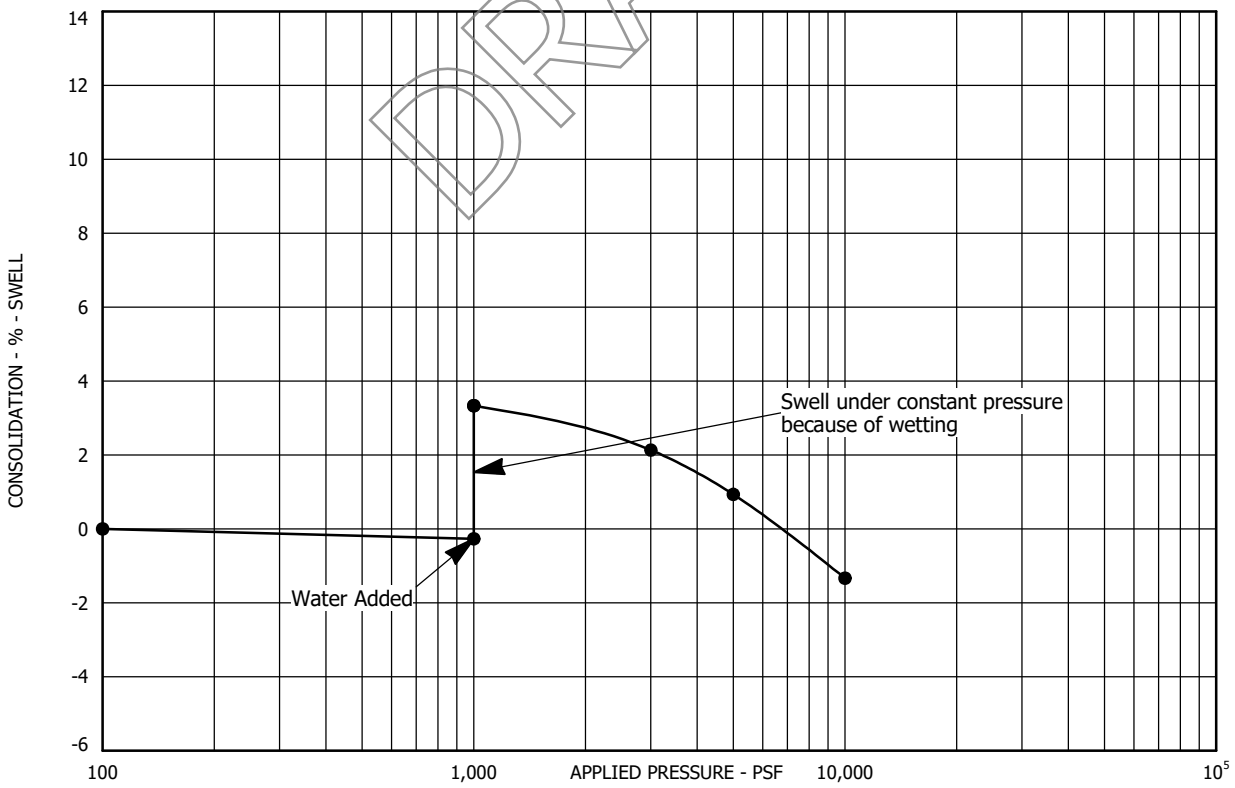
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-99
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 79 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 10

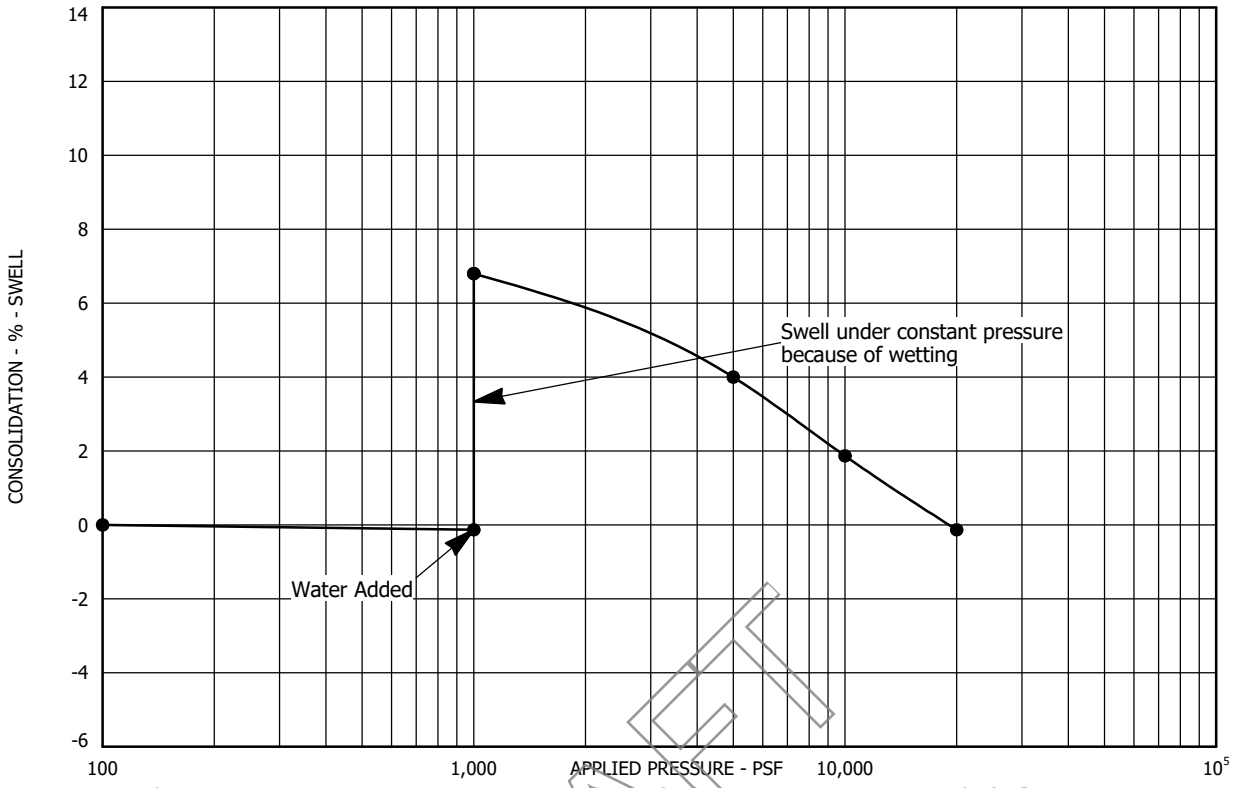
DRAFT



Sample Location: Test Boring No. 80 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 10

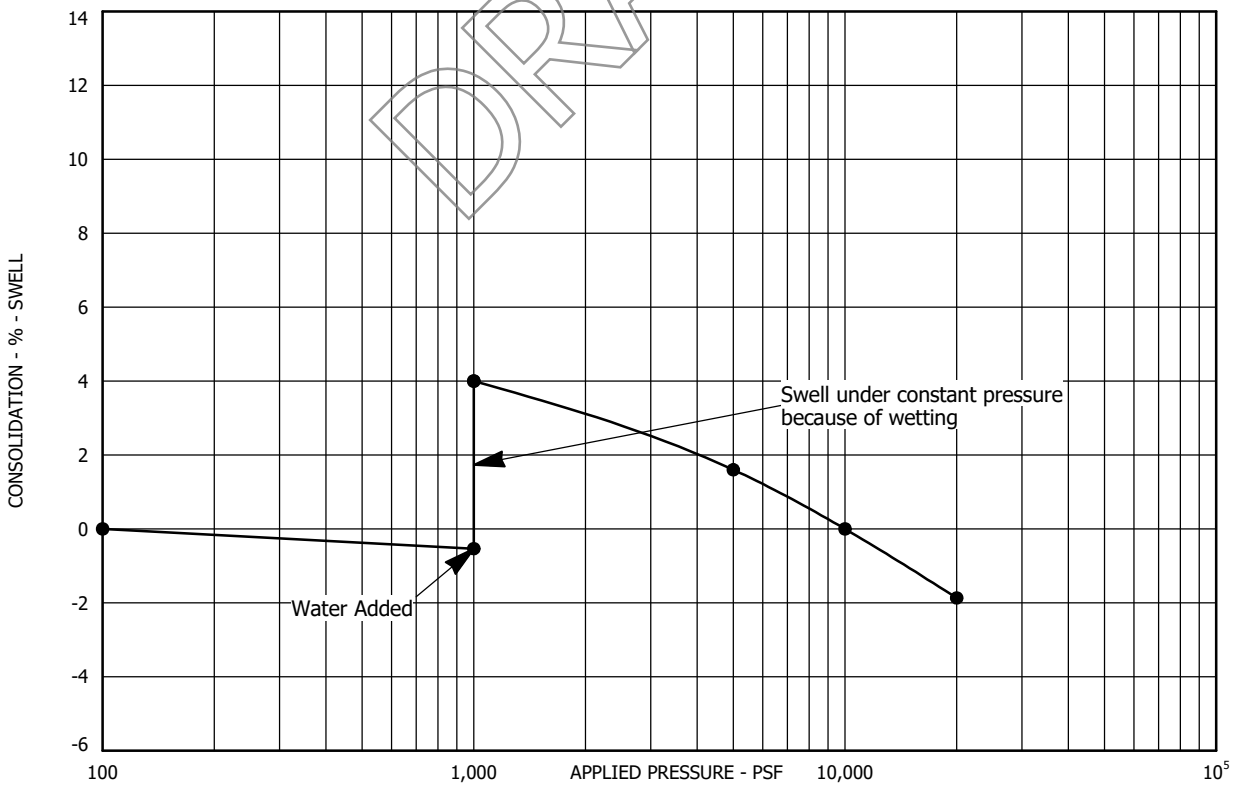
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-100
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 80 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 14

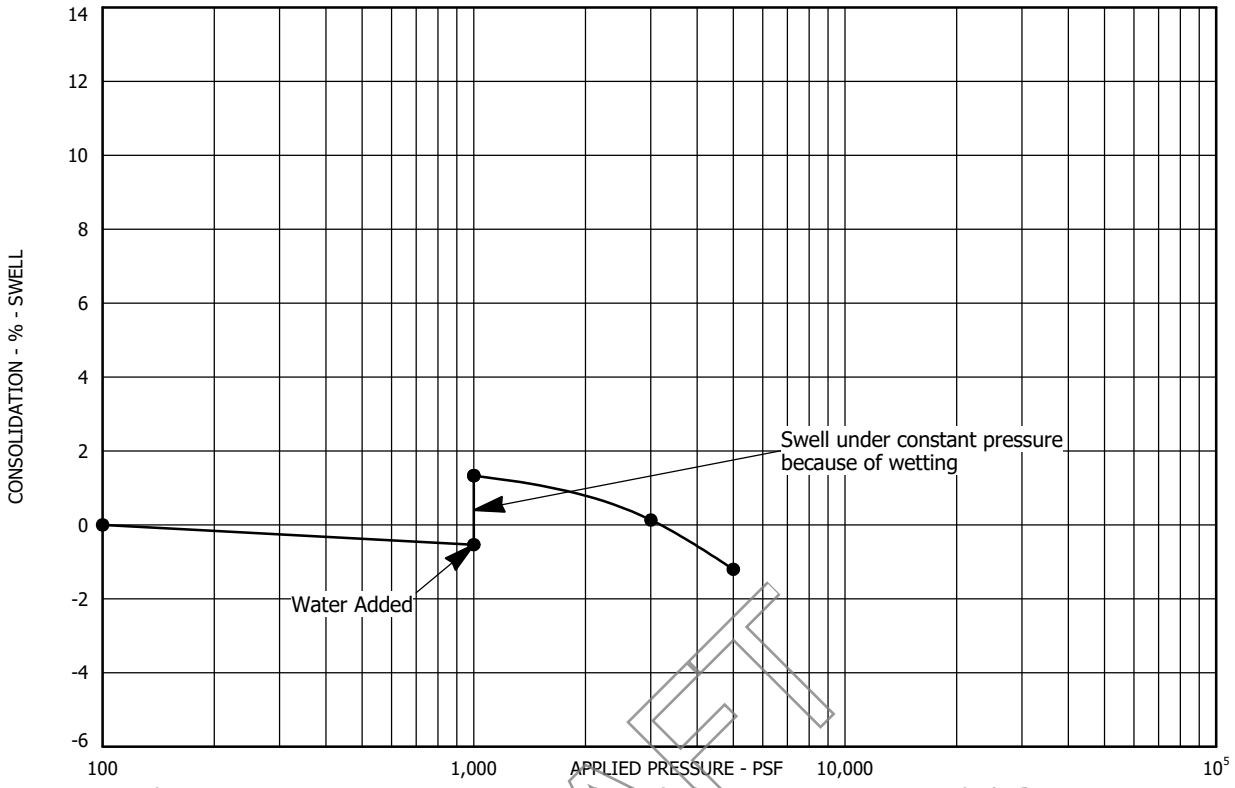
DRAFT



Sample Location: Test Boring No. 80 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 13

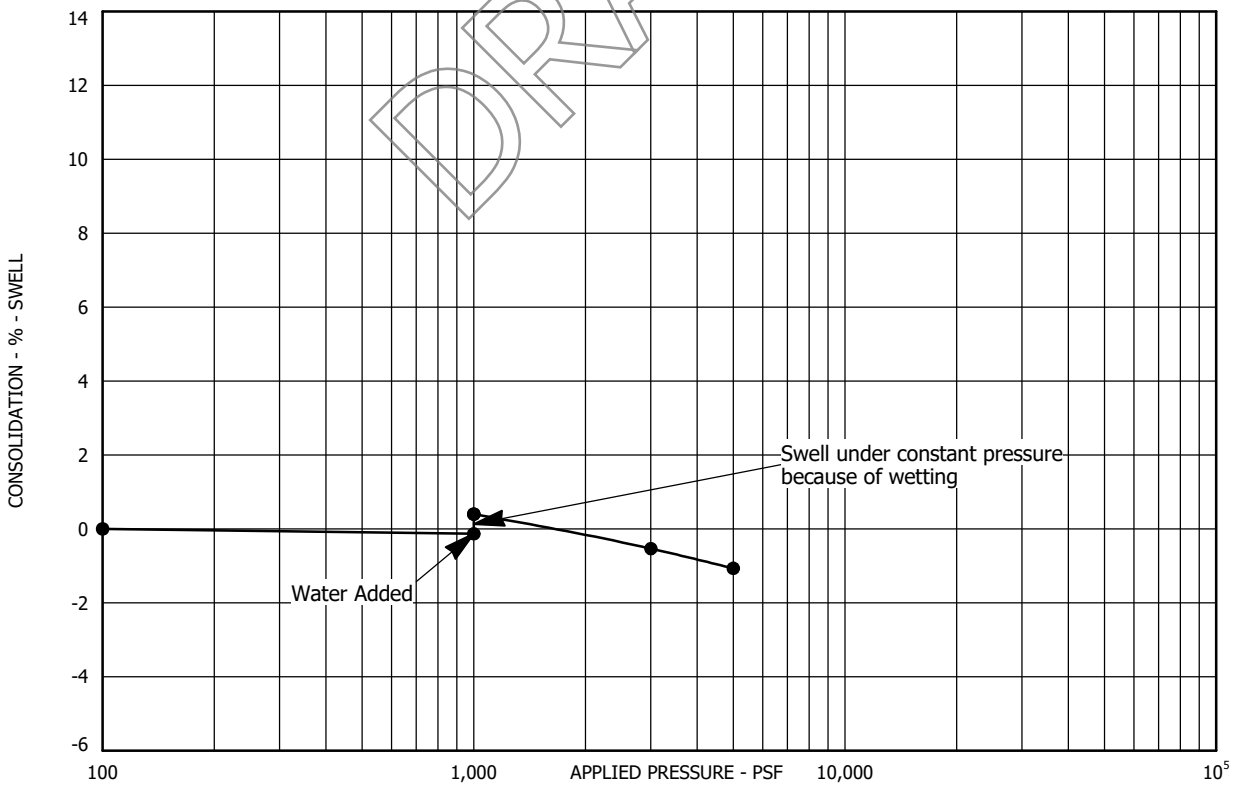
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-101
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 81 at a depth of 7 feet
Sample Description: Clay (Weathered Claystone), slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

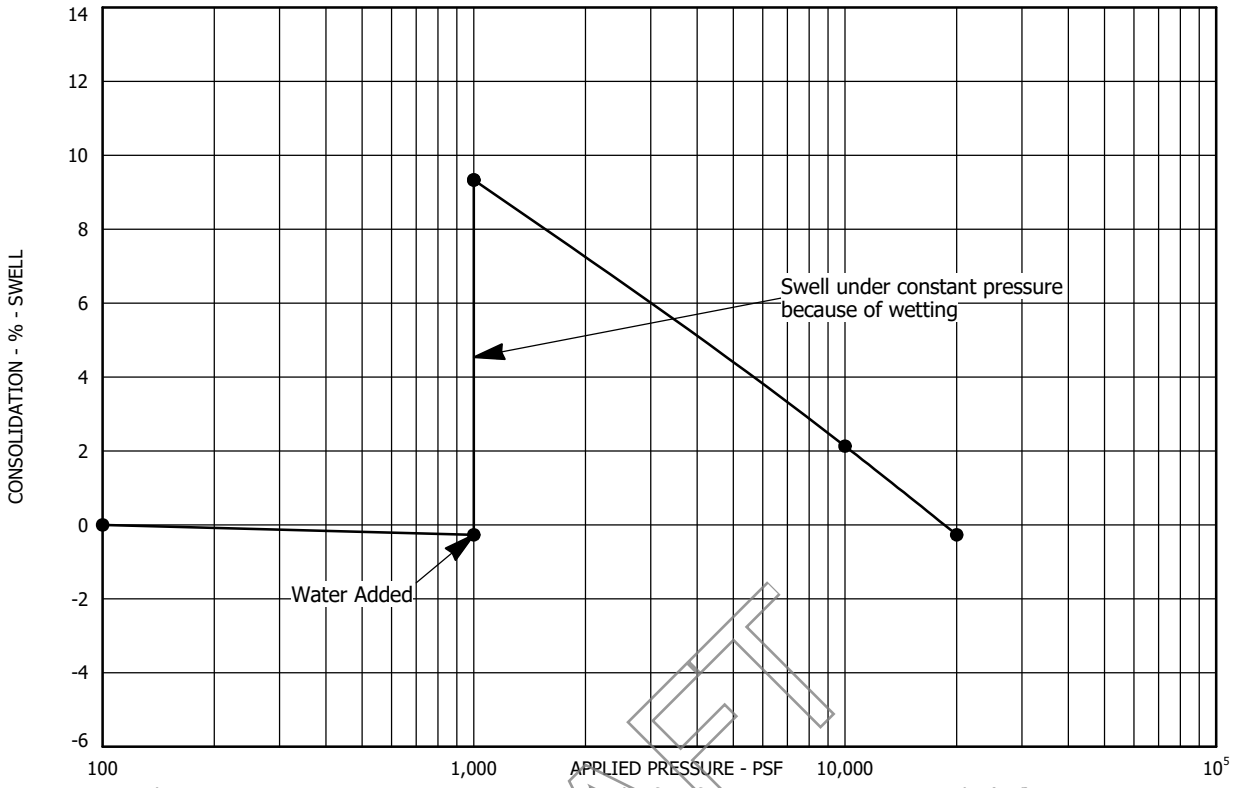
DRAFT



Sample Location: Test Boring No. 81 at a depth of 14 feet
Sample Description: Claystone, sandy (lens)
Dry Unit Weight (pcf): 127
Moisture Content (%): 10

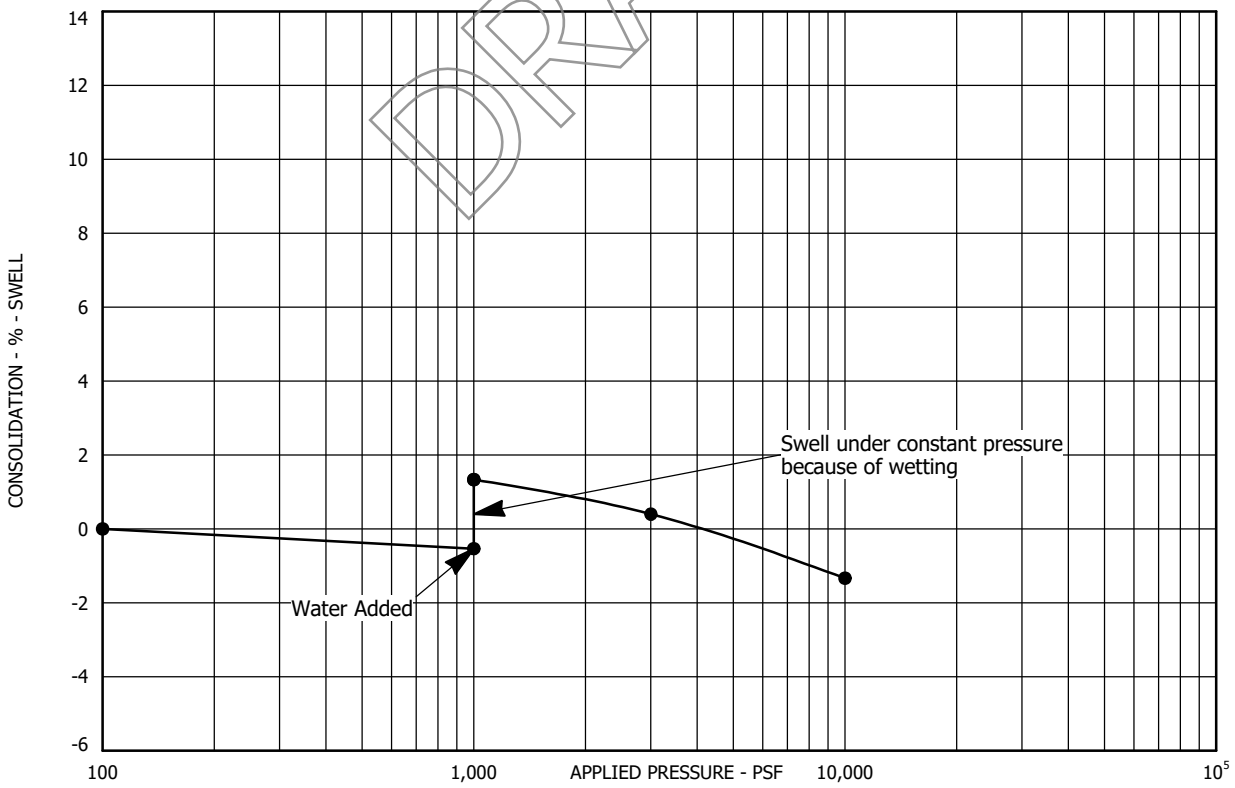
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-102
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 81 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 14

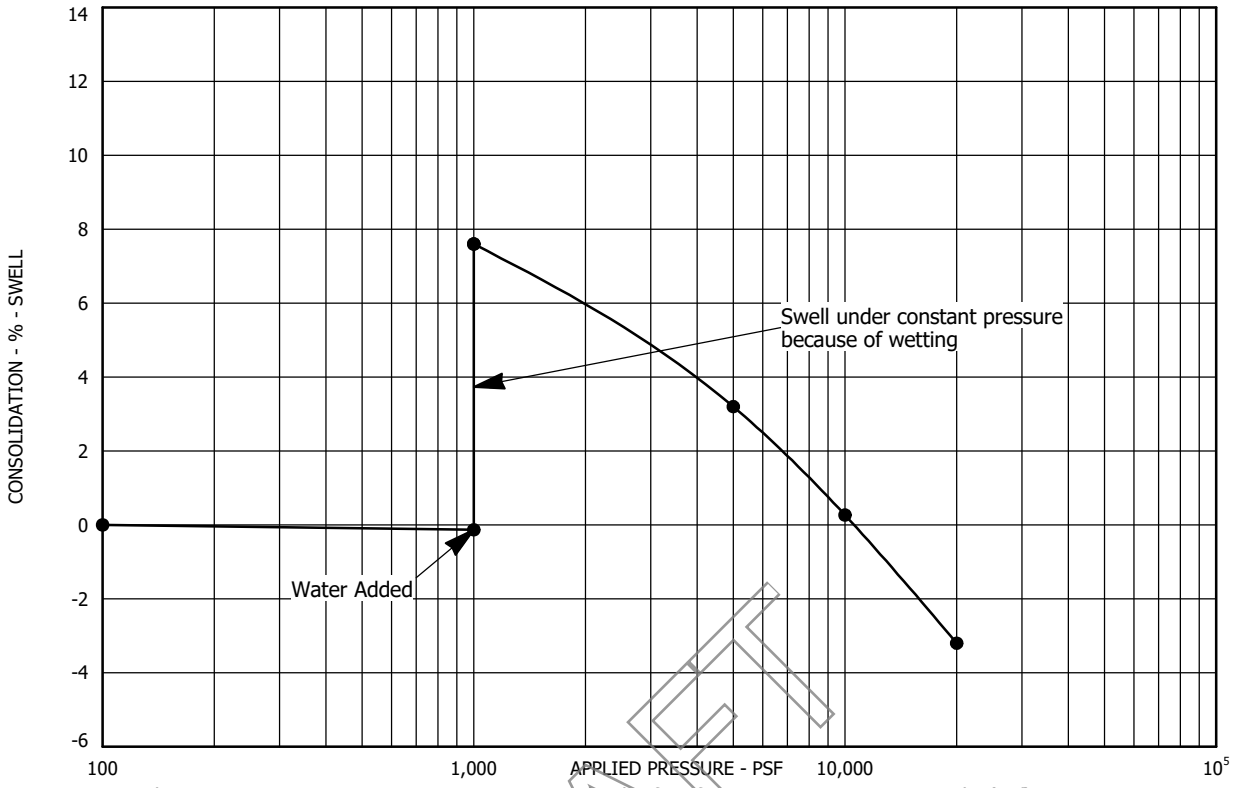
DRAFT



Sample Location: Test Boring No. 82 at a depth of 19 feet
Sample Description: Claystone, sandy (lens)
Dry Unit Weight (pcf): 129
Moisture Content (%): 10

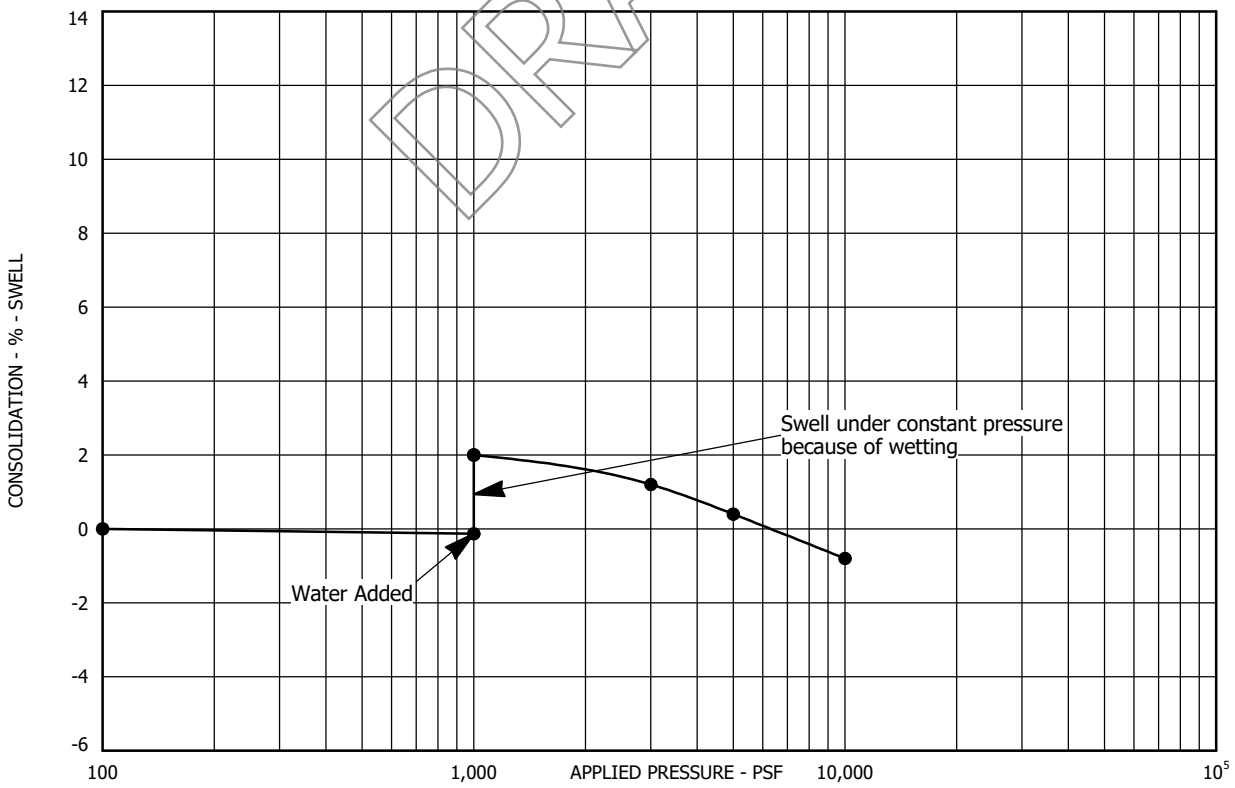
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-103
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 82 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 16

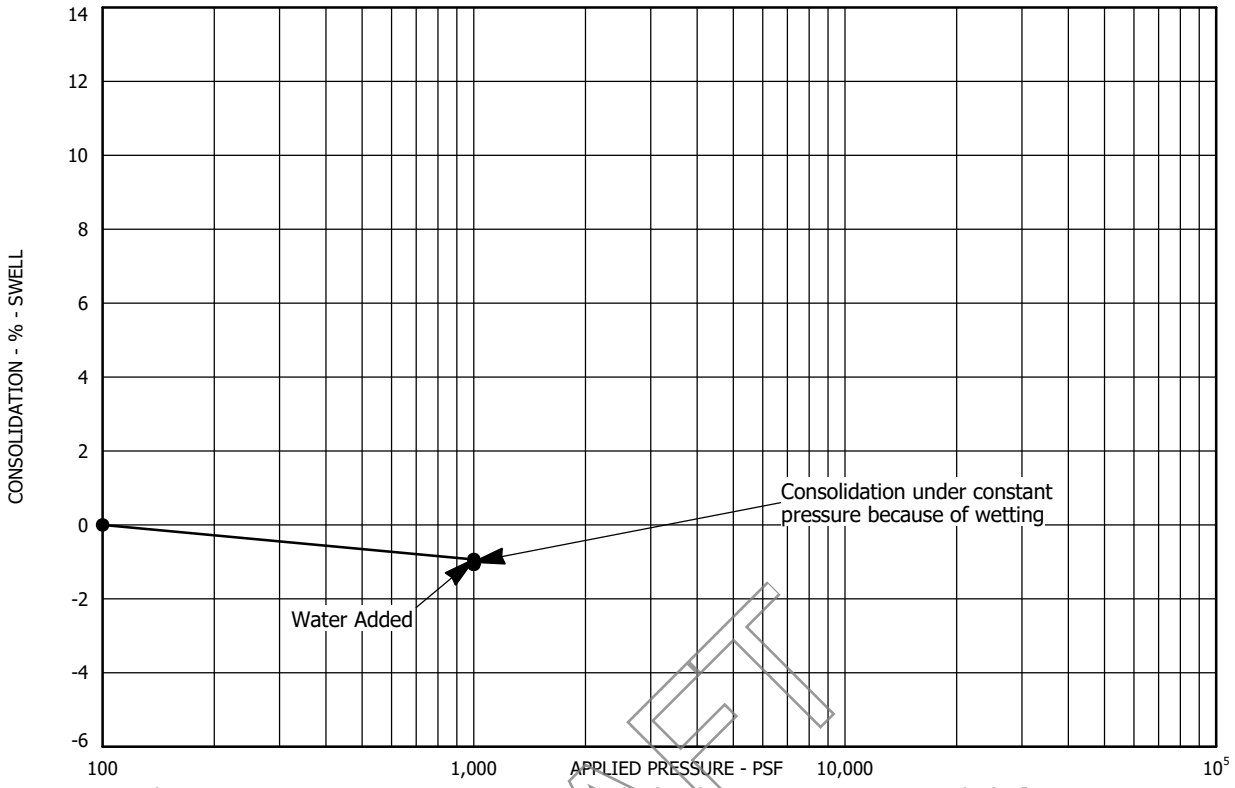
DRAFT



Sample Location: Test Boring No. 83 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 11

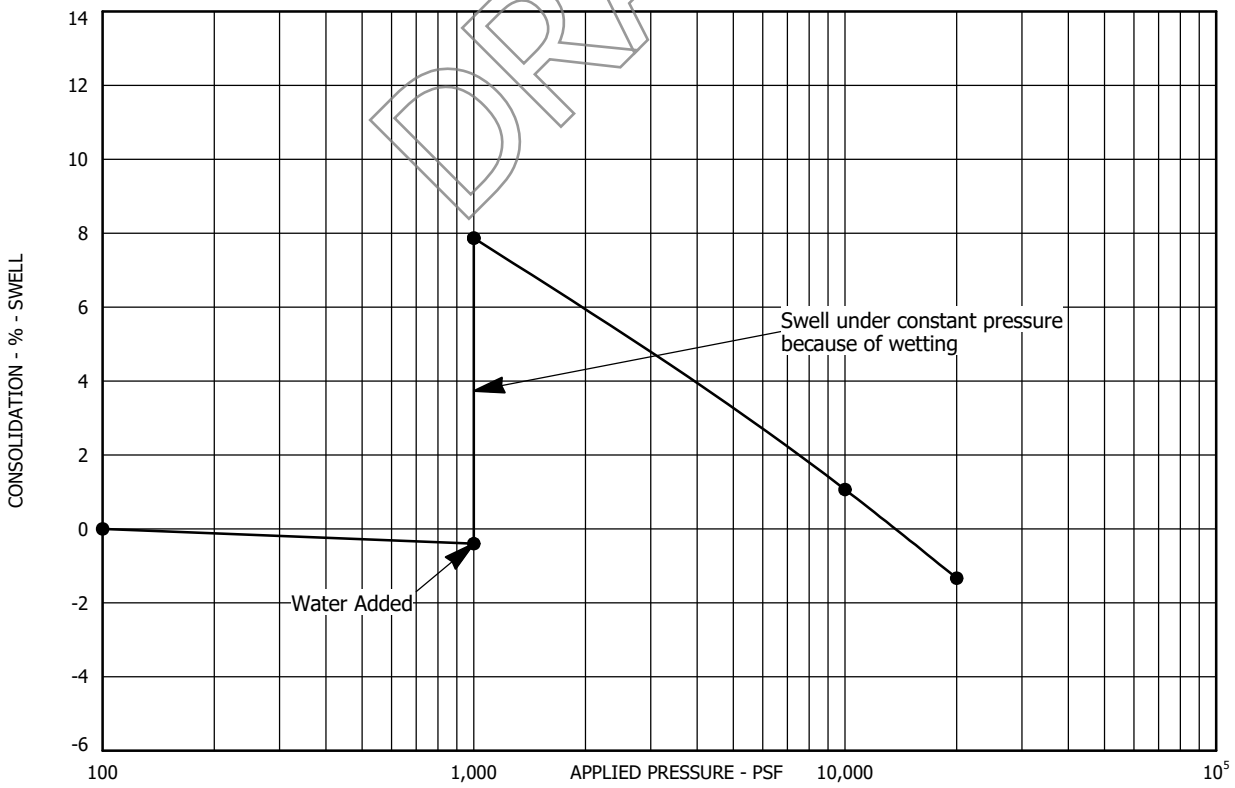
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-104
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 83 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Dry Unit Weight (pcf): 115
Moisture Content (%): 16

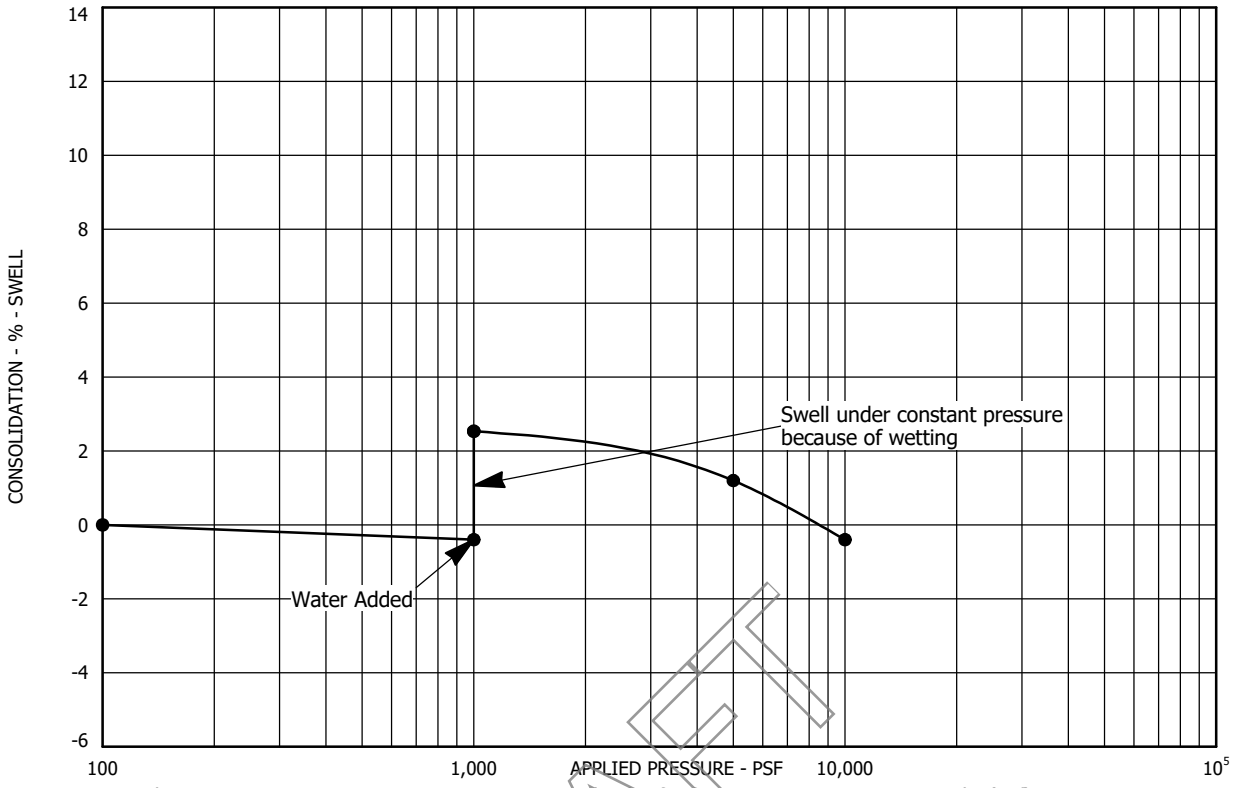
DRAFT



Sample Location: Test Boring No. 83 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 19

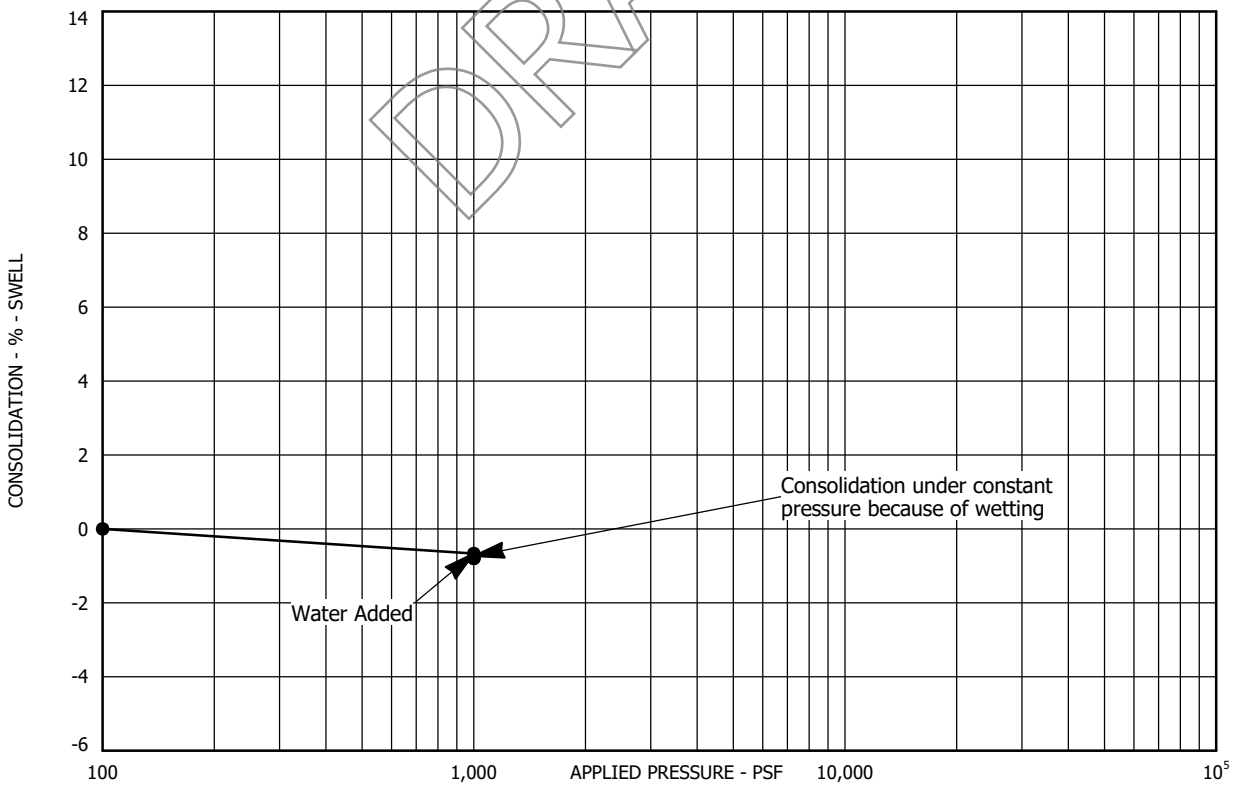
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-105
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 84 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 14

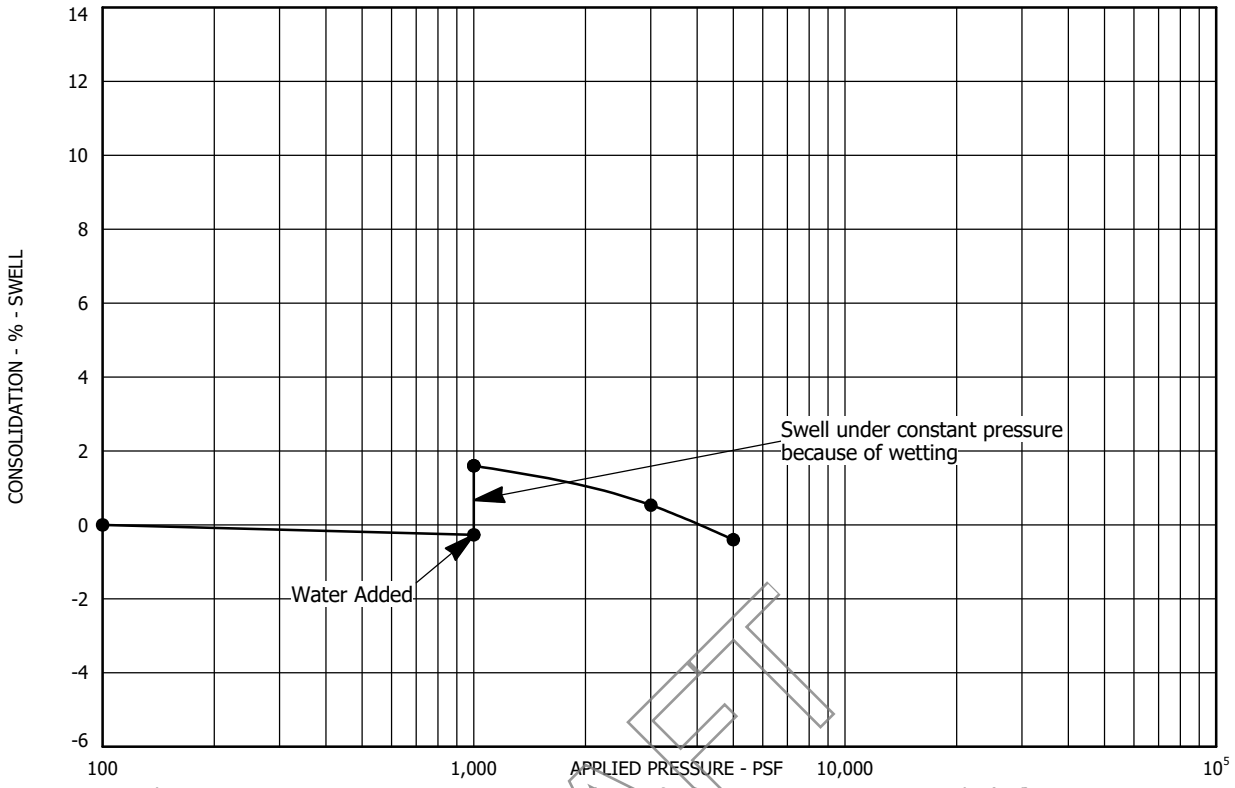
DRAFT



Sample Location: Test Boring No. 84 at a depth of 19 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 17

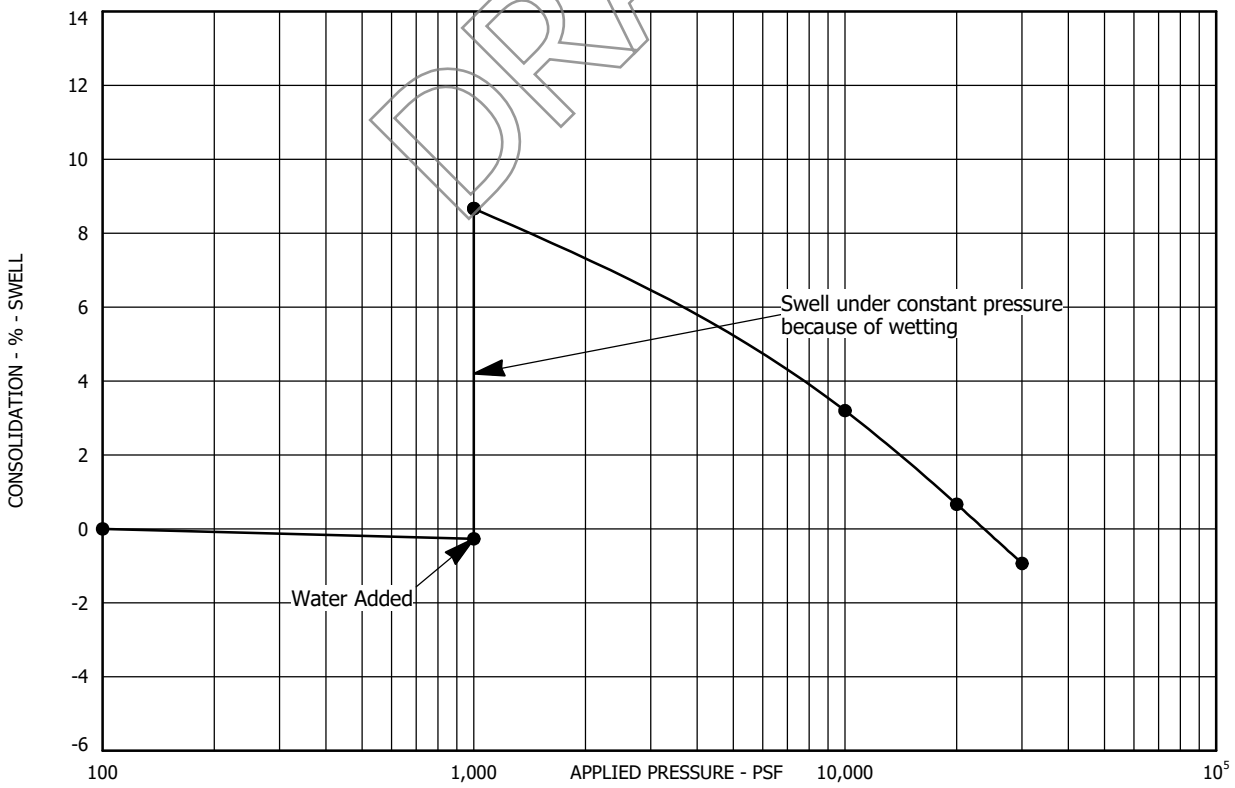
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-106
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 85 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 8

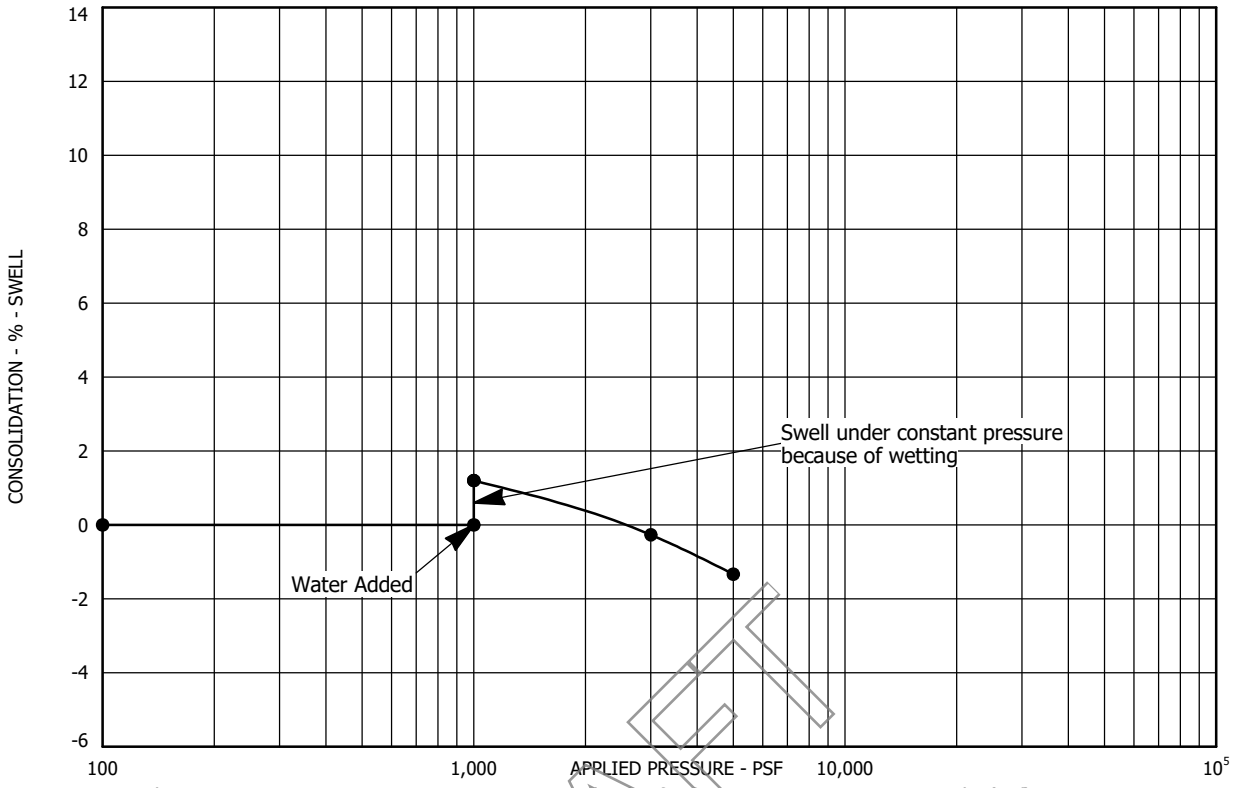
DRAFT



Sample Location: Test Boring No. 85 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 18

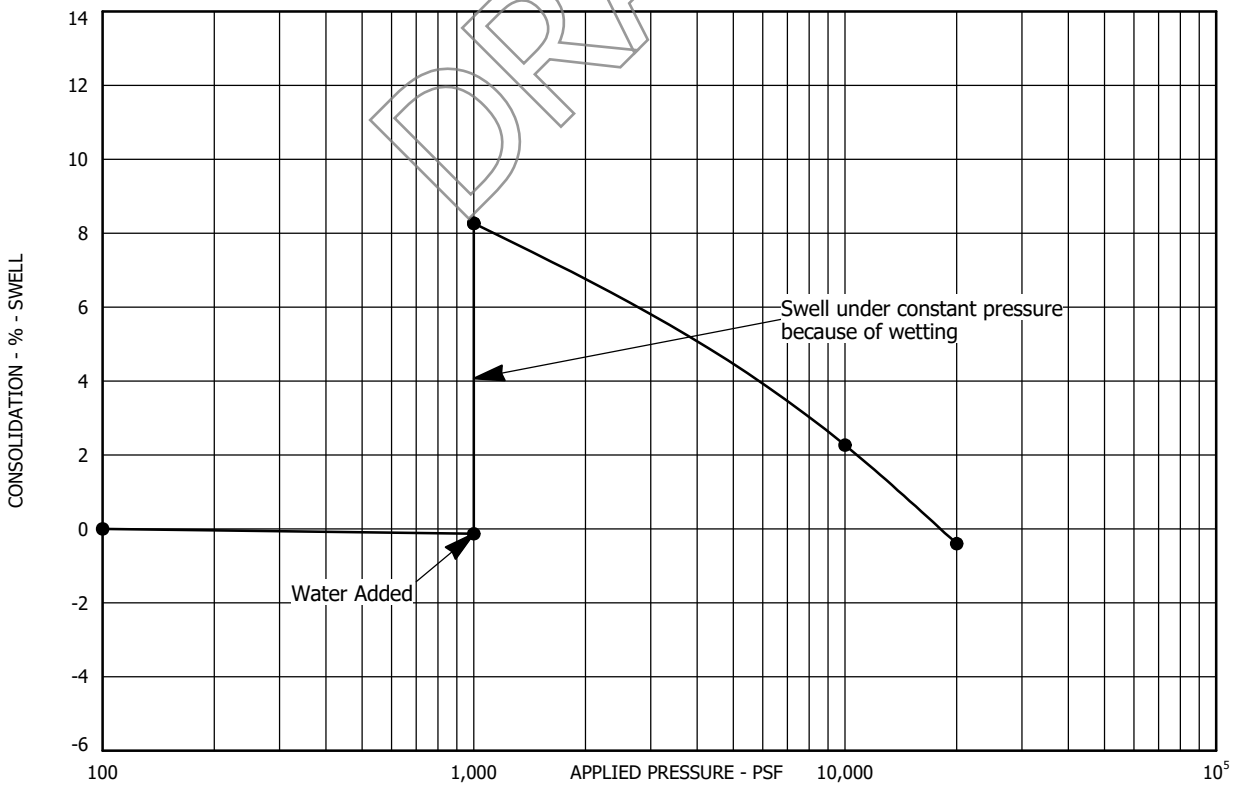
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-107
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 86 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 10

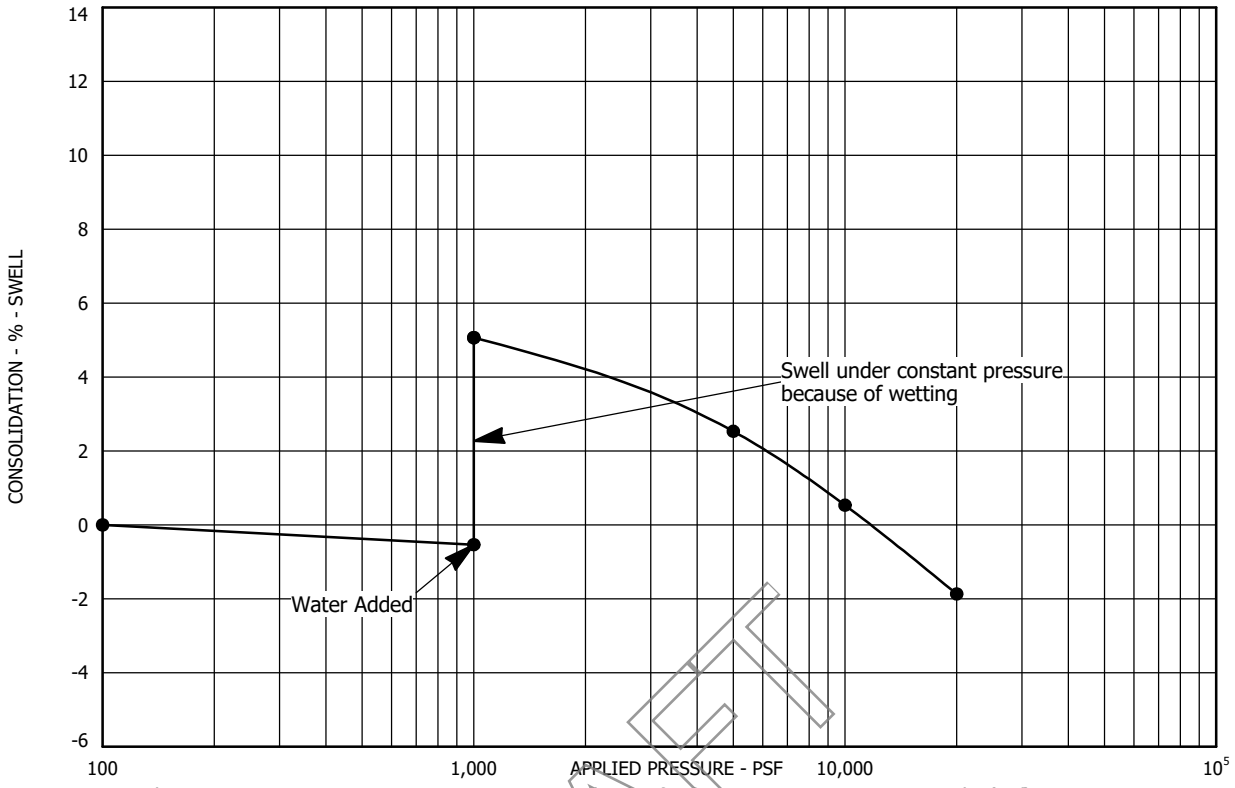
DRAFT



Sample Location: Test Boring No. 86 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

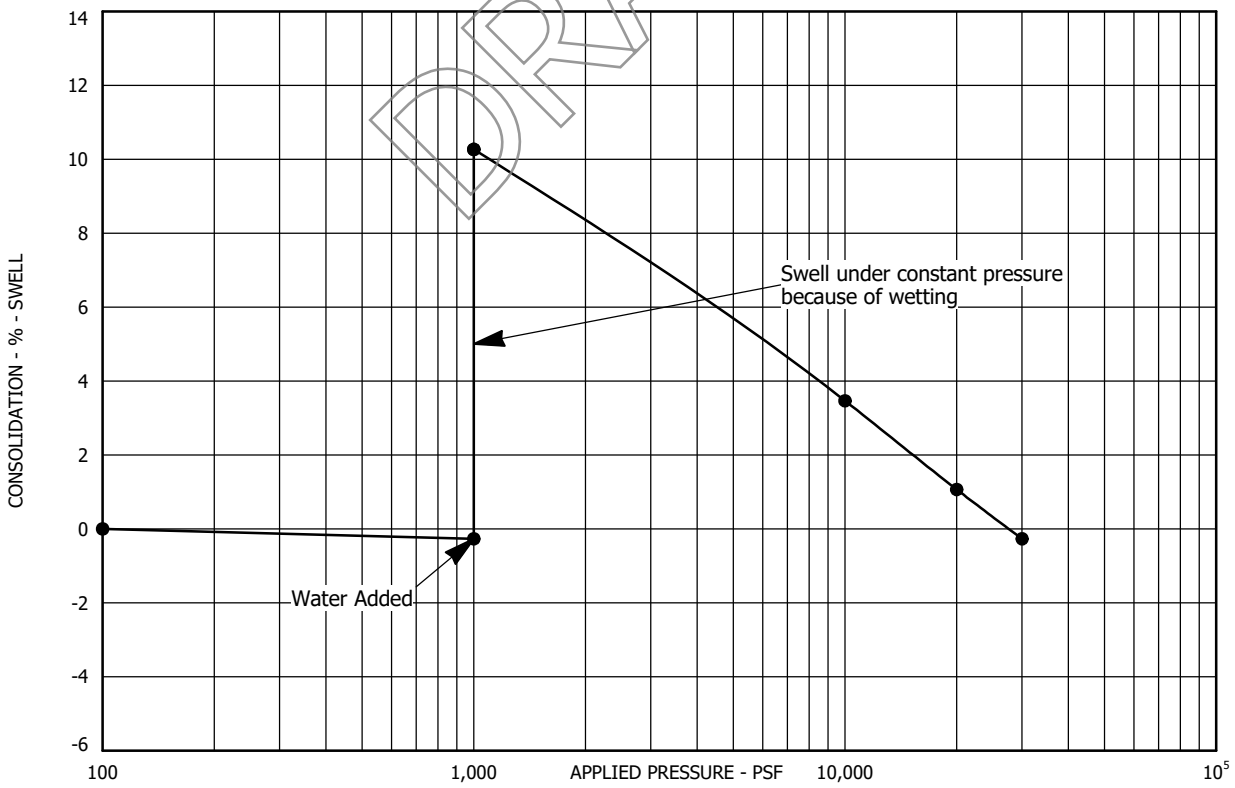
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-108
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 87 at a depth of 9 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 126
Moisture Content (%): 12

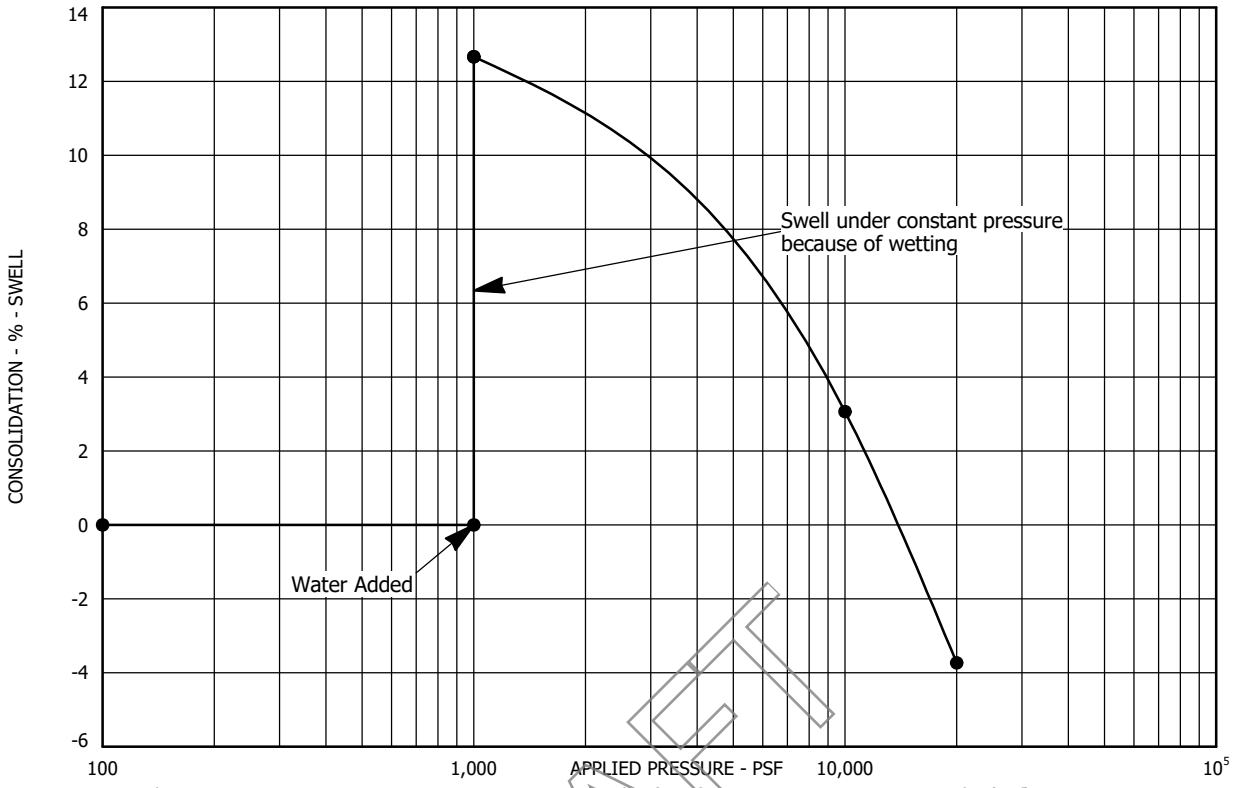
DRAFT



Sample Location: Test Boring No. 87 at a depth of 19 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 122
Moisture Content (%): 13

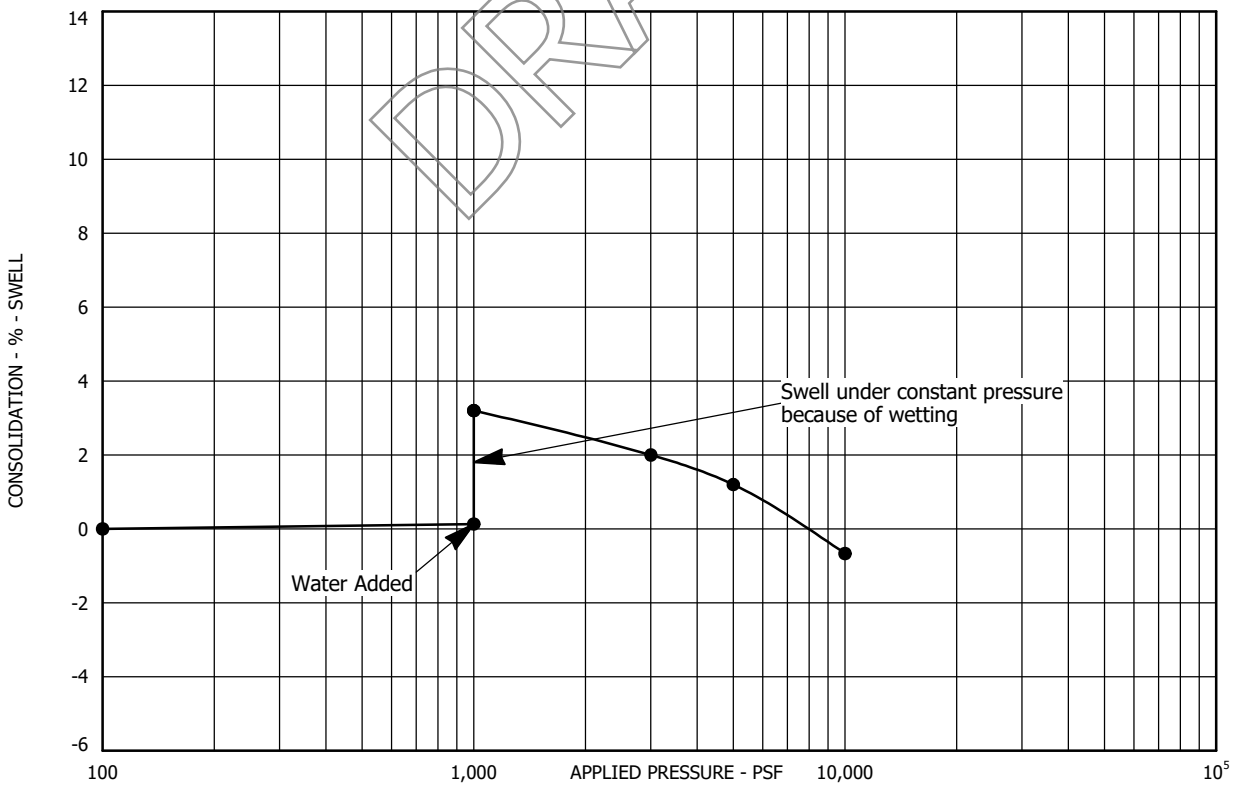
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-109
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 87 at a depth of 29 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

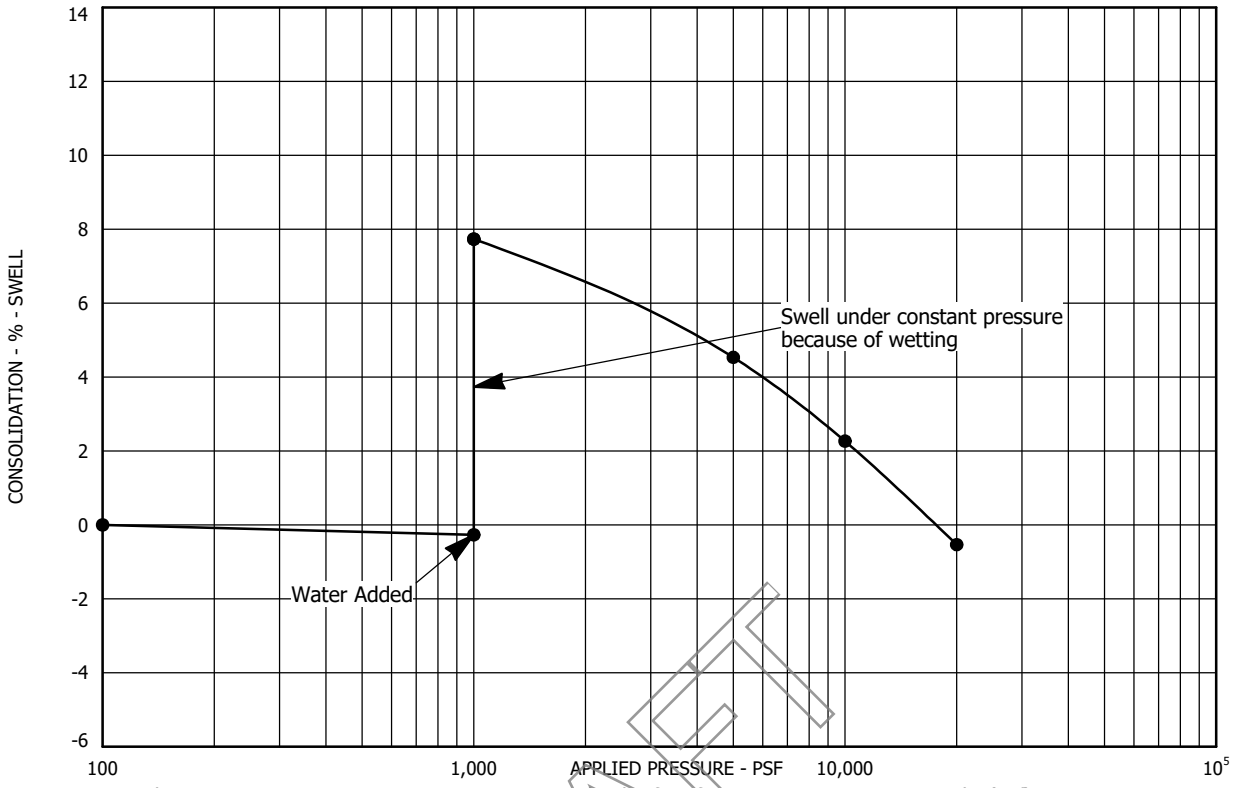
DRAFT



Sample Location: Test Boring No. 88 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 10

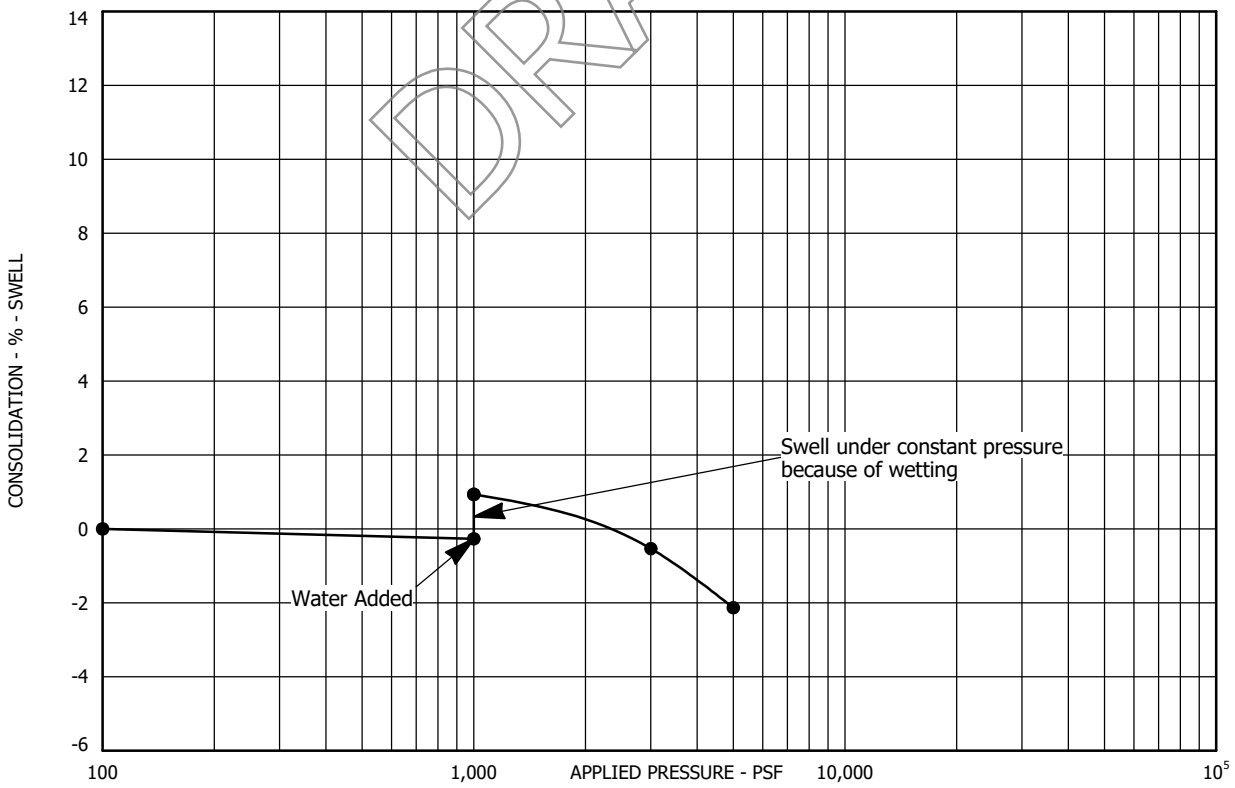
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-110
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 88 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 15

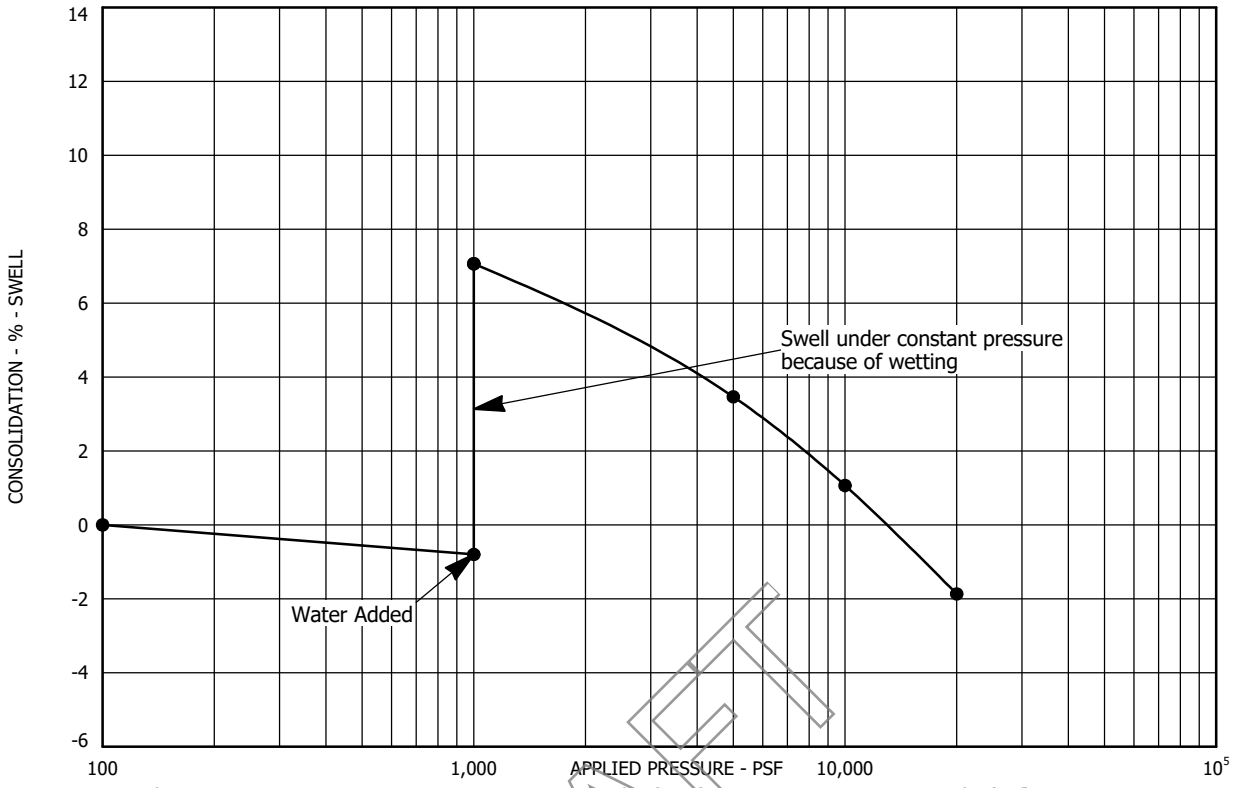
DRAFT



Sample Location: Test Boring No. 89 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 10

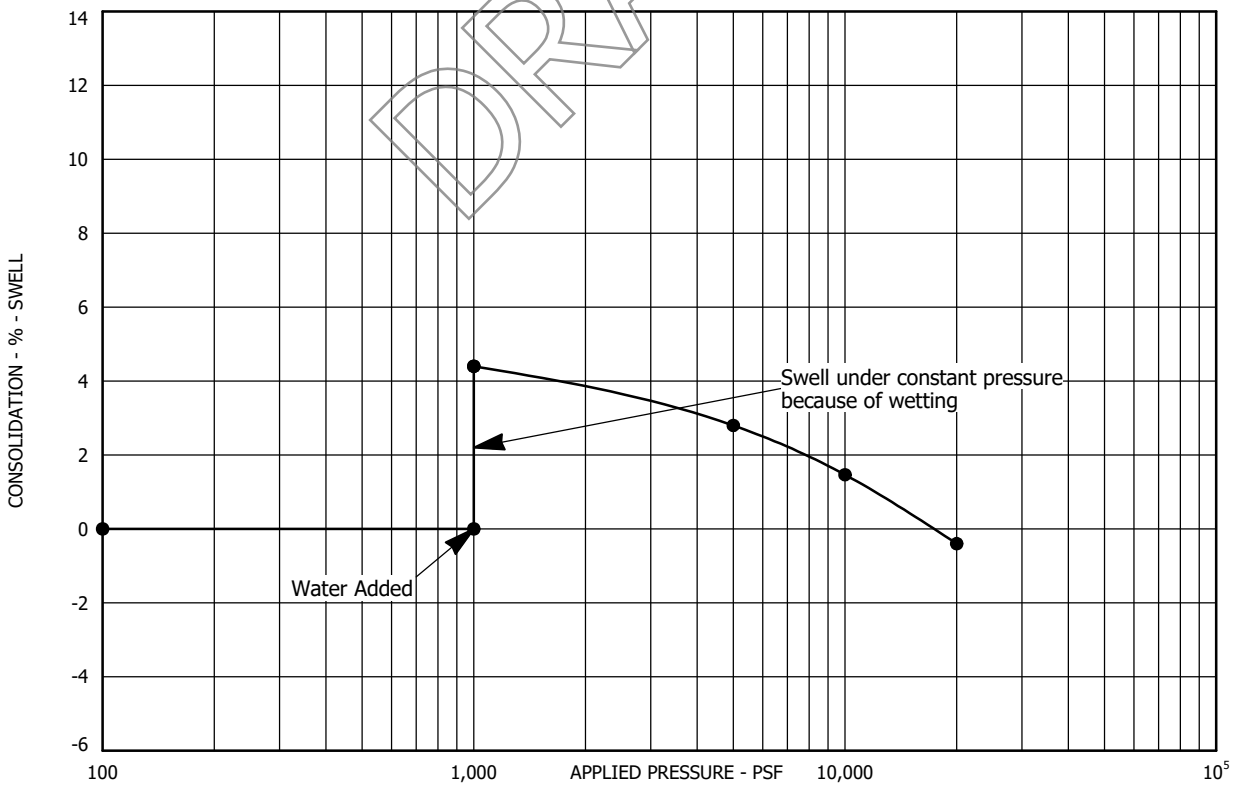
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-111
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 89 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 12

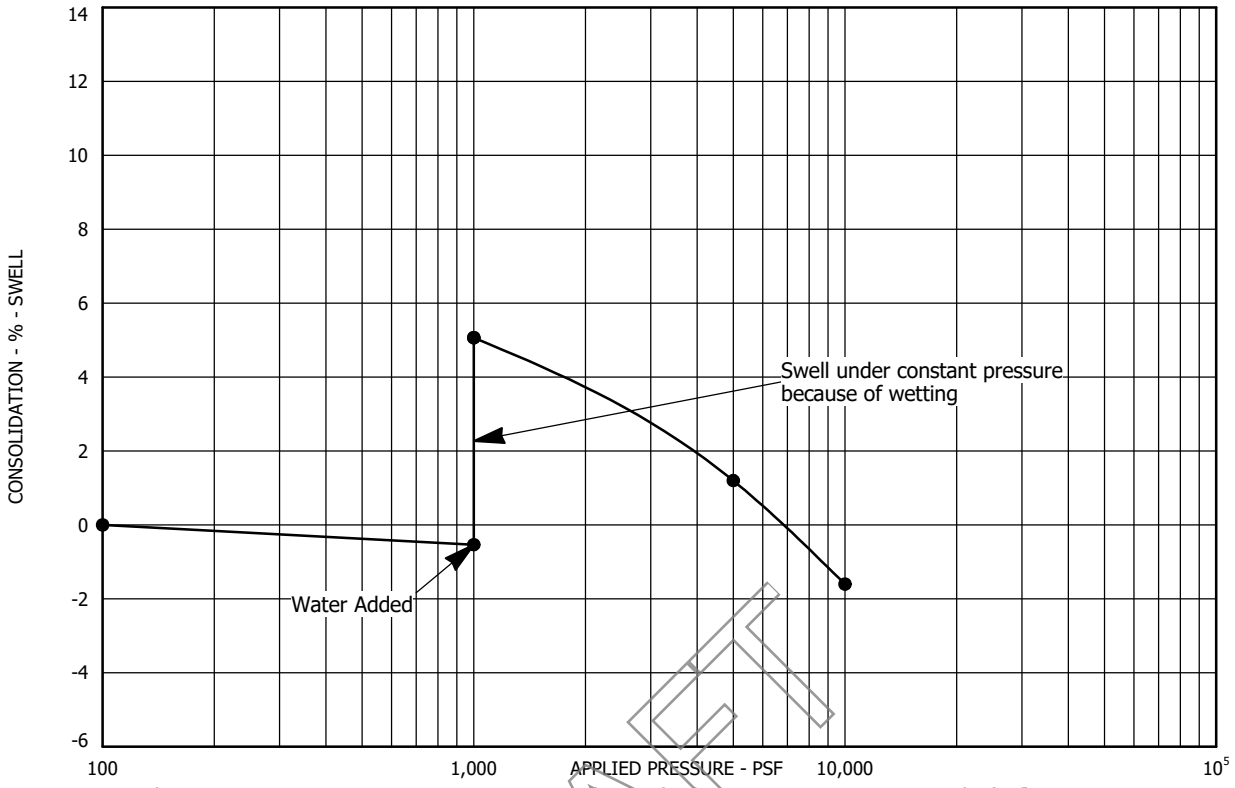
DRAFT



Sample Location: Test Boring No. 90 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 12

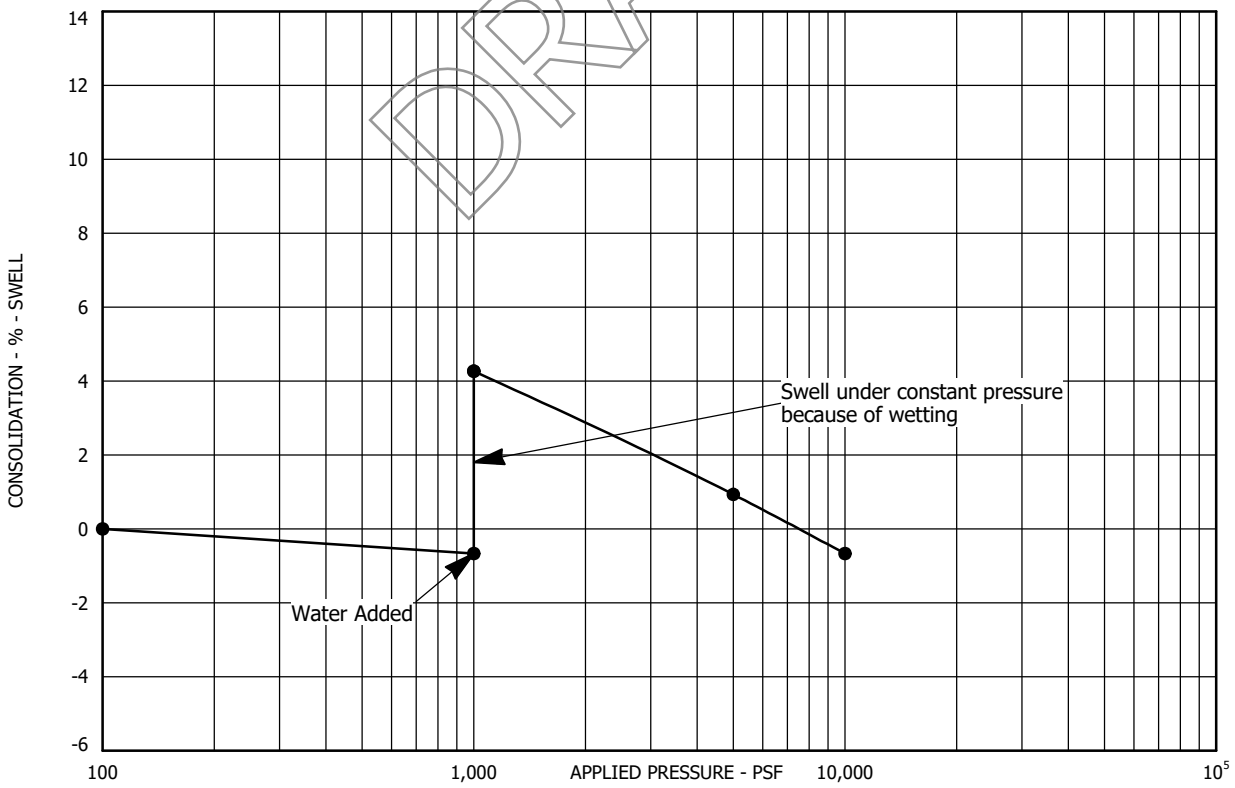
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-112
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 90 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 13

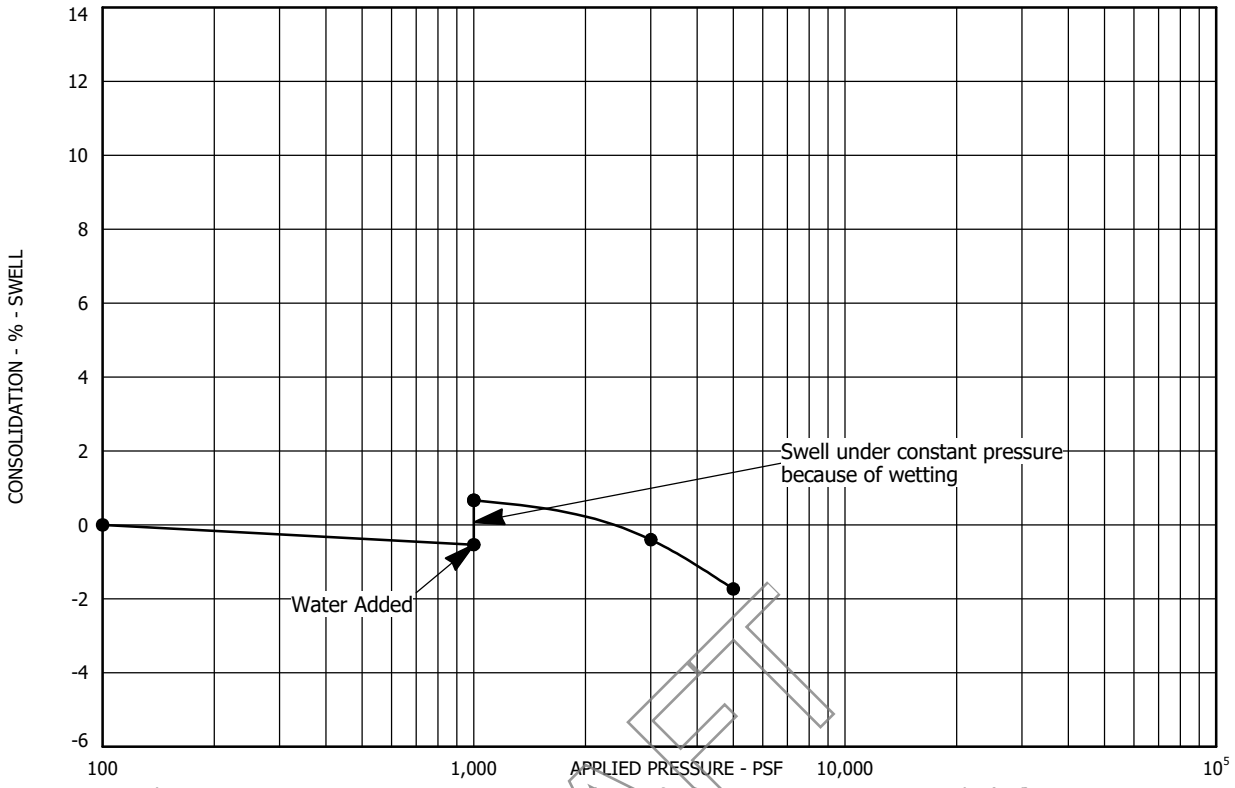
DRAFT



Sample Location: Test Boring No. 90 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 127
Moisture Content (%): 12

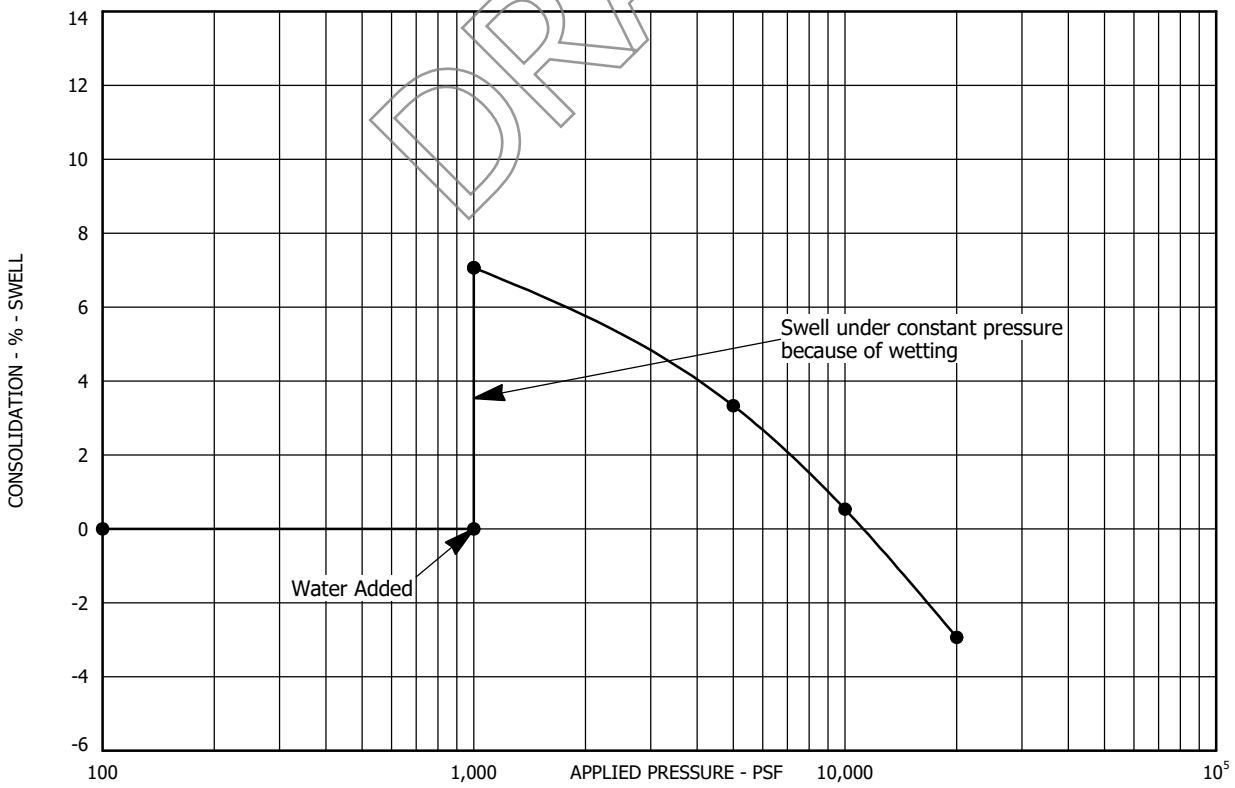
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-113
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 91 at a depth of 7 feet
Sample Description: Clay, slightly sandy, trace gravel
Dry Unit Weight (pcf): 103
Moisture Content (%): 22

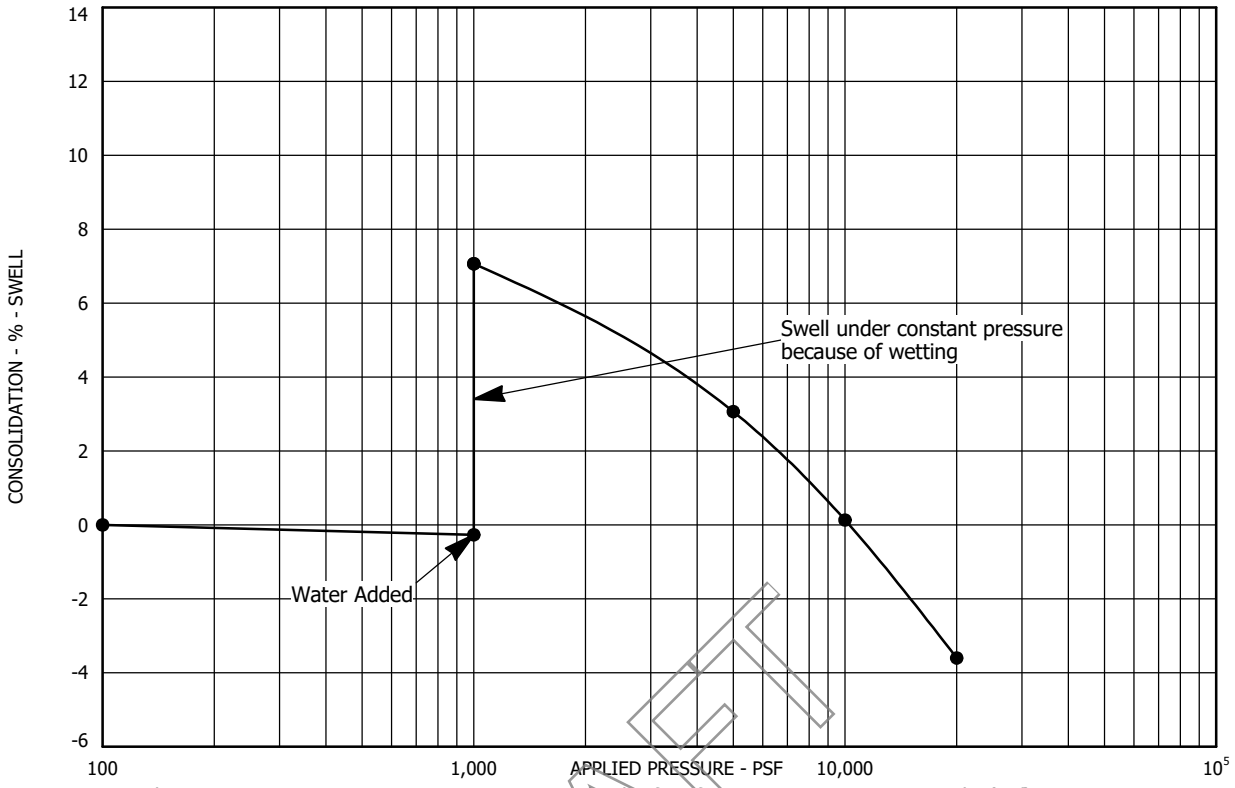
DRAFT



Sample Location: Test Boring No. 91 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 20

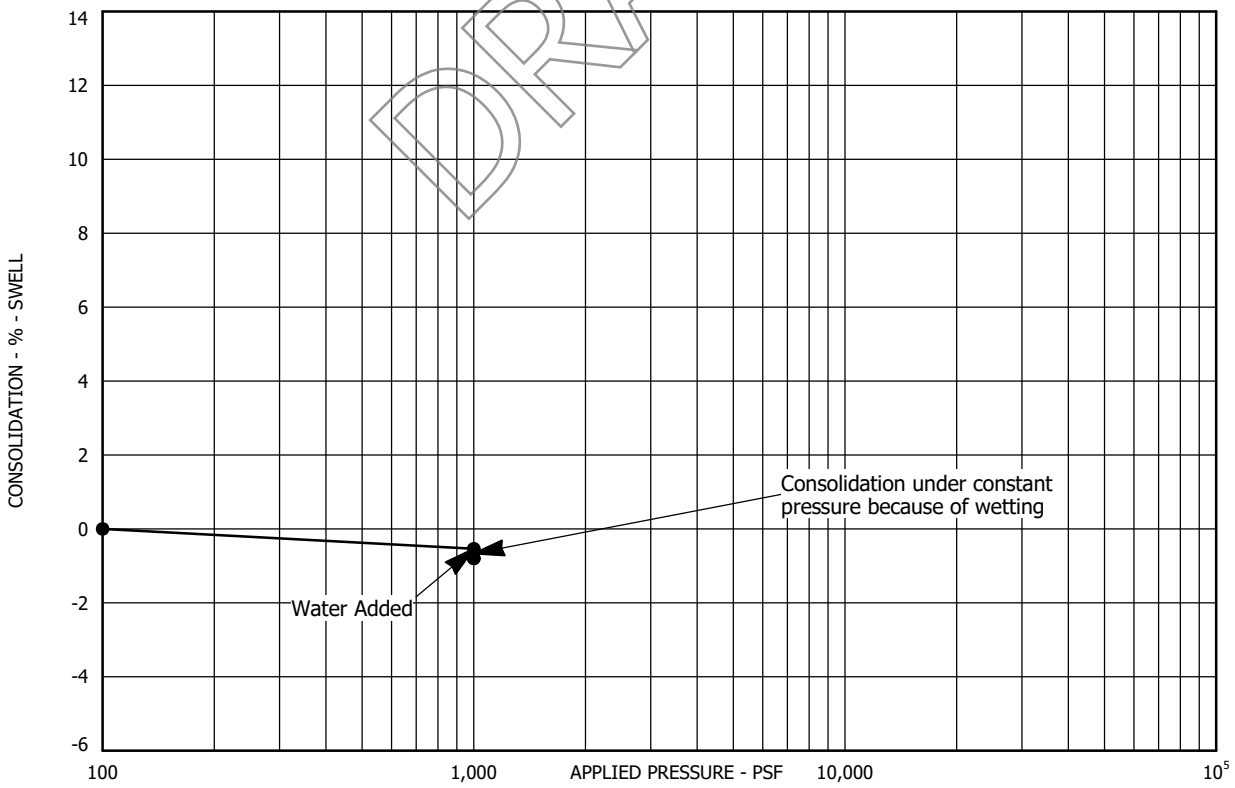
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-114
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 91 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 19

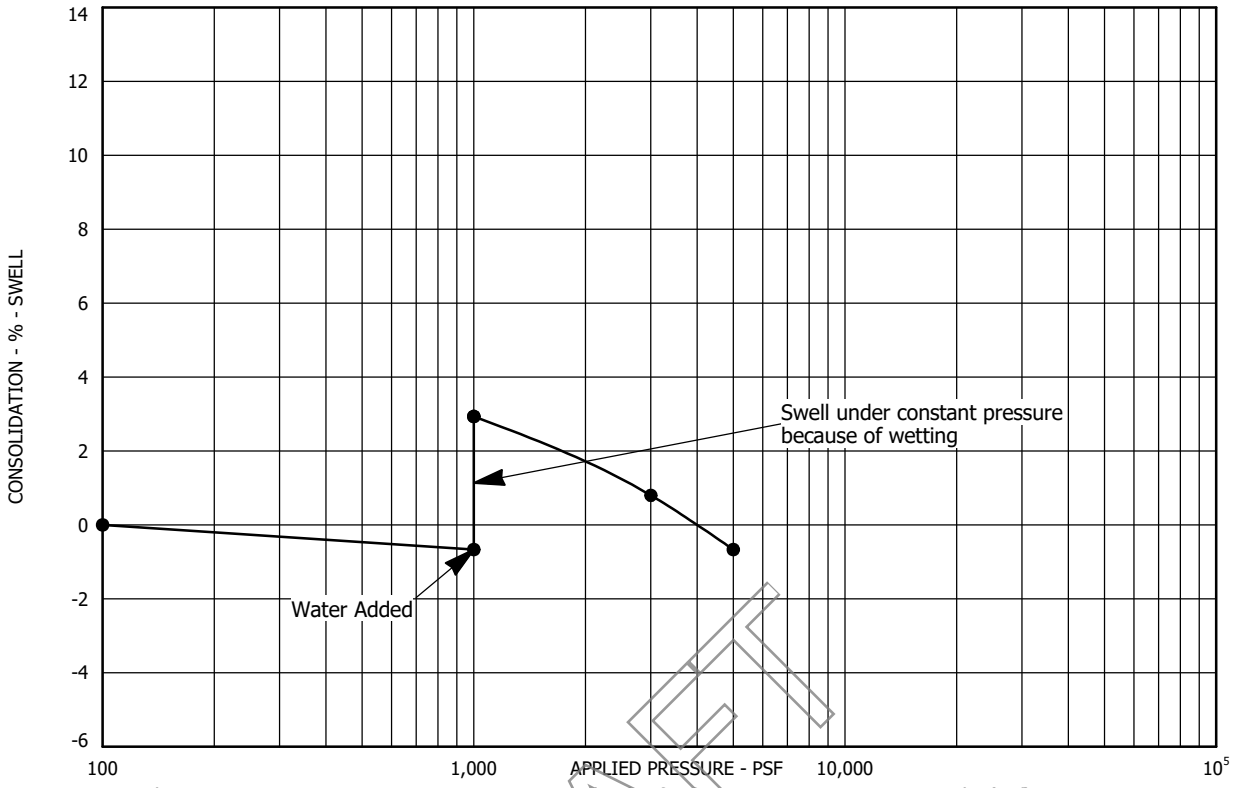
DRAFT



Sample Location: Test Boring No. 92 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 19

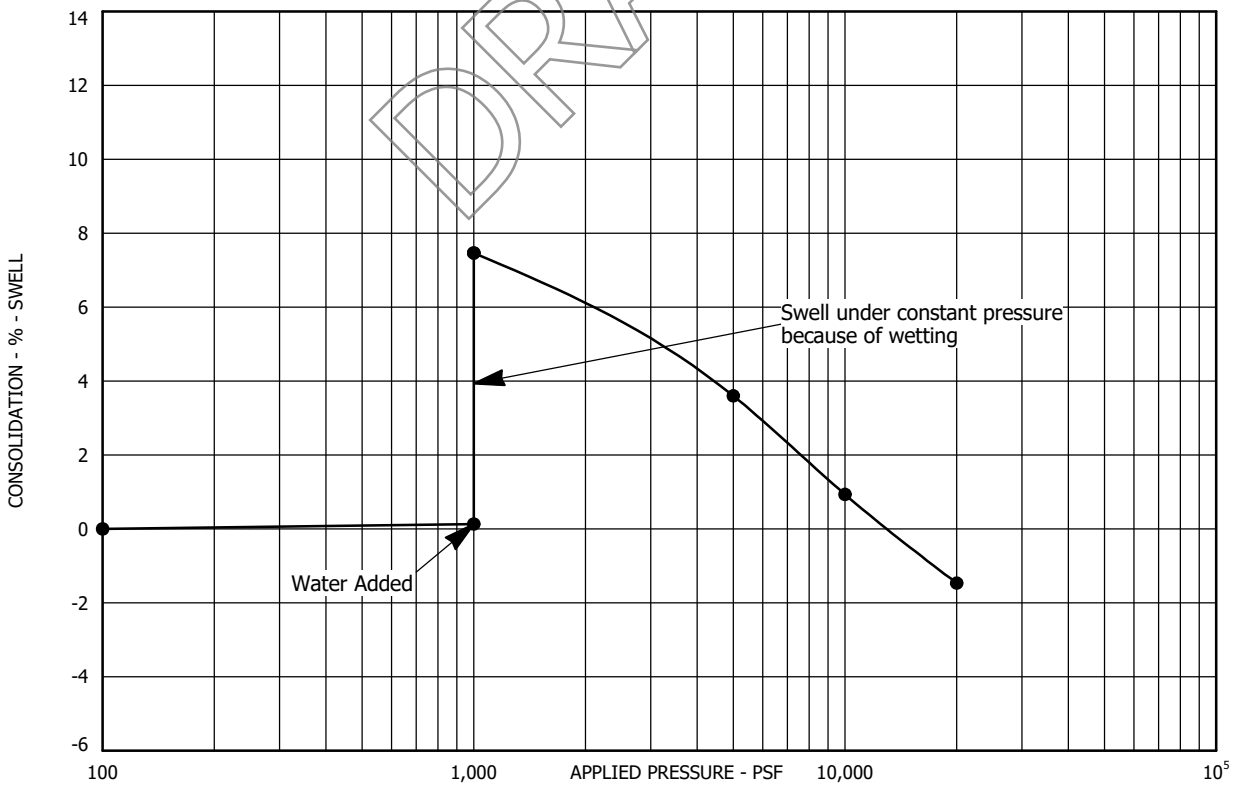
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-115
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 92 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 18

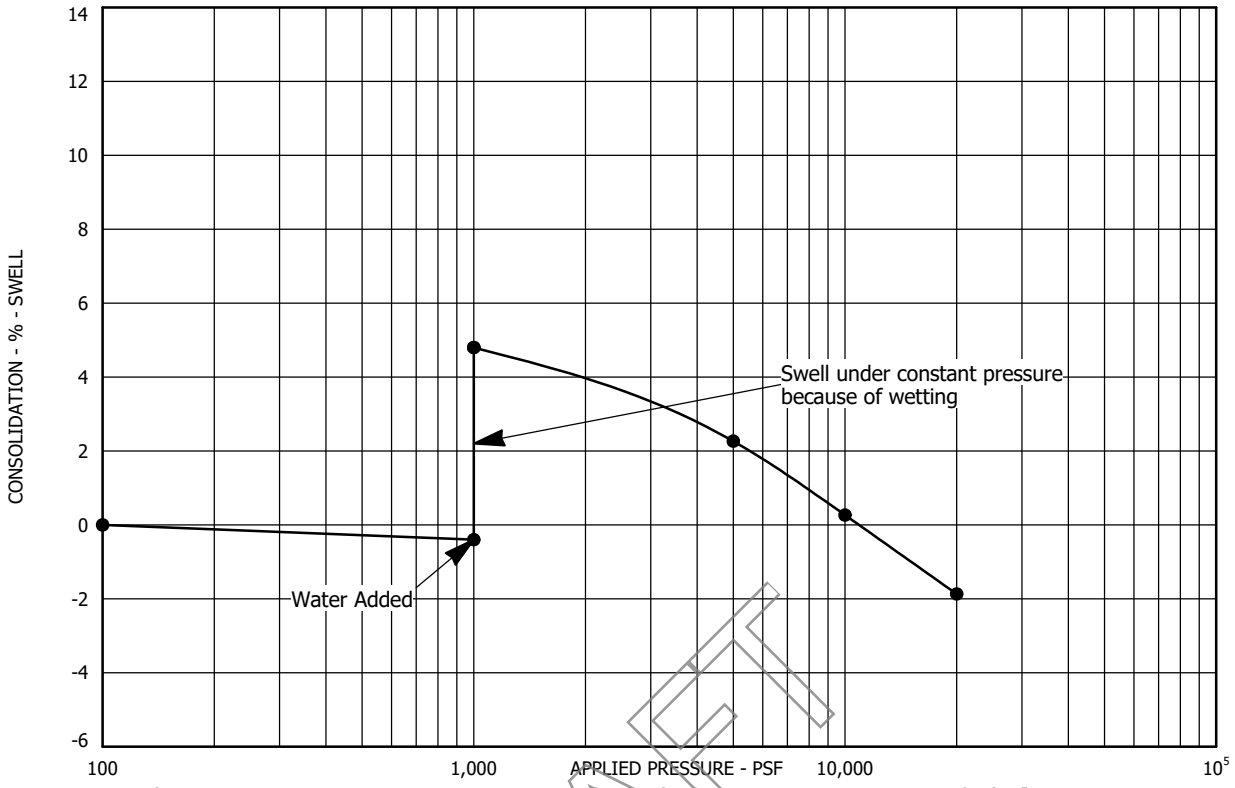
DRAFT



Sample Location: Test Boring No. 92 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

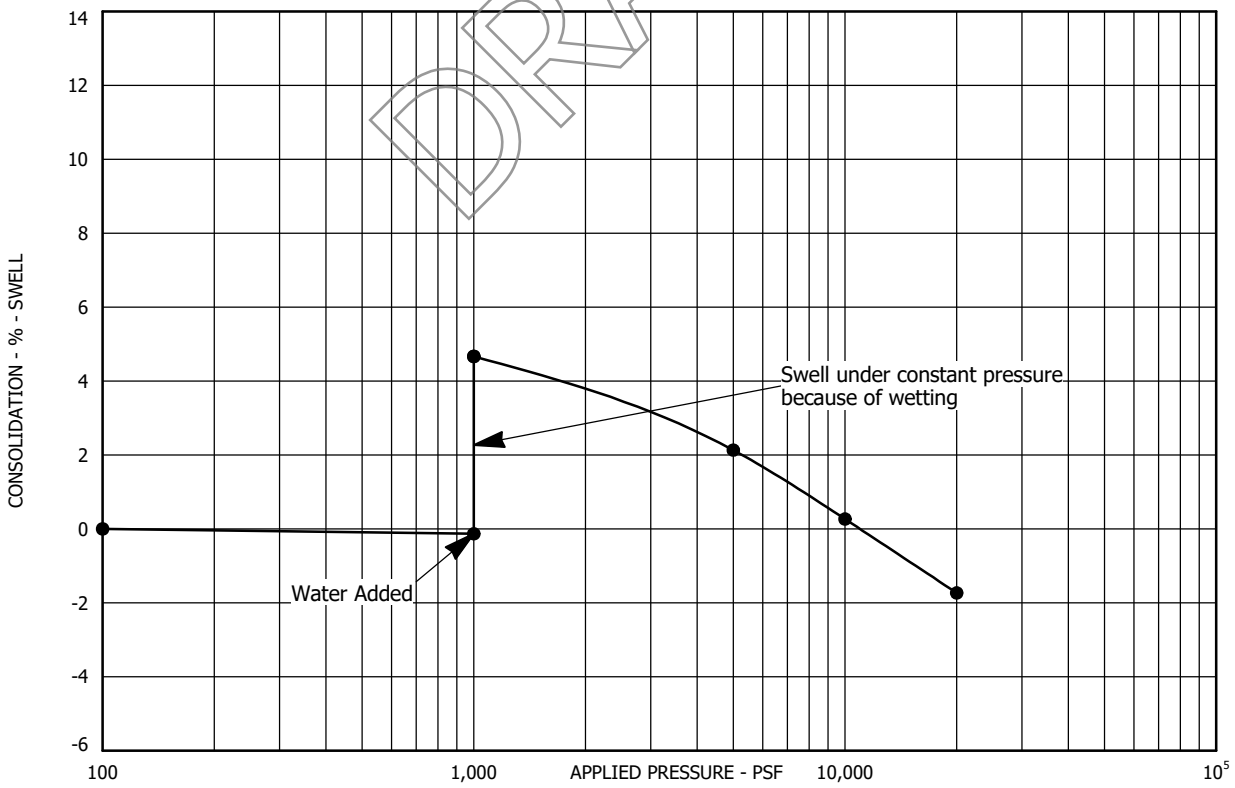
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-116
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 93 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 8

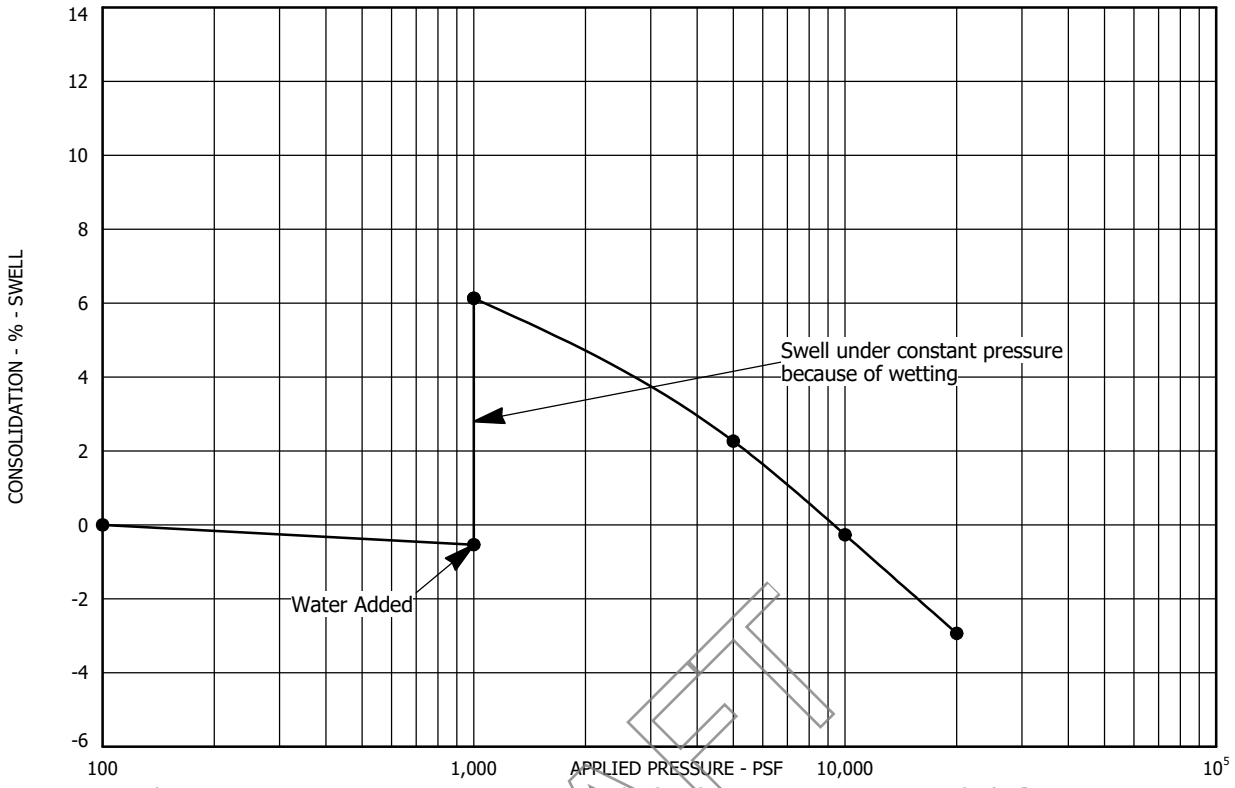
DRAFT



Sample Location: Test Boring No. 93 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 18

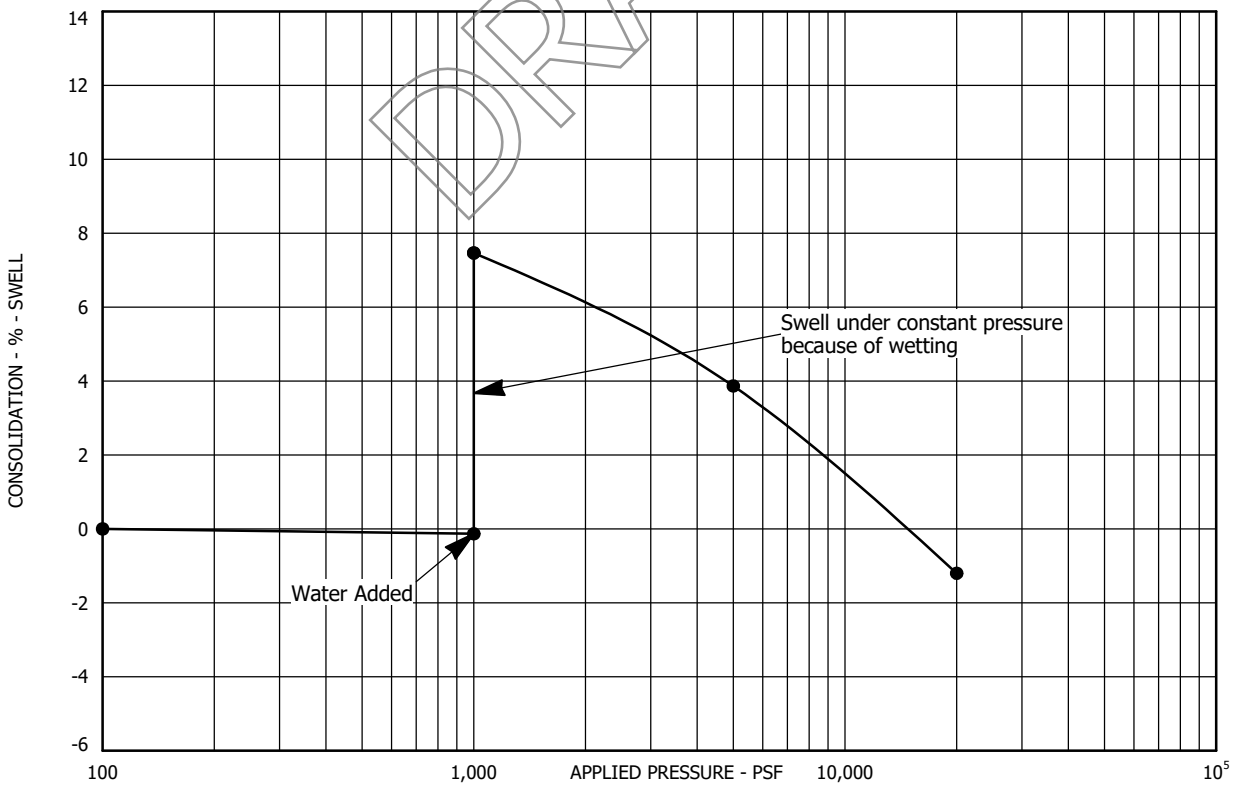
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-117
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 93 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 18

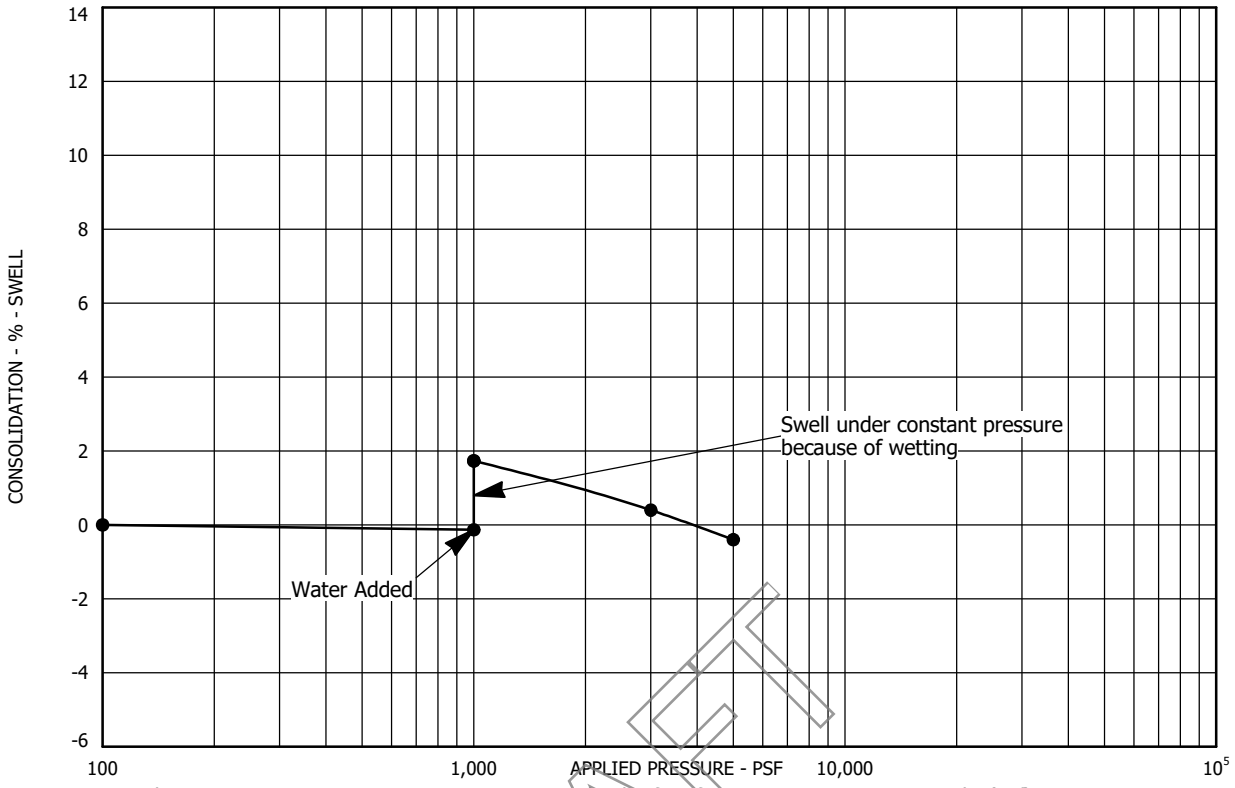
DRAFT



Sample Location: Test Boring No. 93 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 16

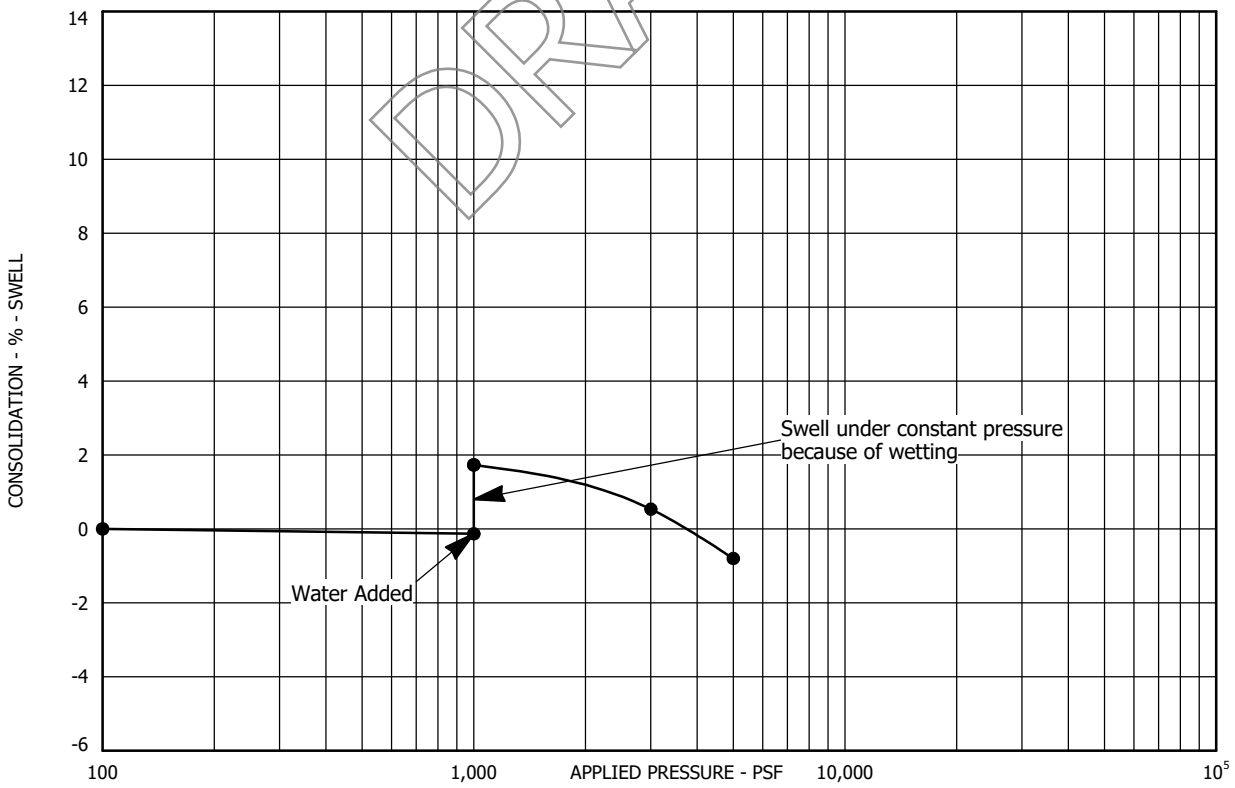
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-118
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 94 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 22

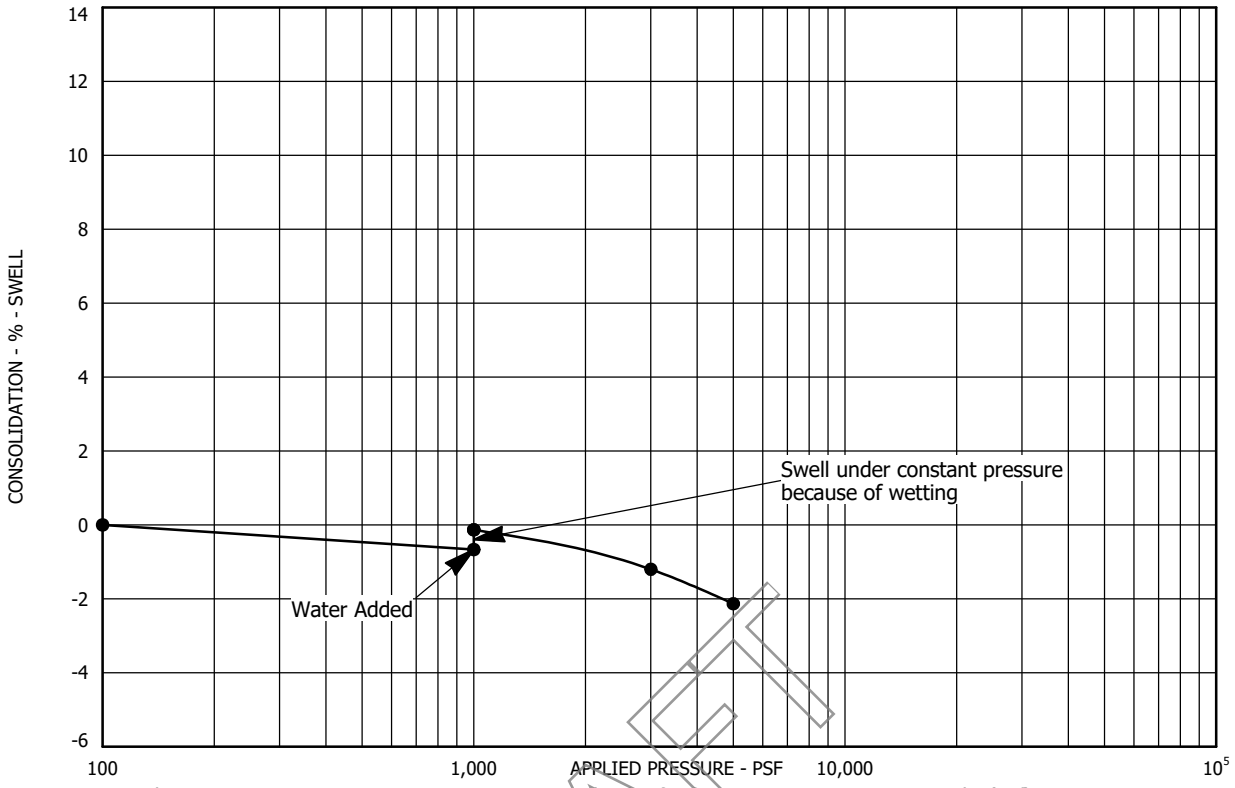
DRAFT



Sample Location: Test Boring No. 95 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 9

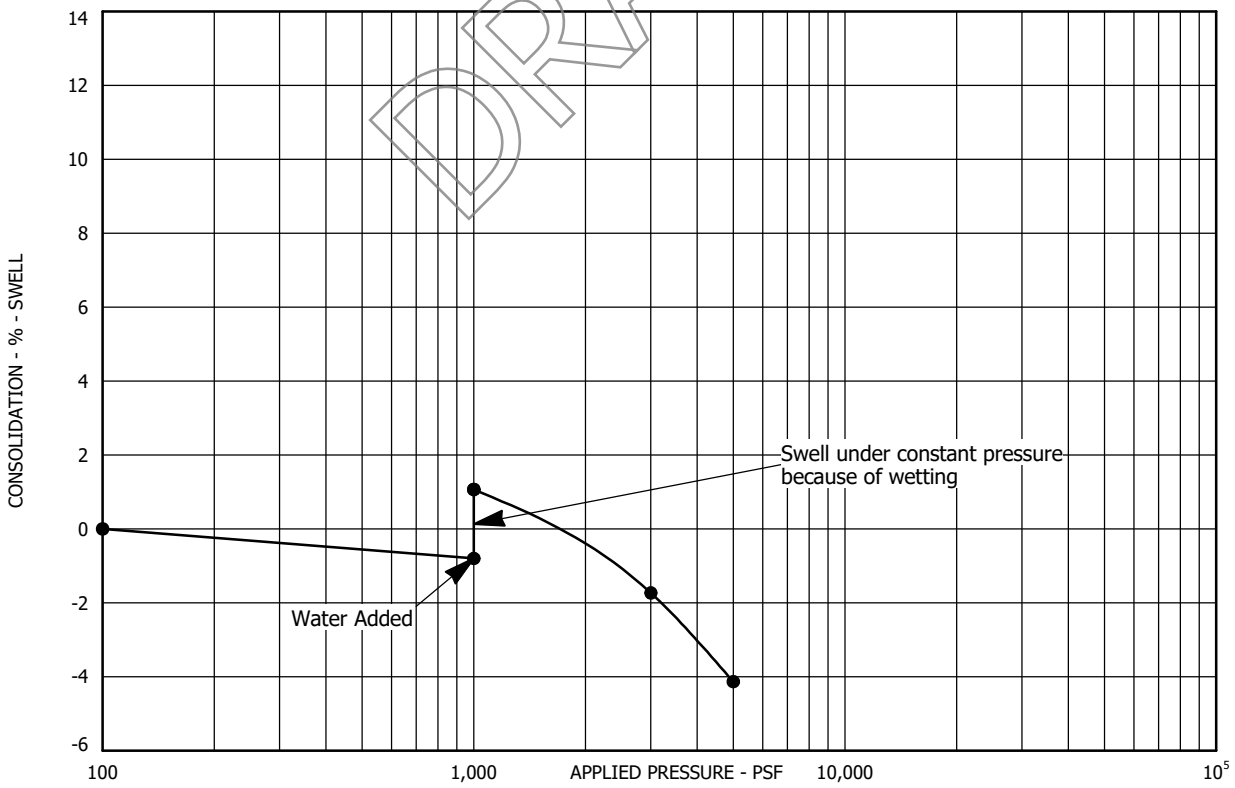
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-119
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 95 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

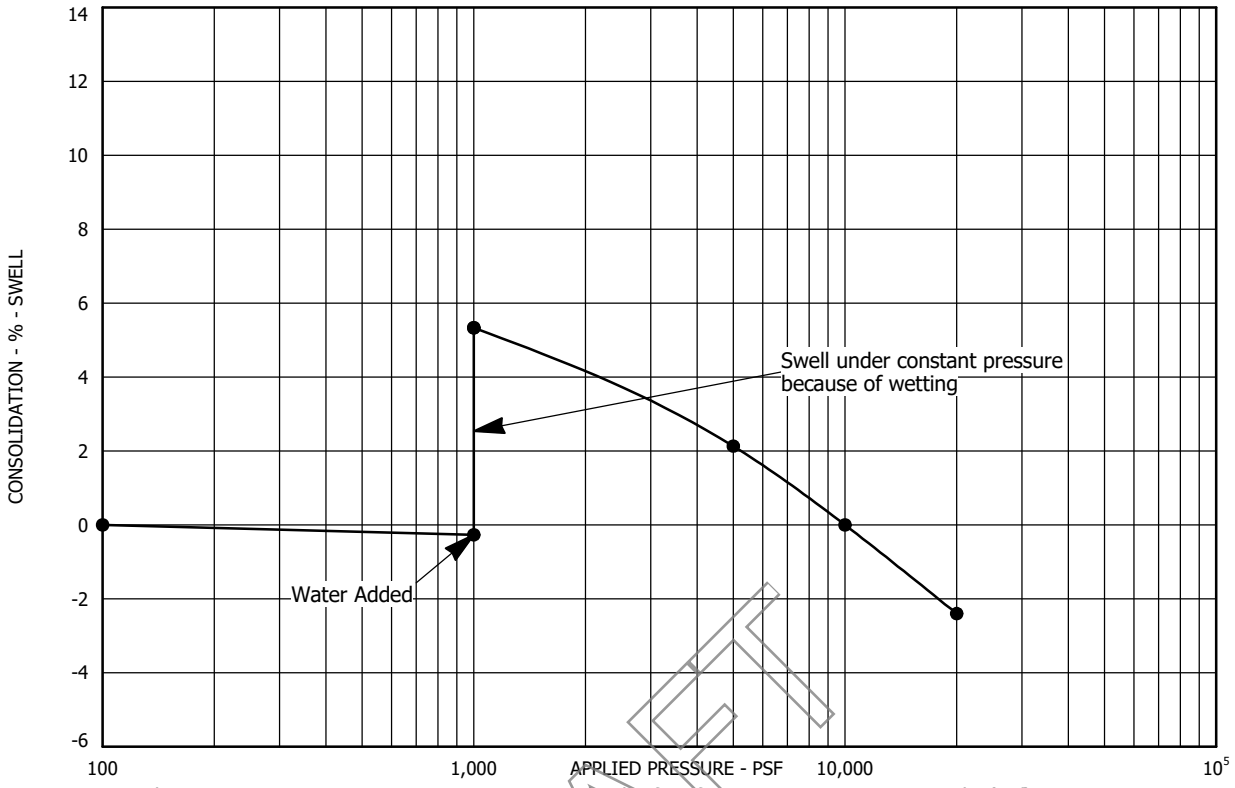
DRAFT



Sample Location: Test Boring No. 95 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 102
Moisture Content (%): 15

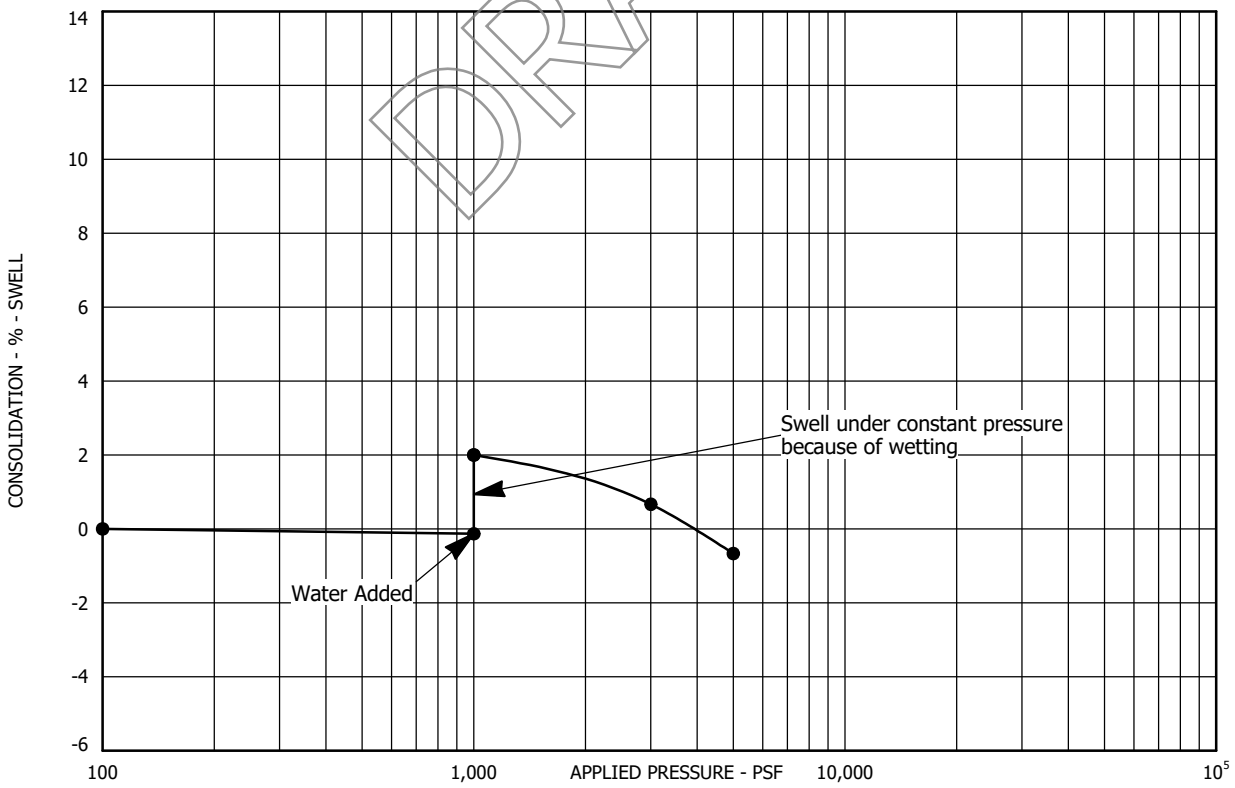
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-120
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 95 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 16

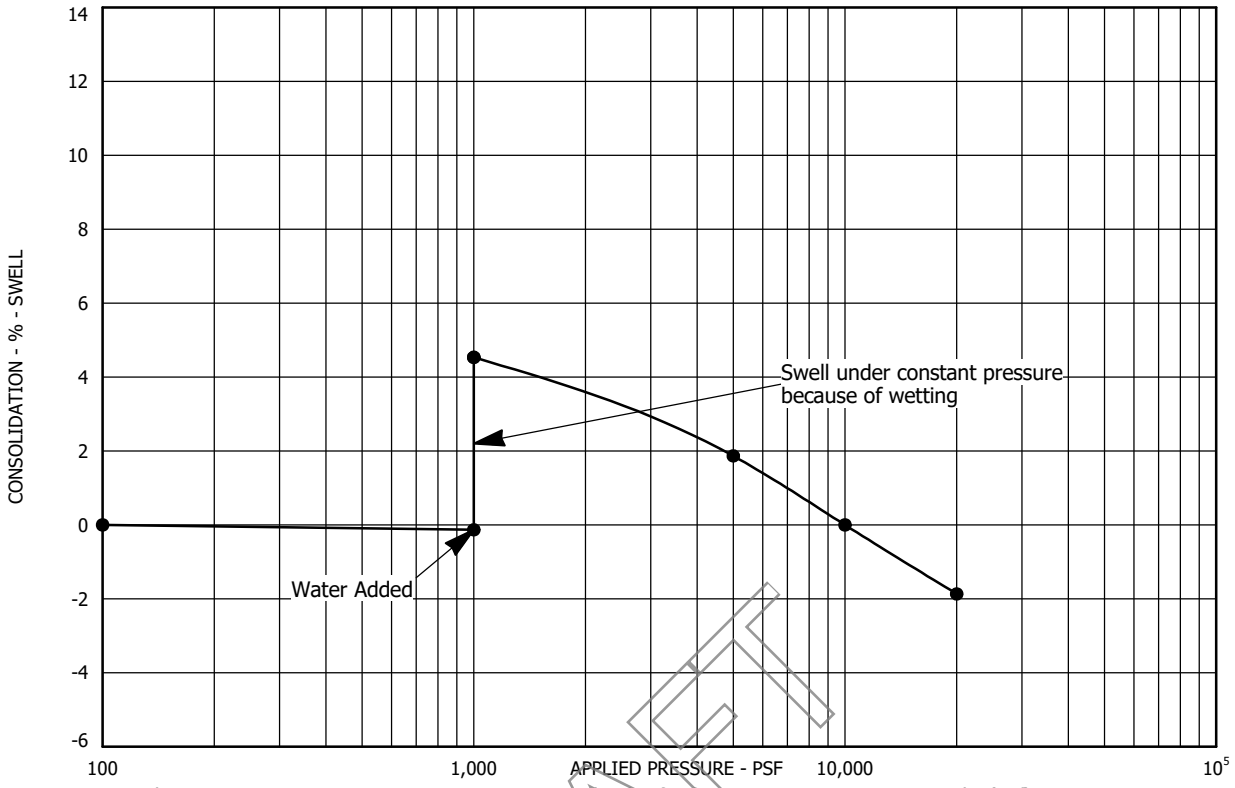
DRAFT



Sample Location: Test Boring No. 96 at a depth of 4 feet
Sample Description: Clay, very sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 7

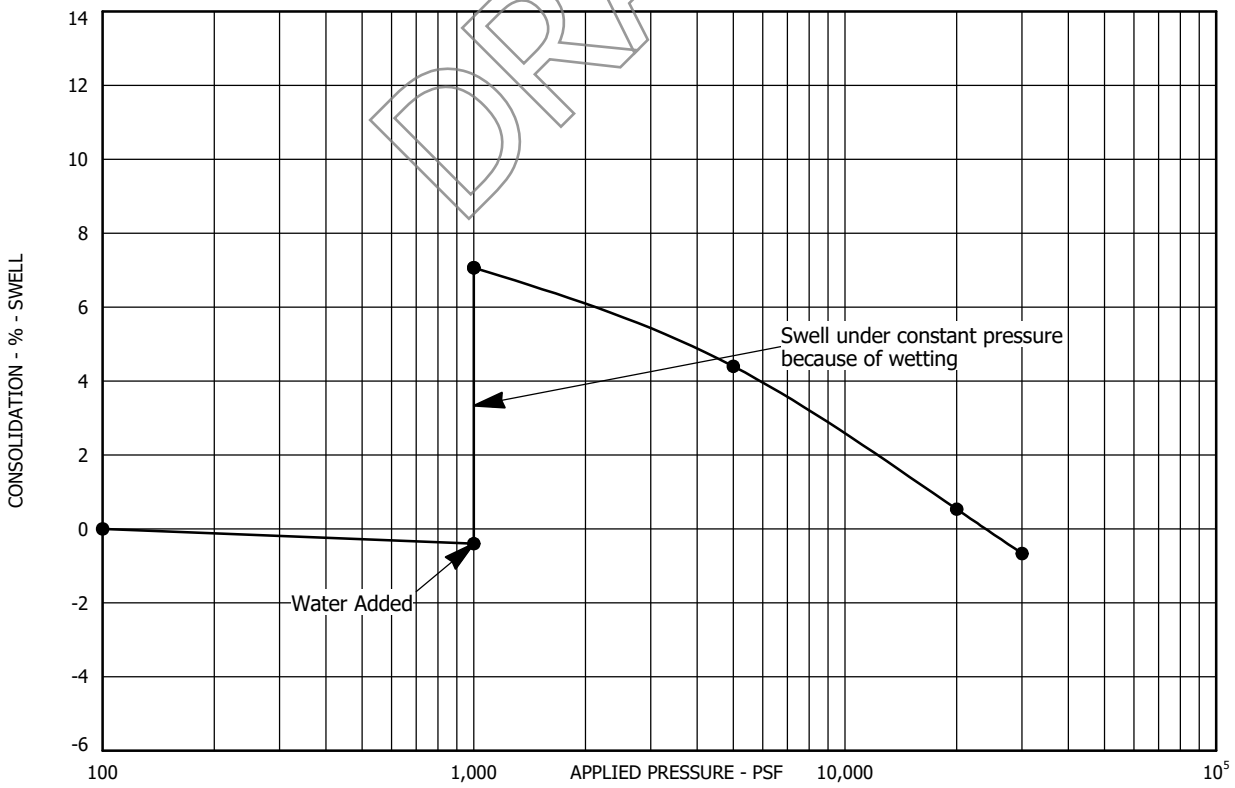
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-121
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 96 at a depth of 9 feet
Sample Description: silt, very sandy (lens)
Dry Unit Weight (pcf): 124
Moisture Content (%): 10

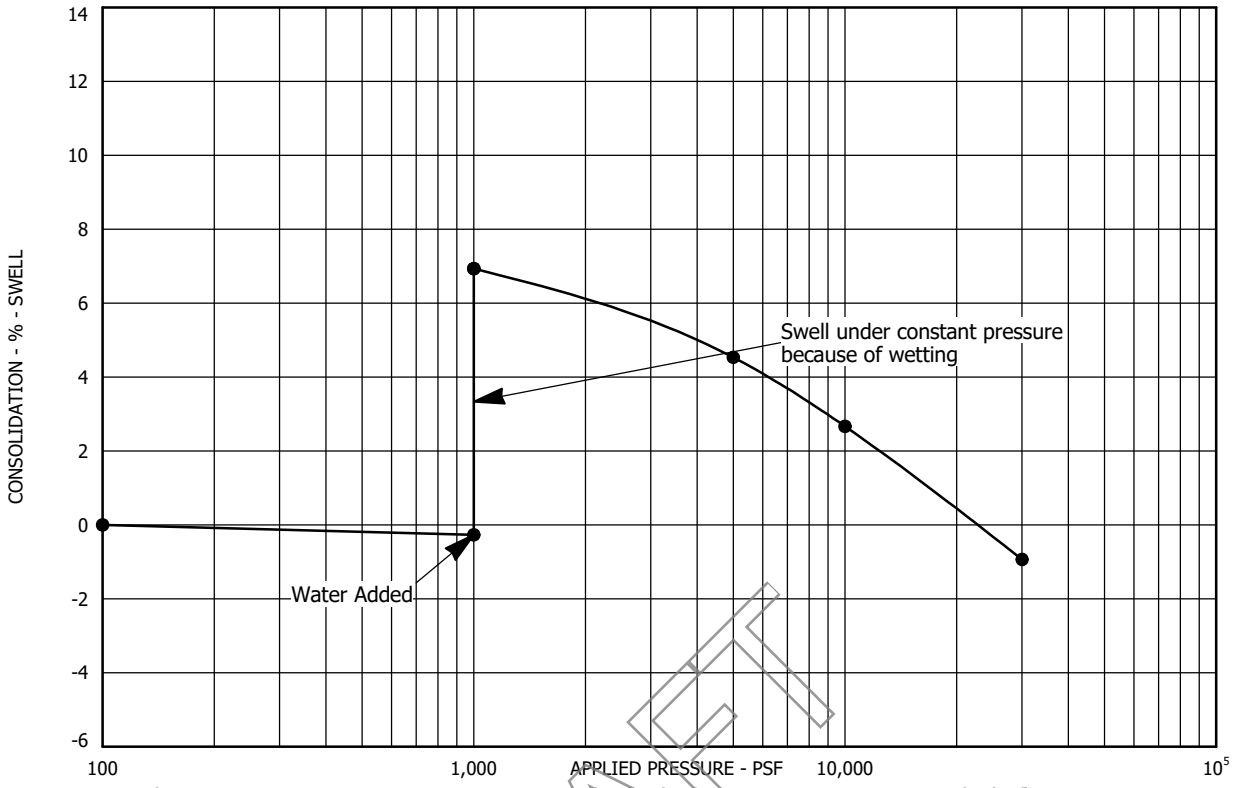
DRAFT



Sample Location: Test Boring No. 96 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 125
Moisture Content (%): 13

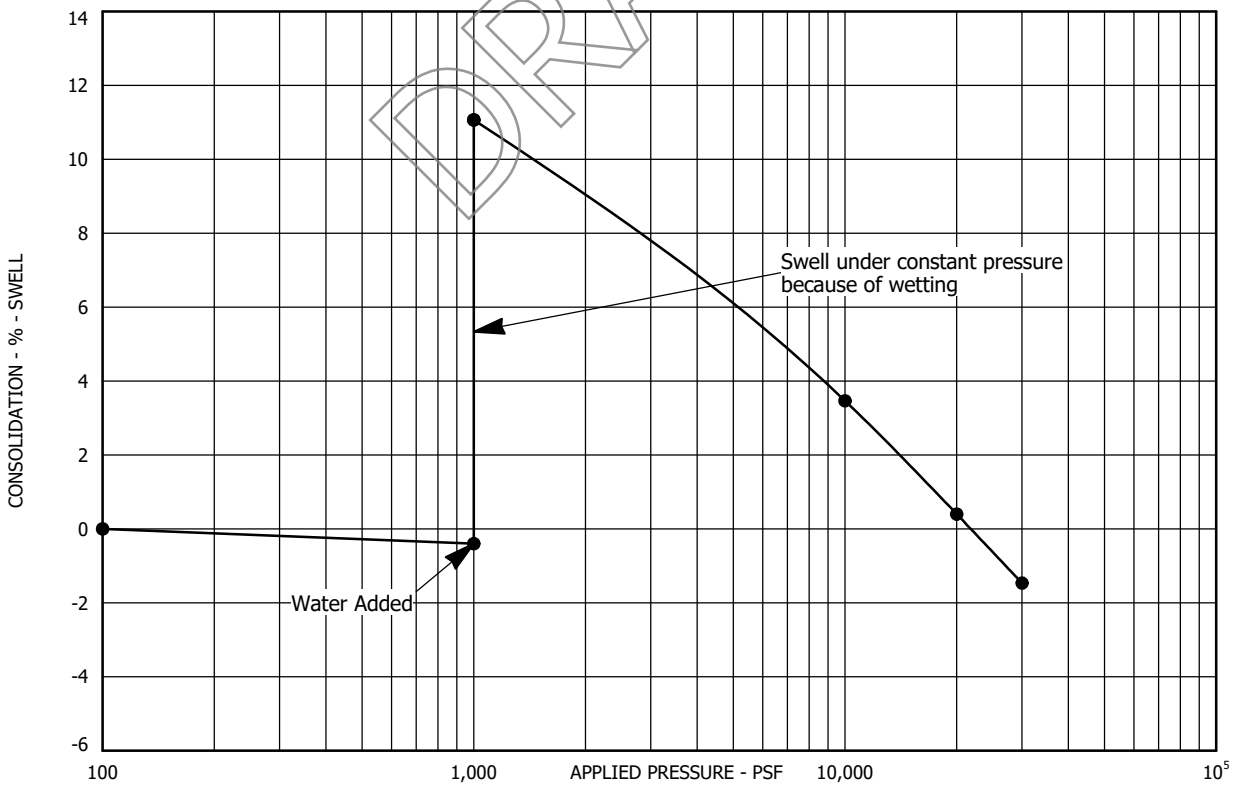
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-122
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 97 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 124
Moisture Content (%): 10

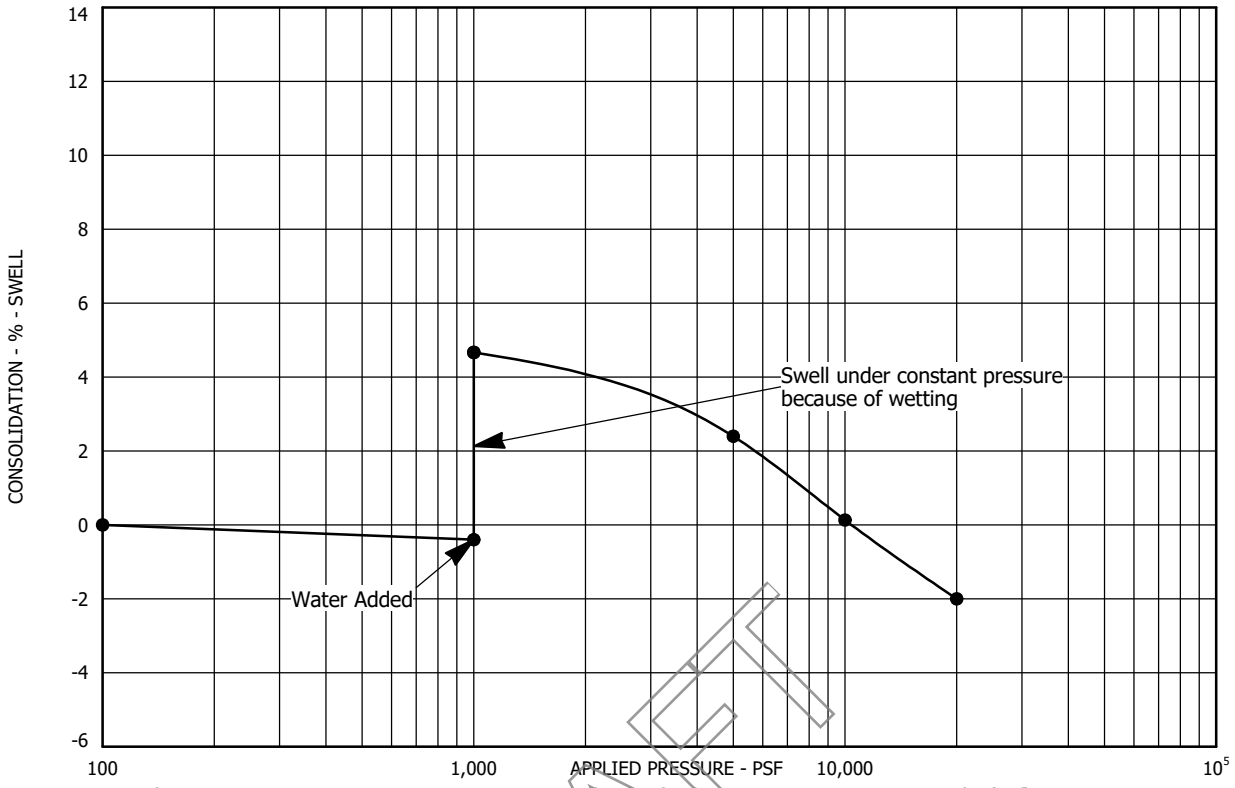
DRAFT



Sample Location: Test Boring No. 98 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 125
Moisture Content (%): 15

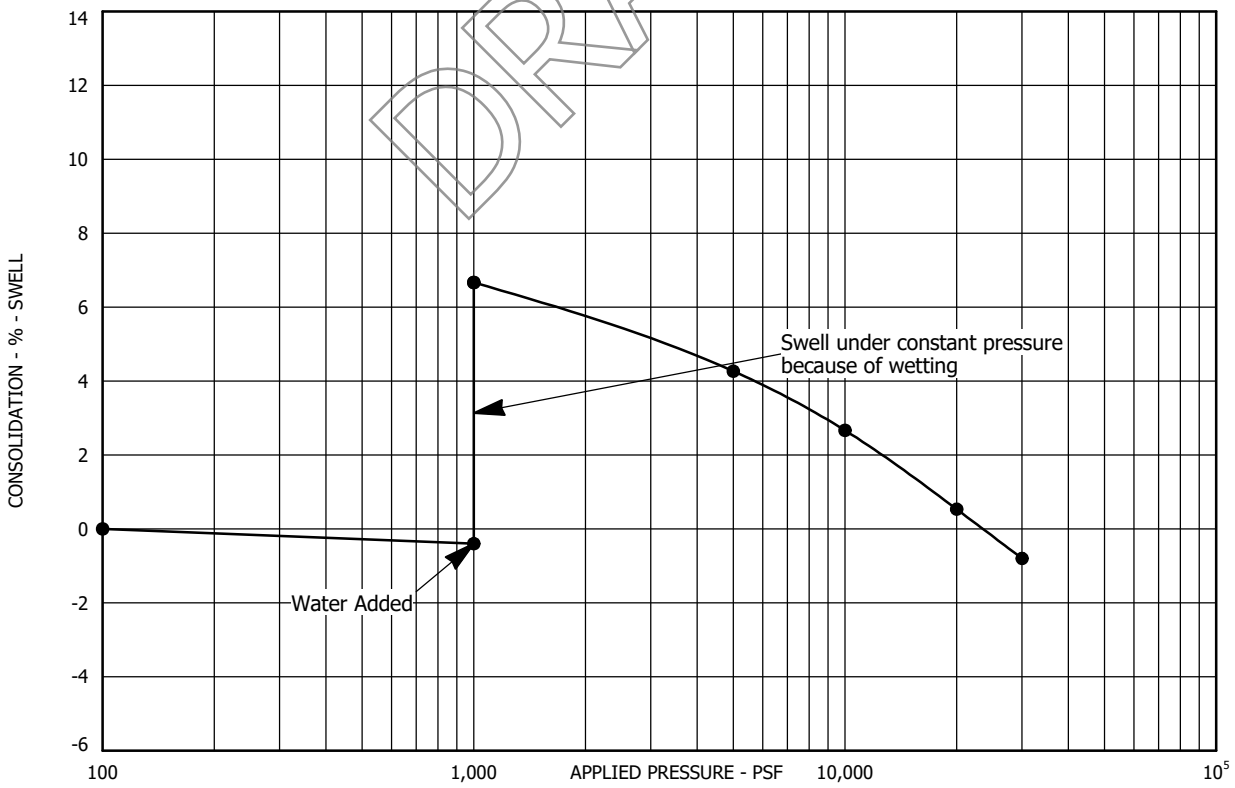
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-123
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 99 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 11

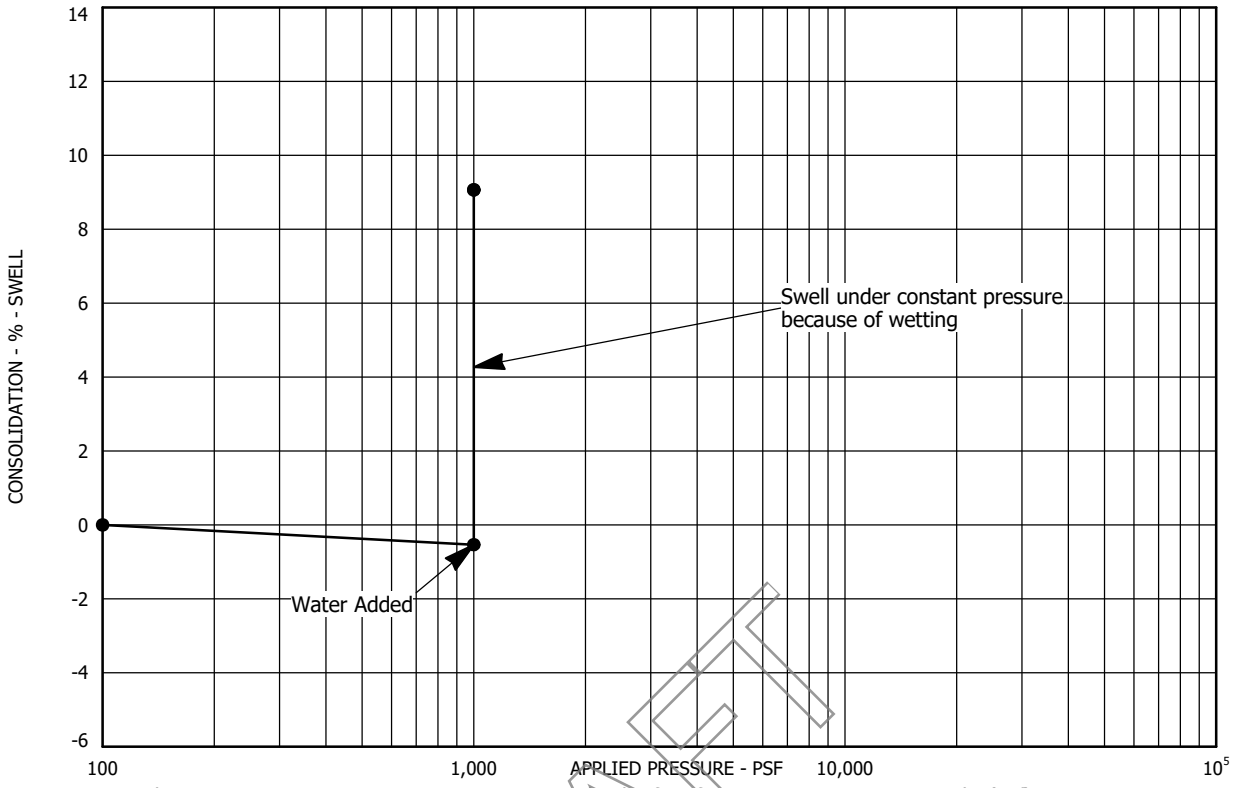
DRAFT



Sample Location: Test Boring No. 99 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 13

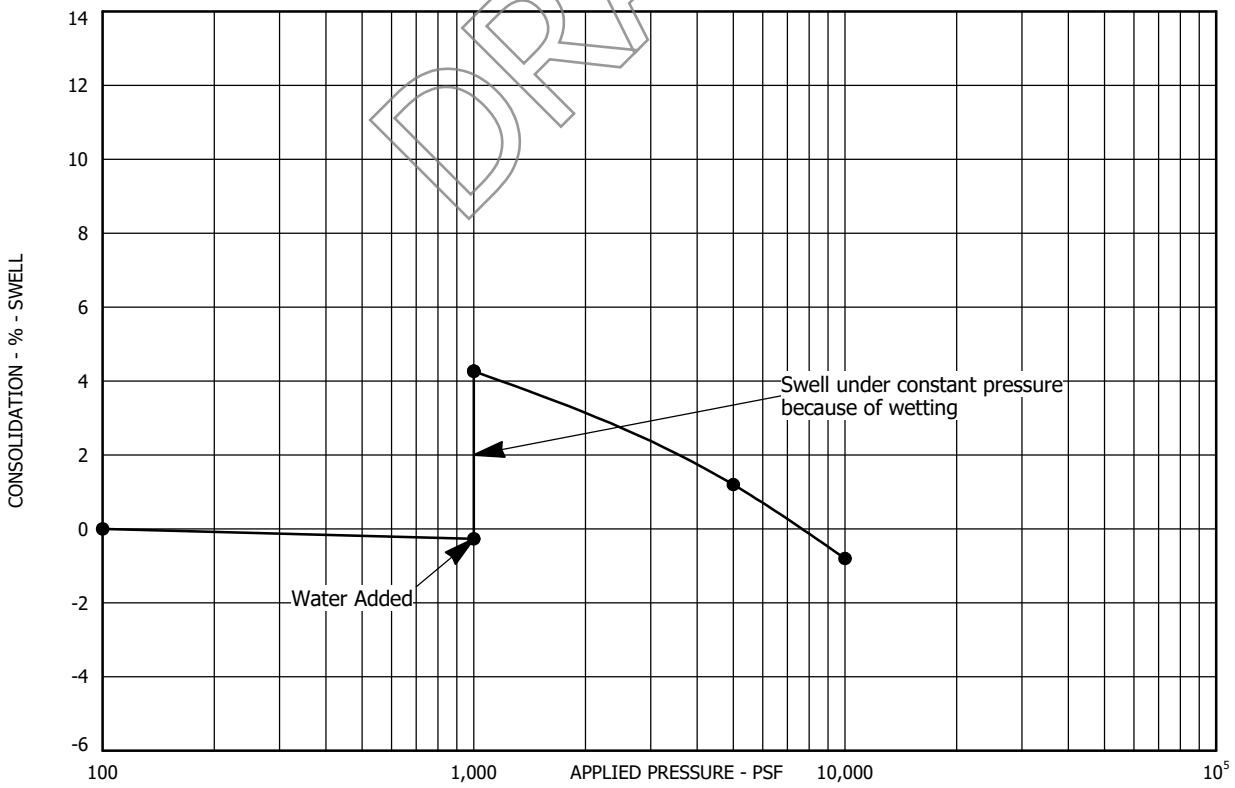
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-124
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 99 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 19

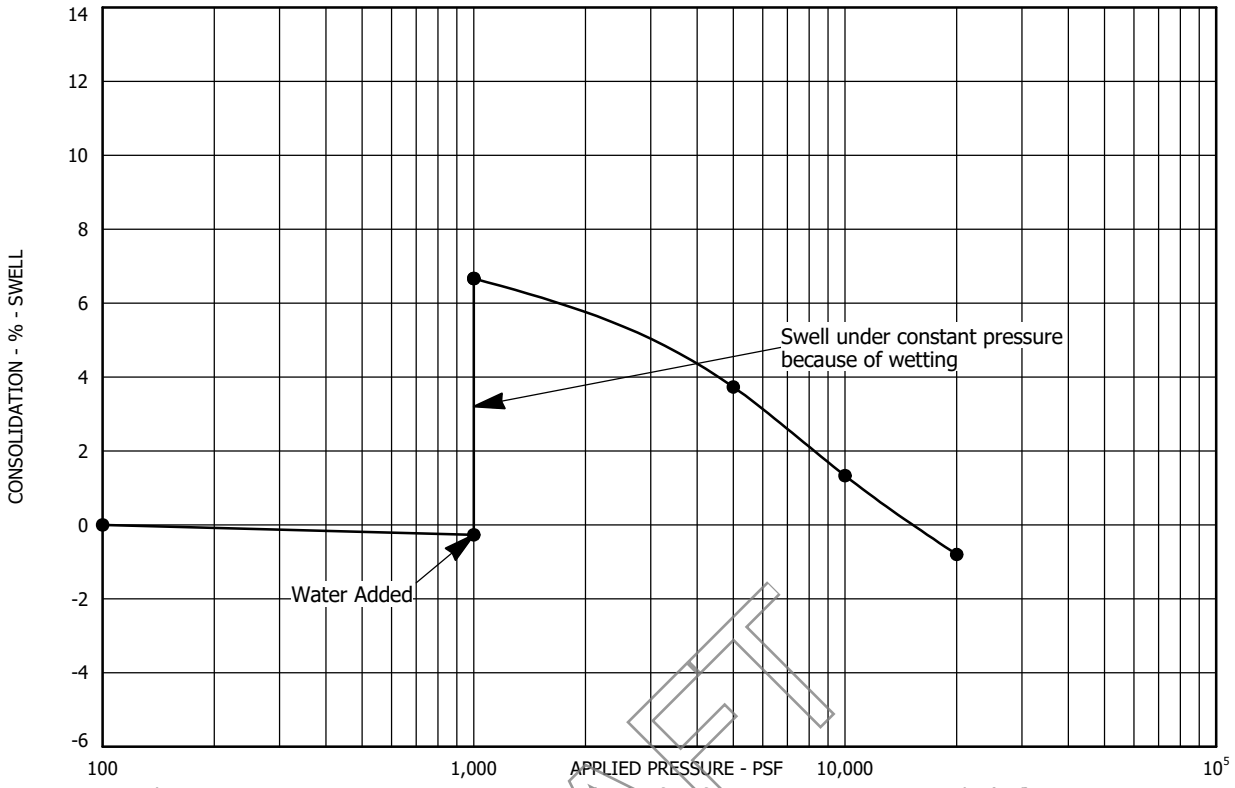
DRAFT



Sample Location: Test Boring No. 100 at a depth of 9 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 24

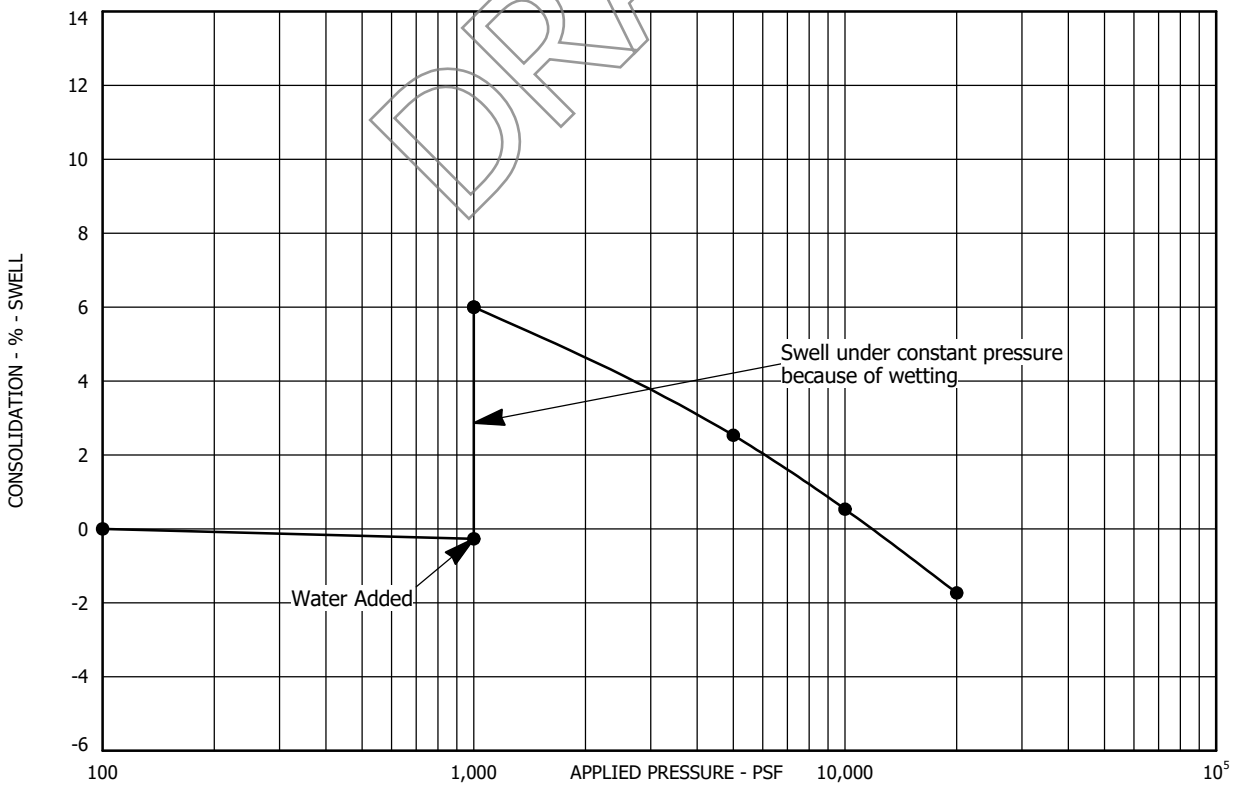
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-125
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 100 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 13

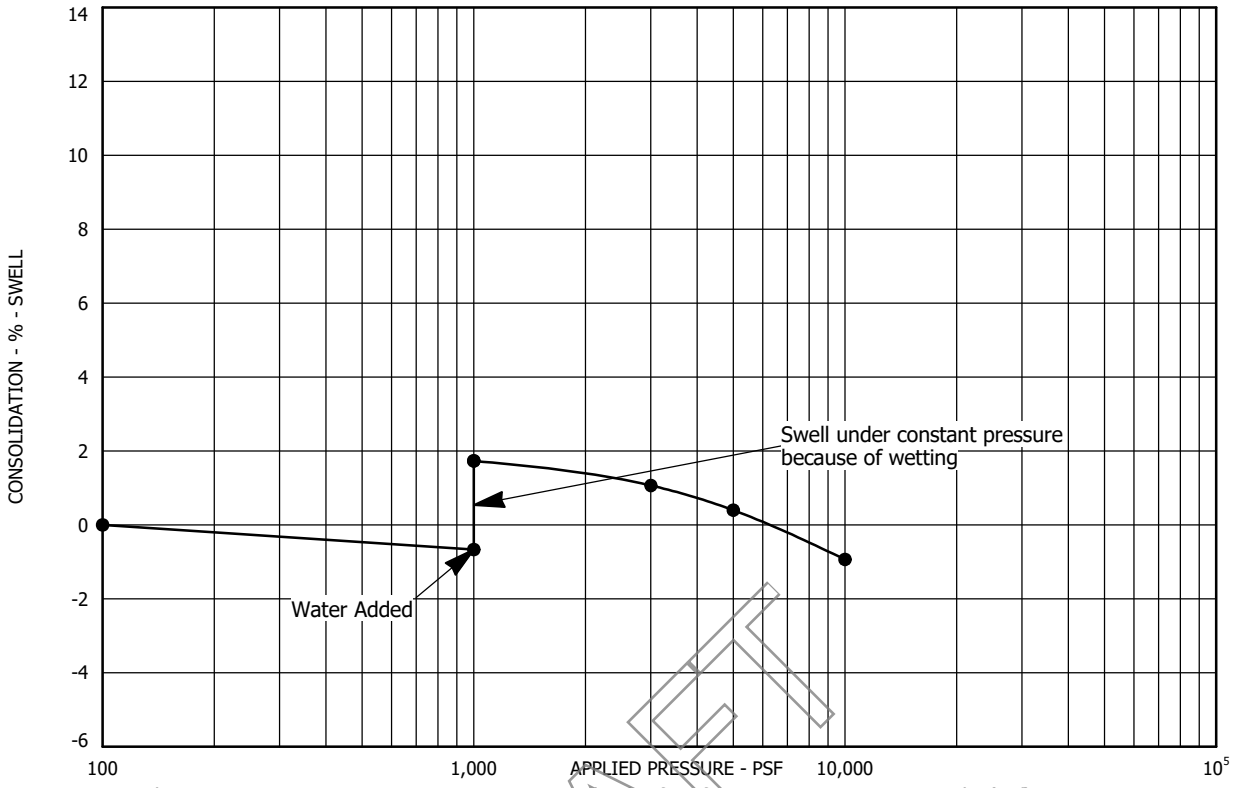
DRAFT



Sample Location: Test Boring No. 101 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 14

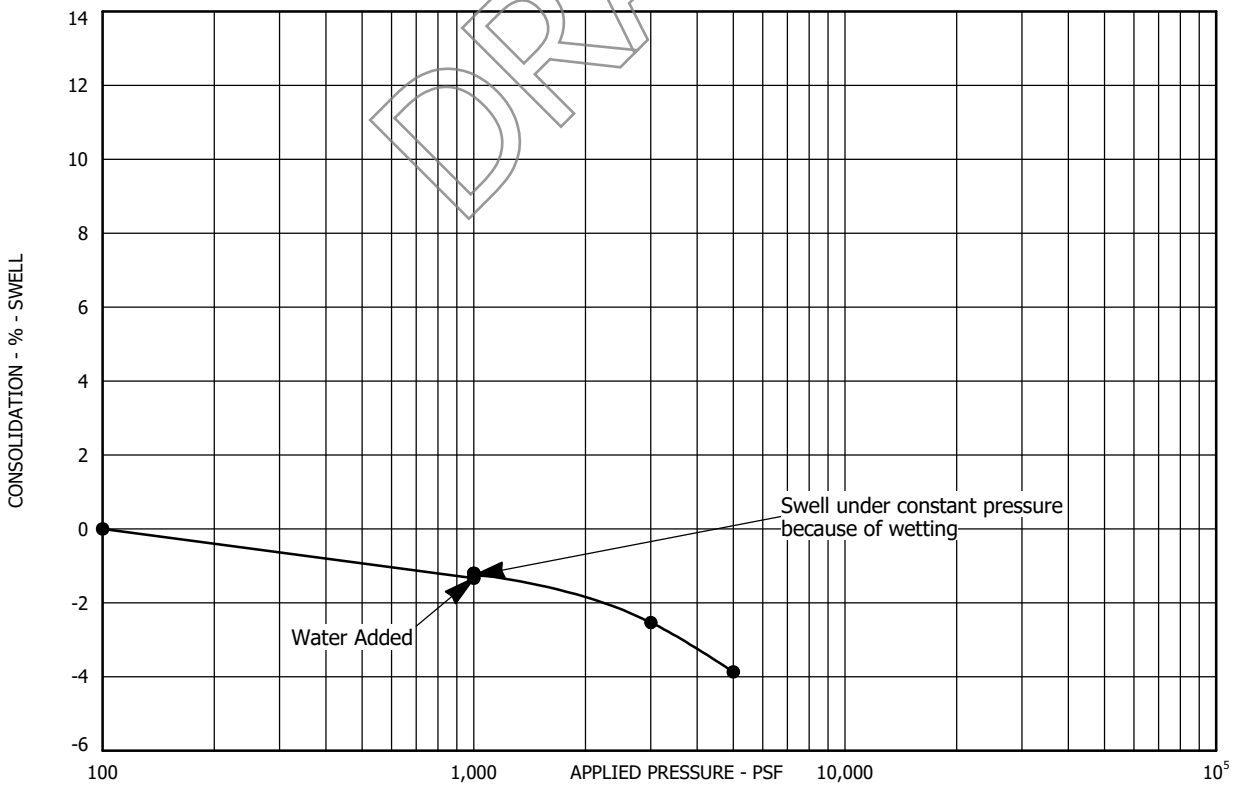
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-126
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 101 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 11

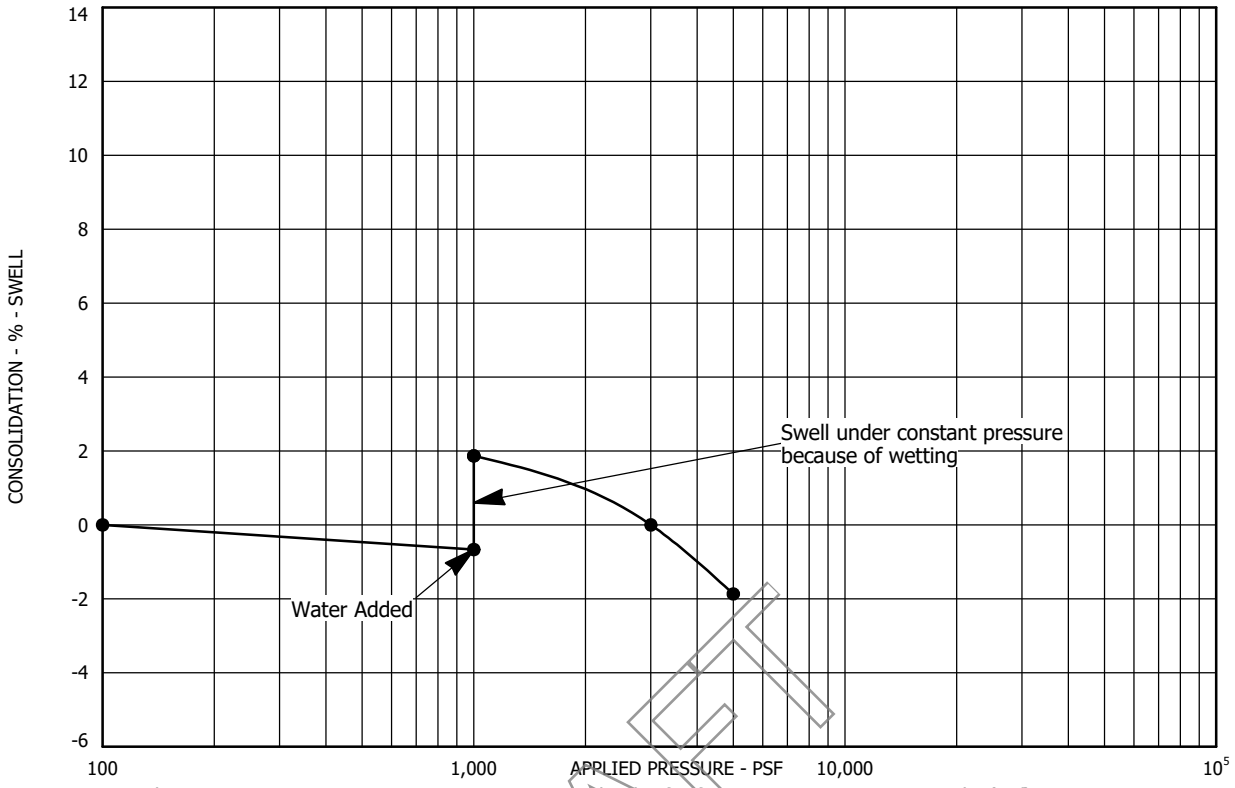
DRAFT



Sample Location: Test Boring No. 101 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 12

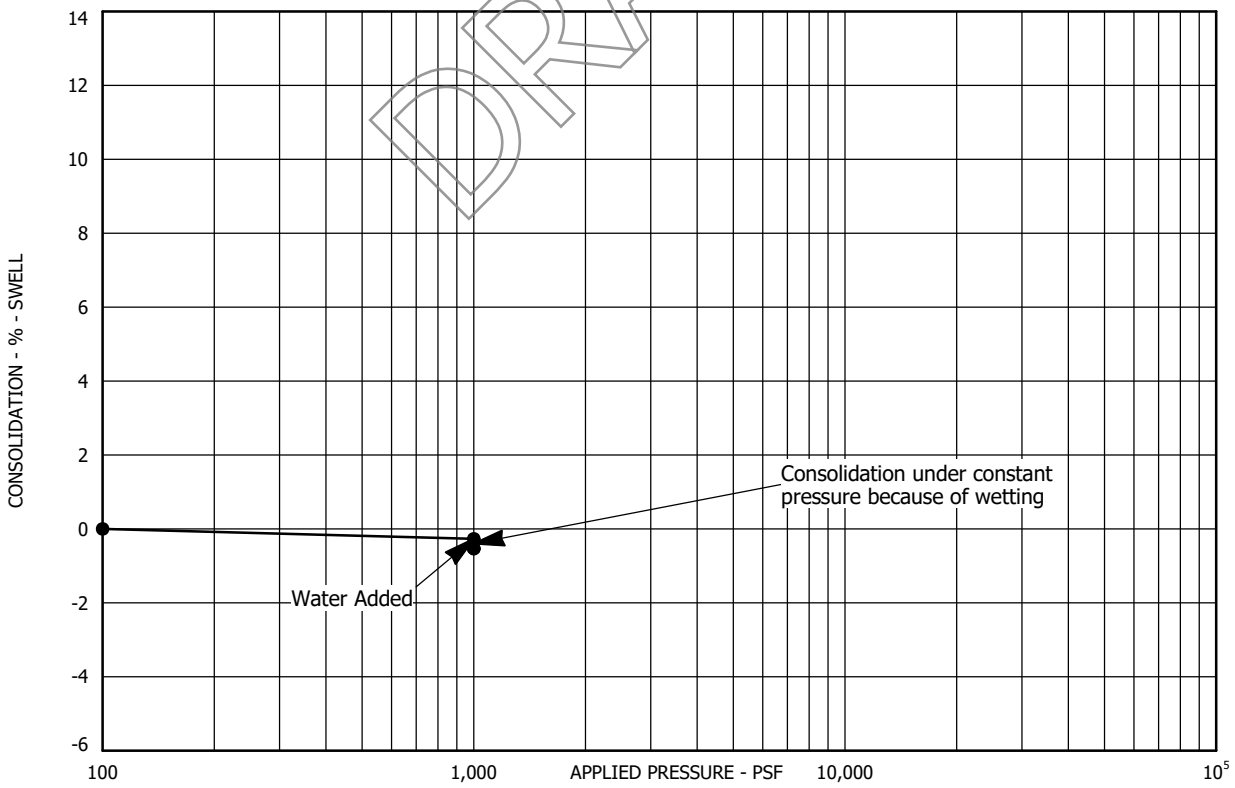
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-127
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 102 at a depth of 9 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 20

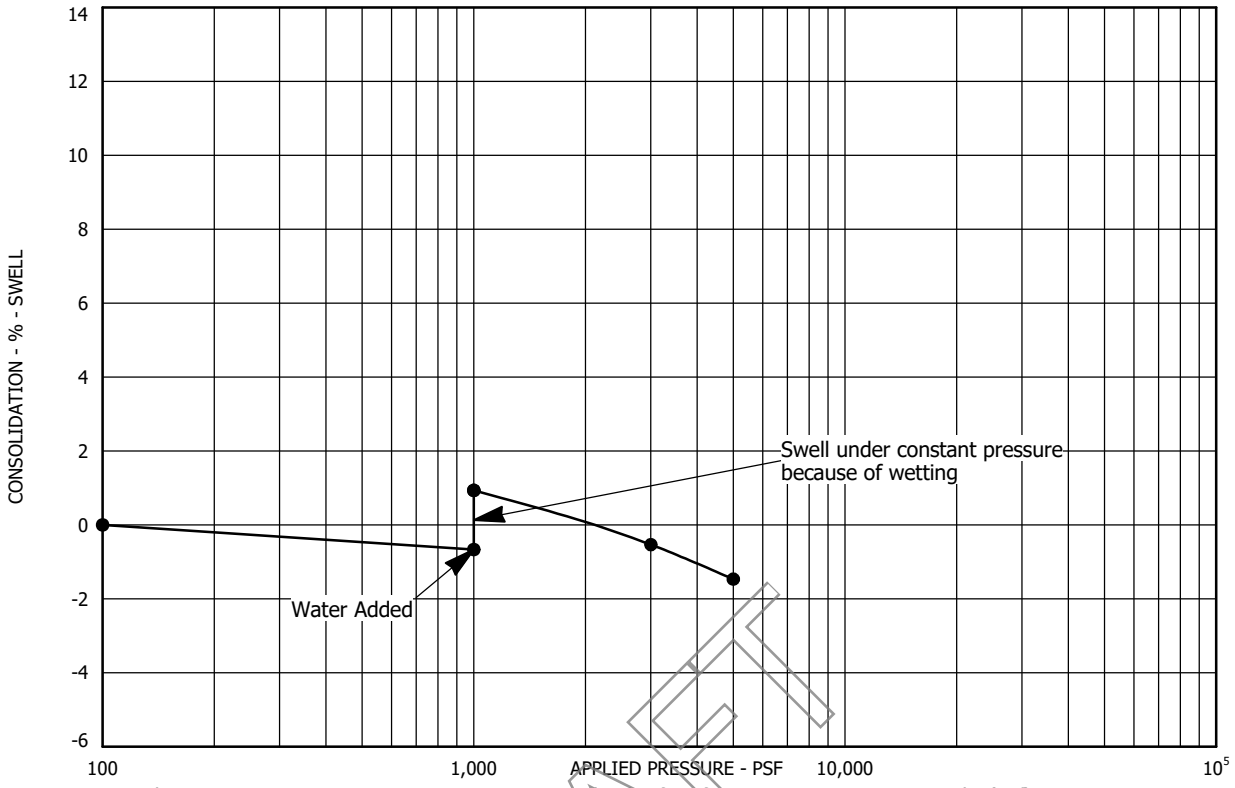
DRAFT



Sample Location: Test Boring No. 103 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 17

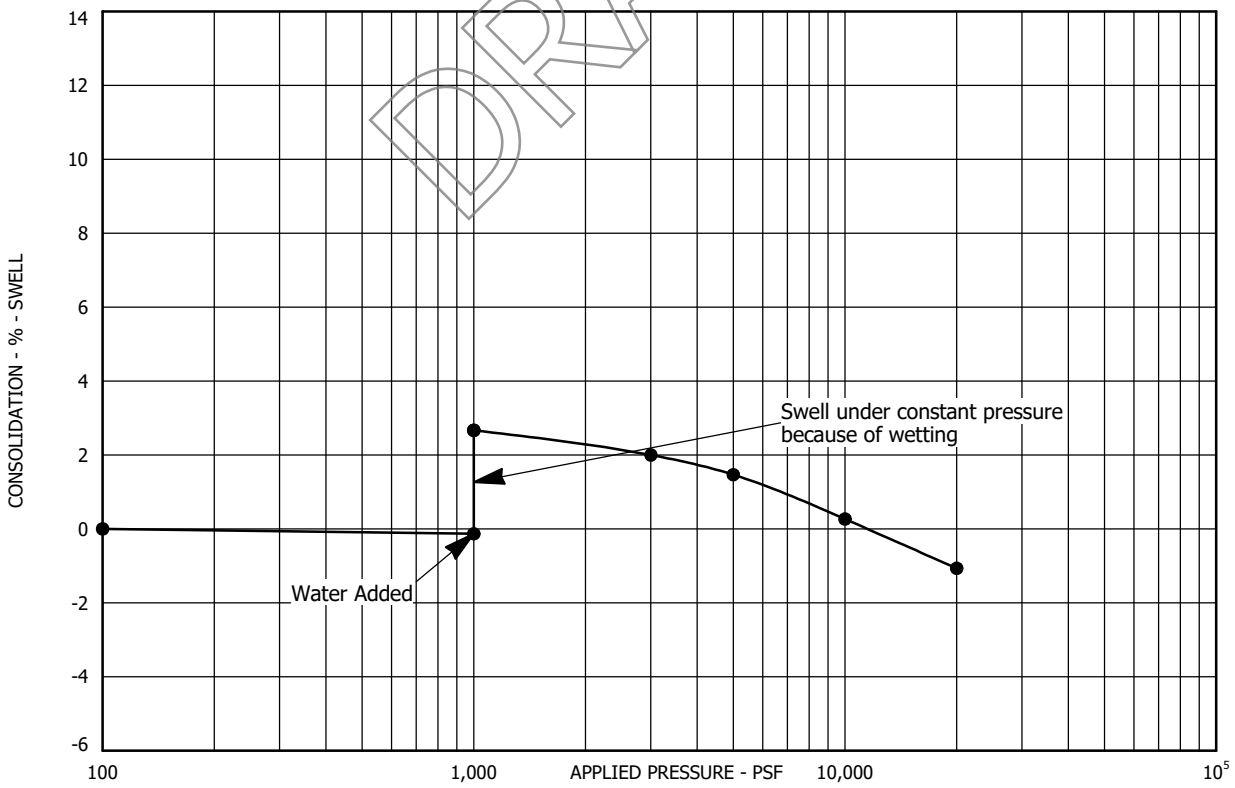
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-128
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 103 at a depth of 14 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 104
Moisture Content (%): 22

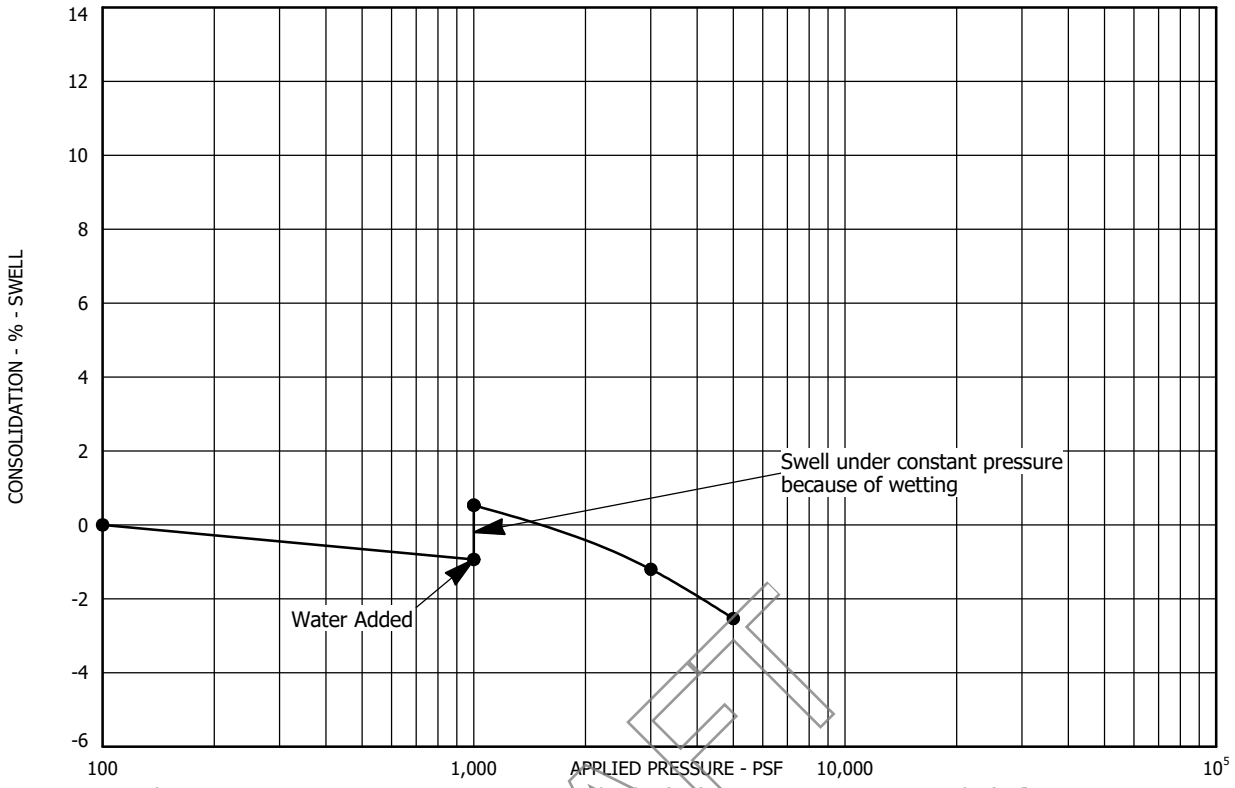
DRAFT



Sample Location: Test Boring No. 103 at a depth of 34 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 126
Moisture Content (%): 13

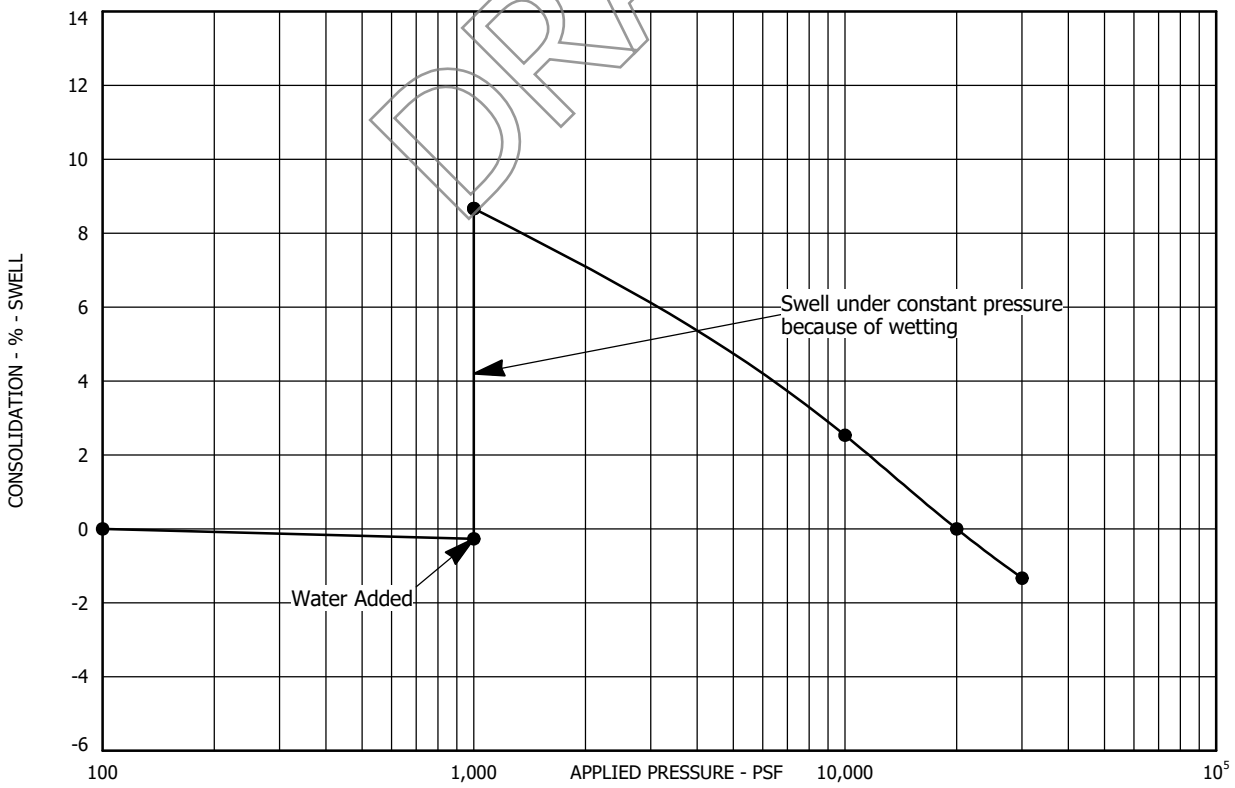
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-129
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 104 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 14

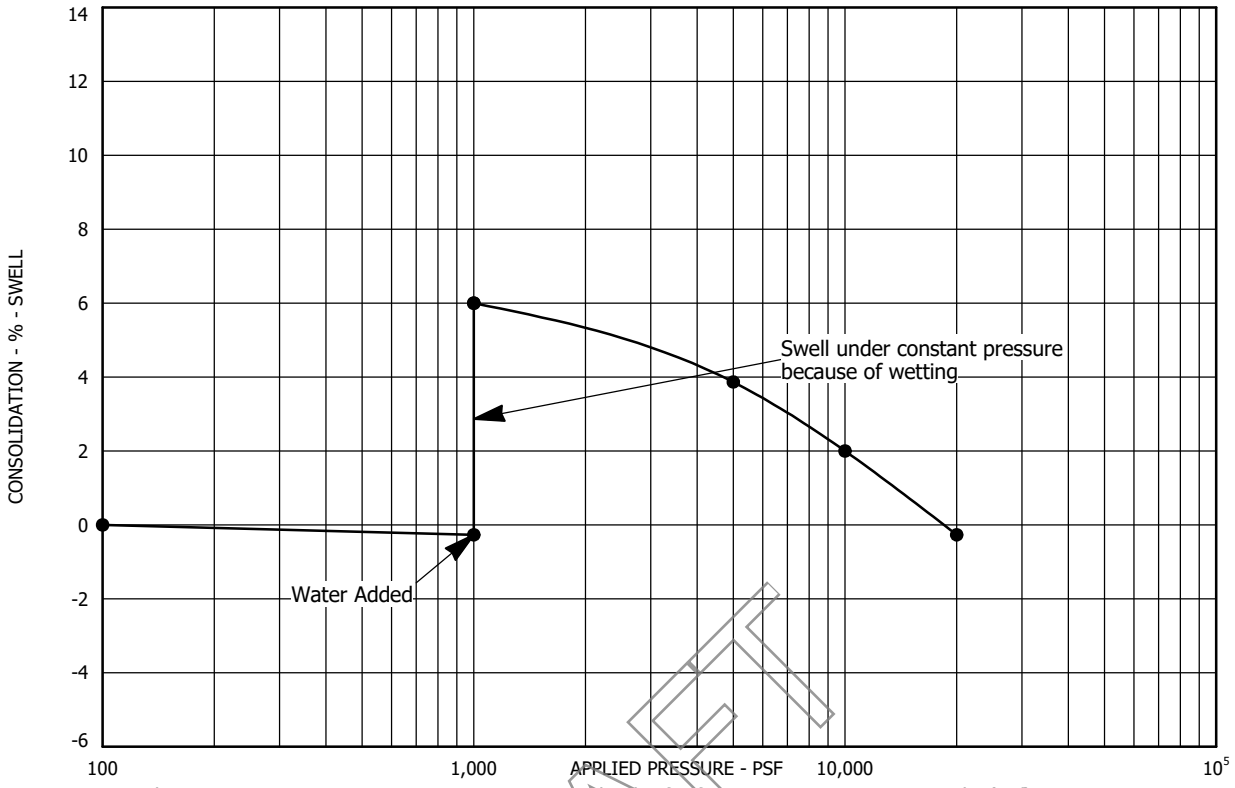
DRAFT



Sample Location: Test Boring No. 104 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 129
Moisture Content (%): 13

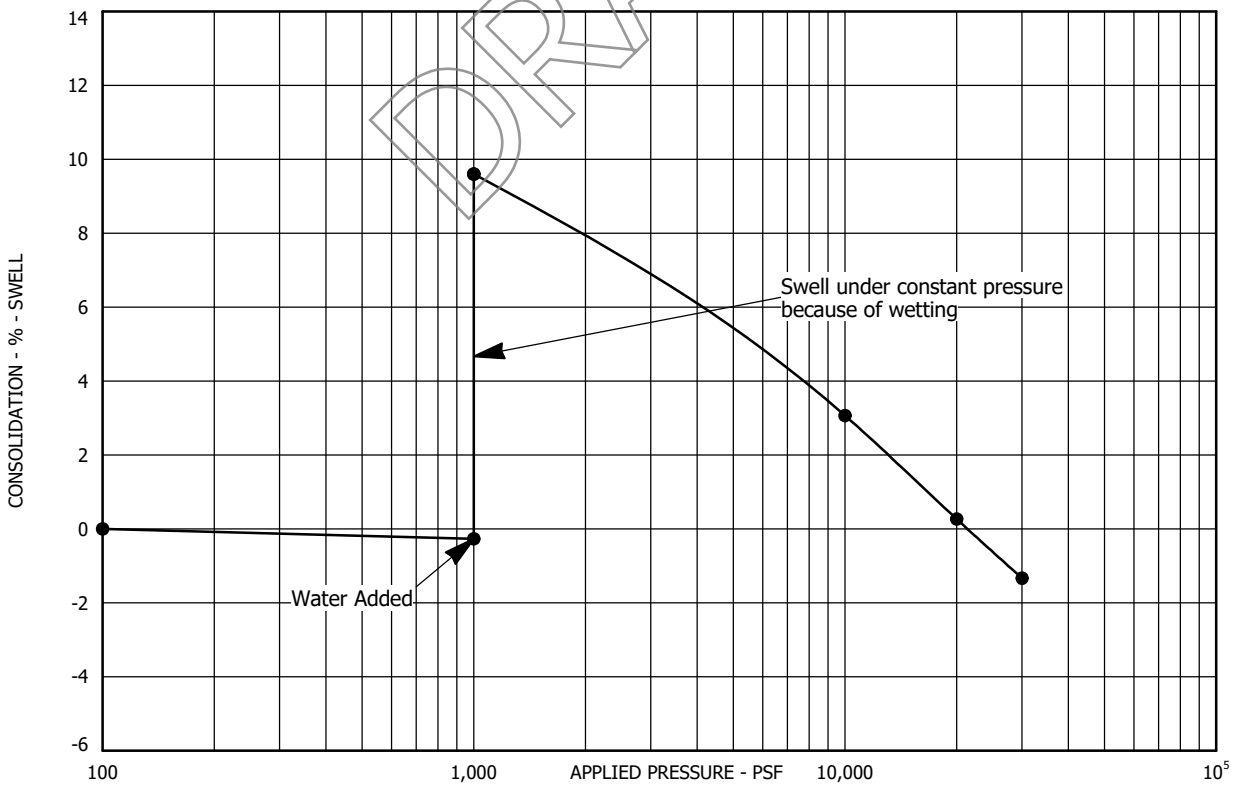
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-130
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 105 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 15

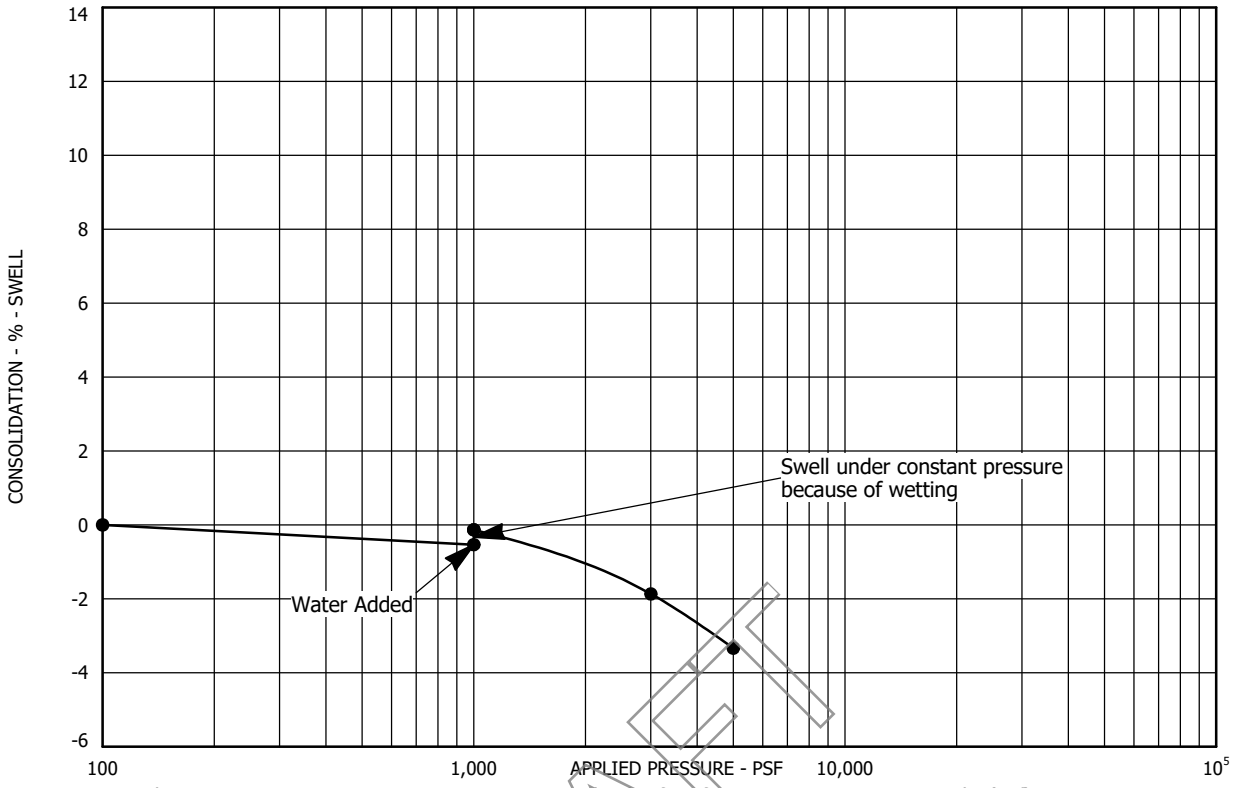
DRAFT



Sample Location: Test Boring No. 105 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 14

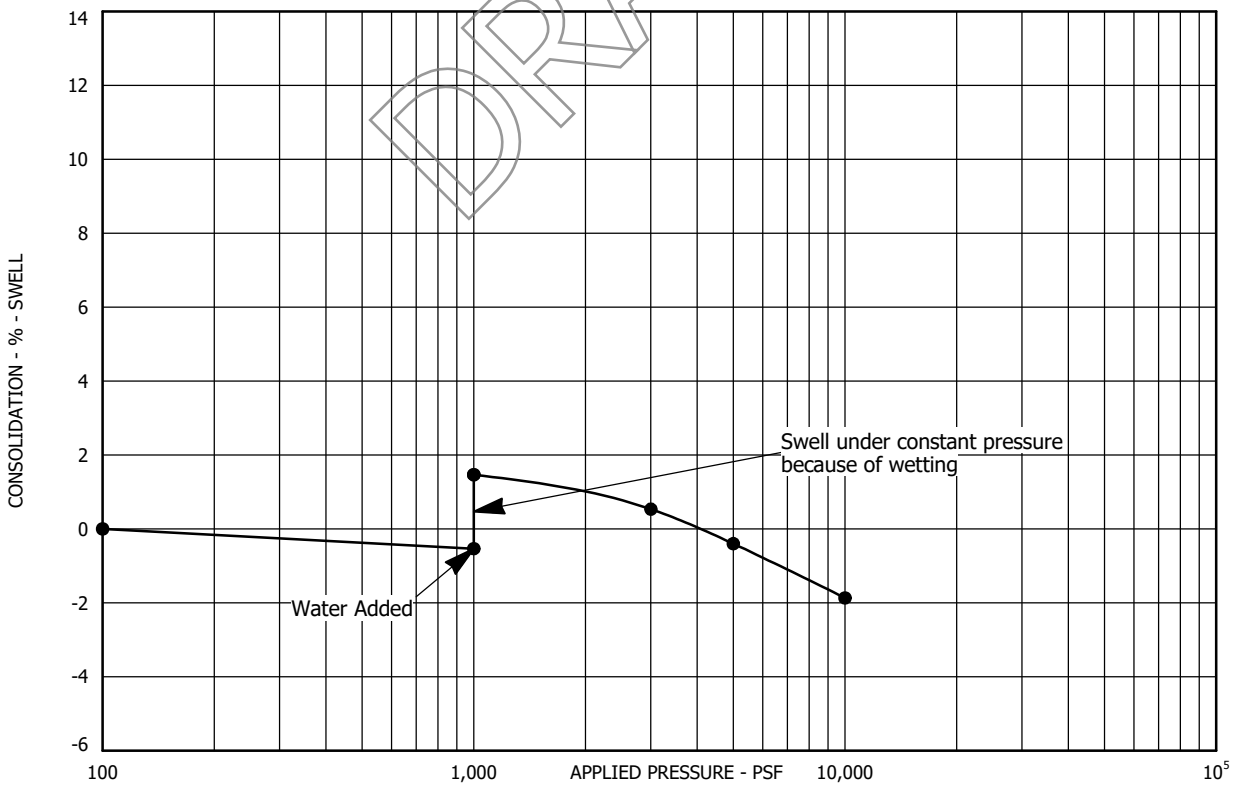
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-131
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 105 at a depth of 24 feet
Sample Description: Claystone, silty
Dry Unit Weight (pcf): 114
Moisture Content (%): 9

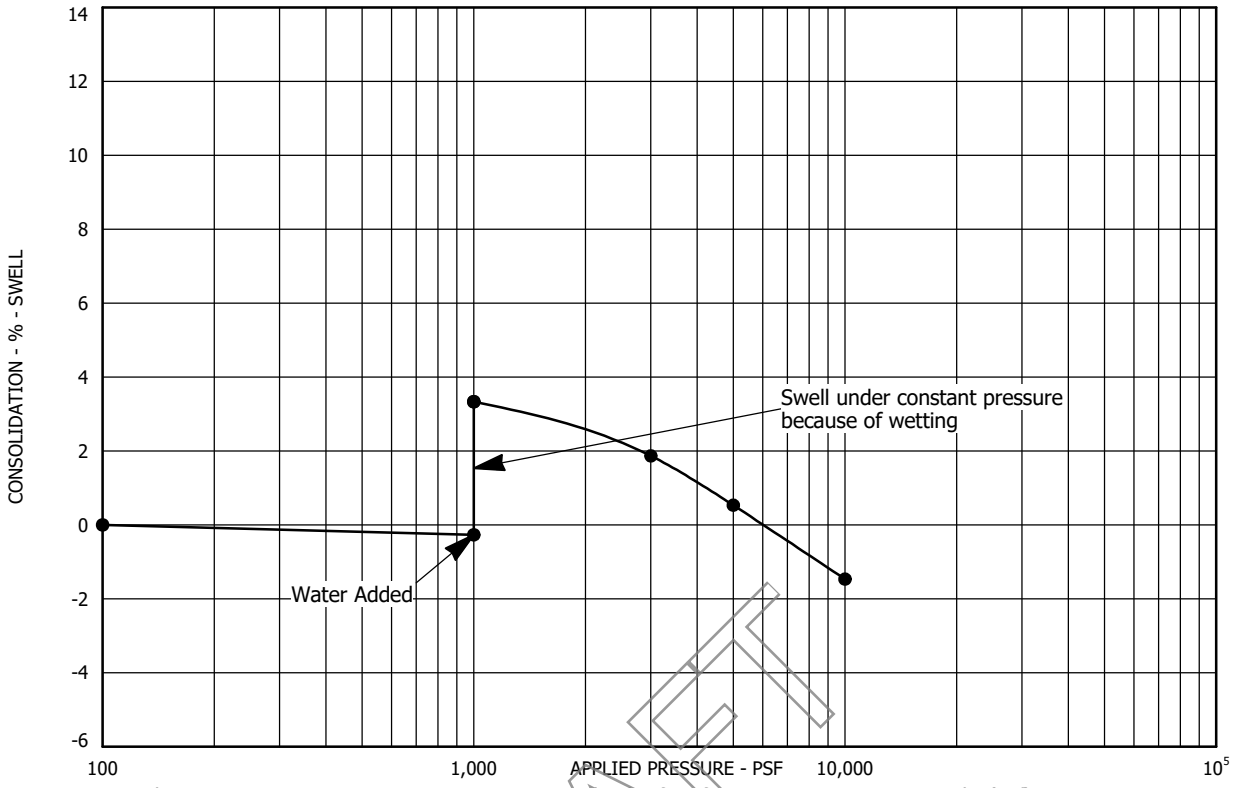
DRAFT



Sample Location: Test Boring No. 106 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 16

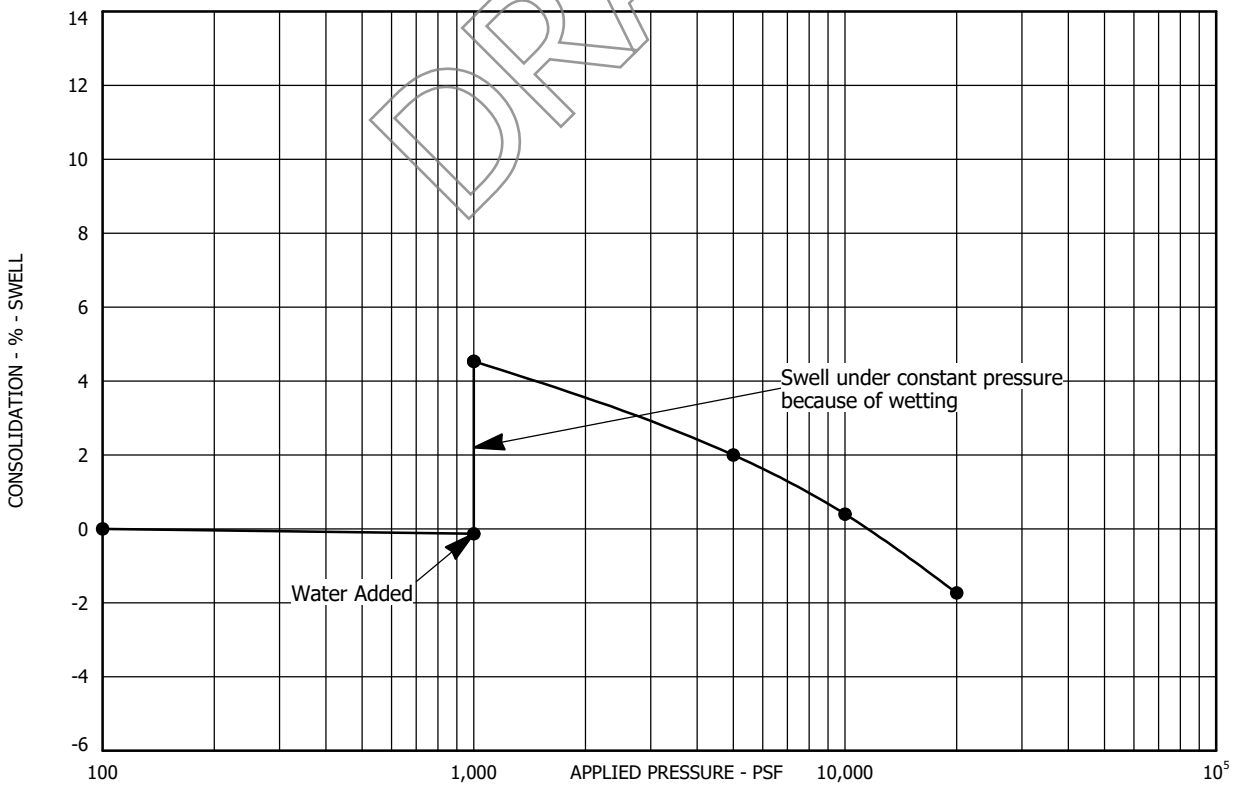
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-132
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 106 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 110
Moisture Content (%): 19

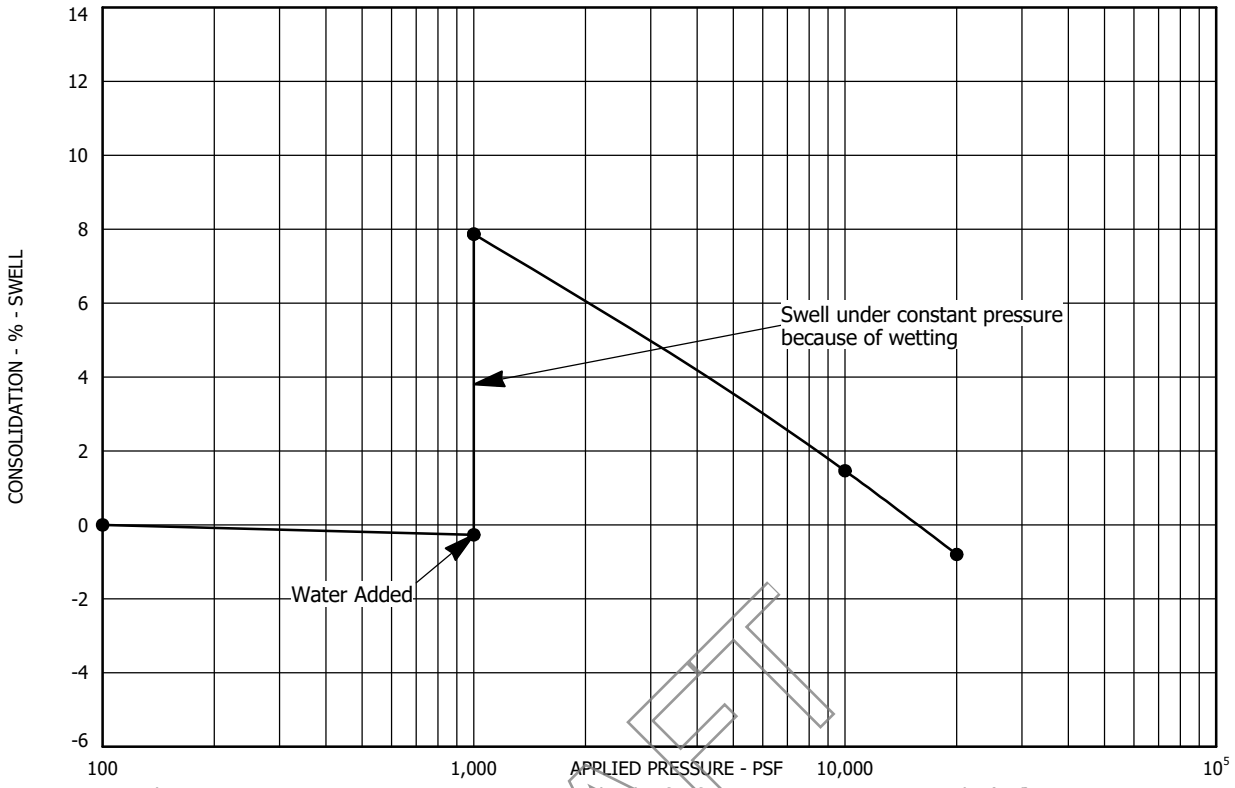
DRAFT



Sample Location: Test Boring No. 106 at a depth of 44 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 109
Moisture Content (%): 17

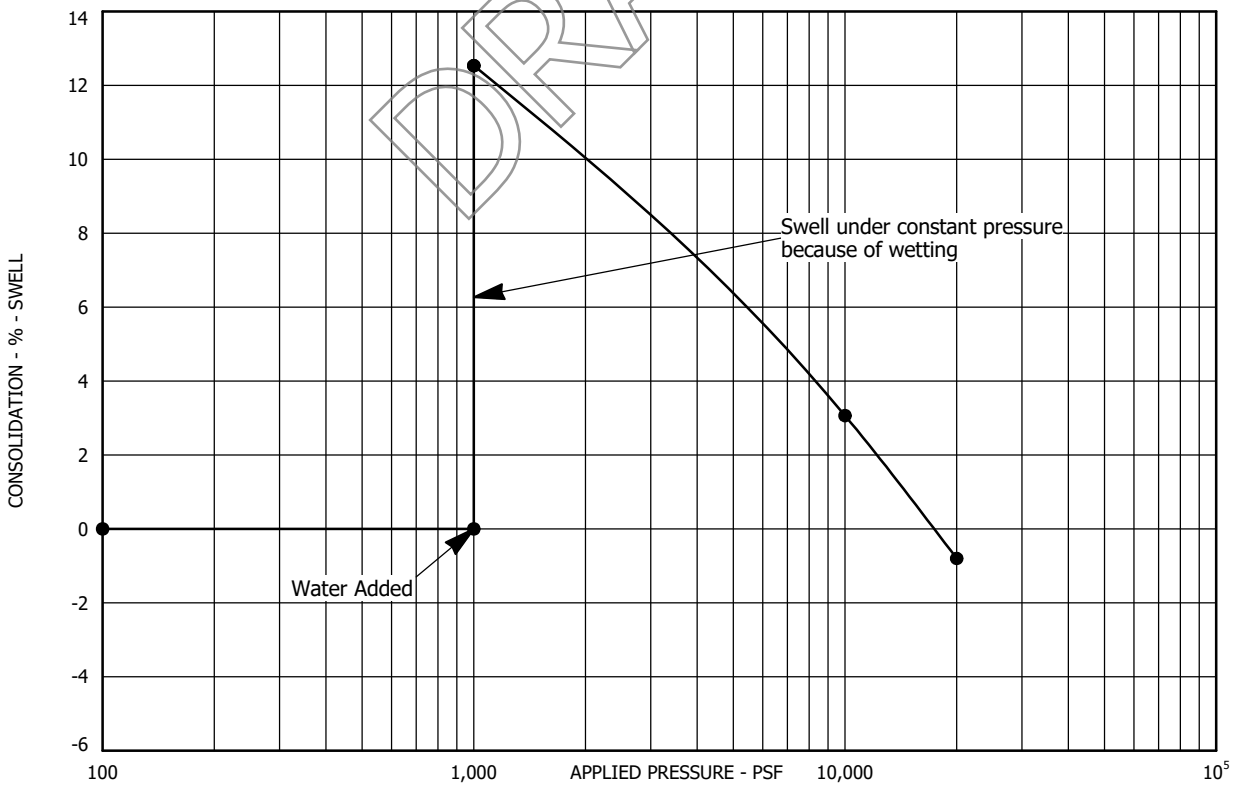
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-133
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 107 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

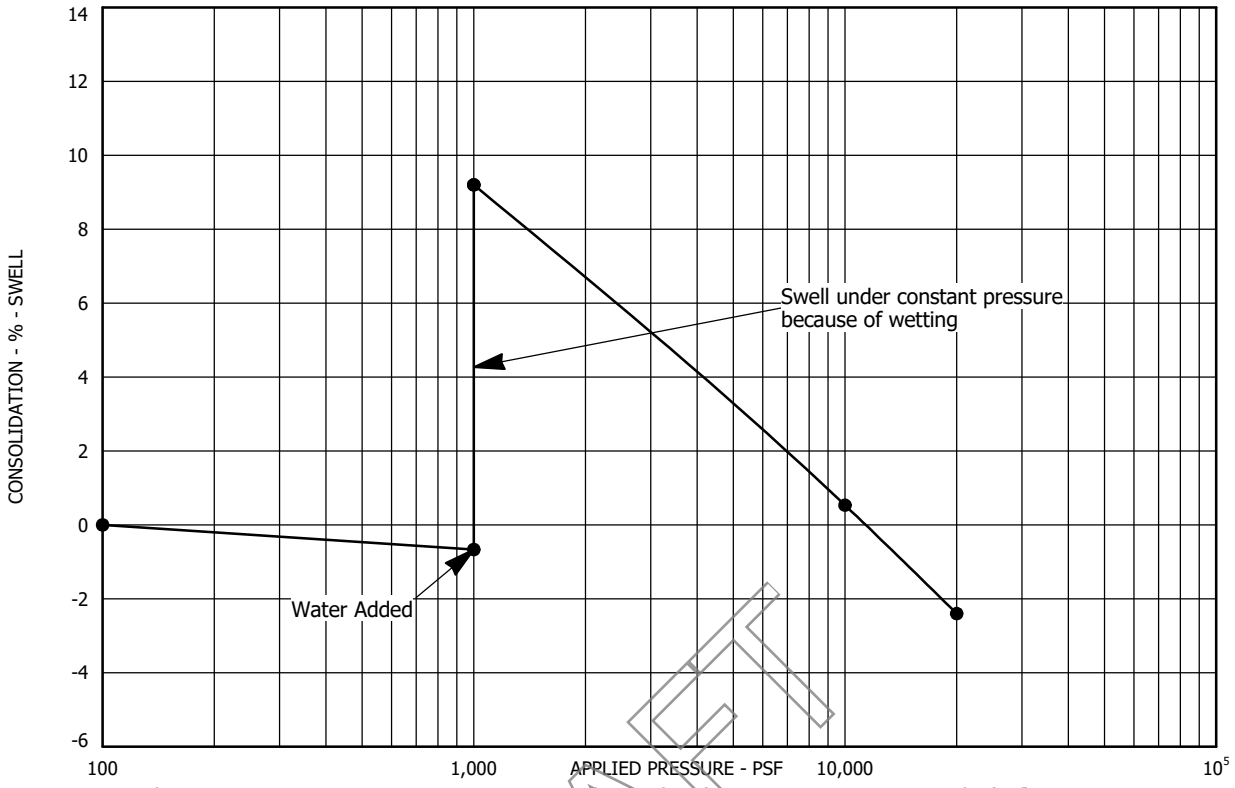
DRAFT



Sample Location: Test Boring No. 107 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 18

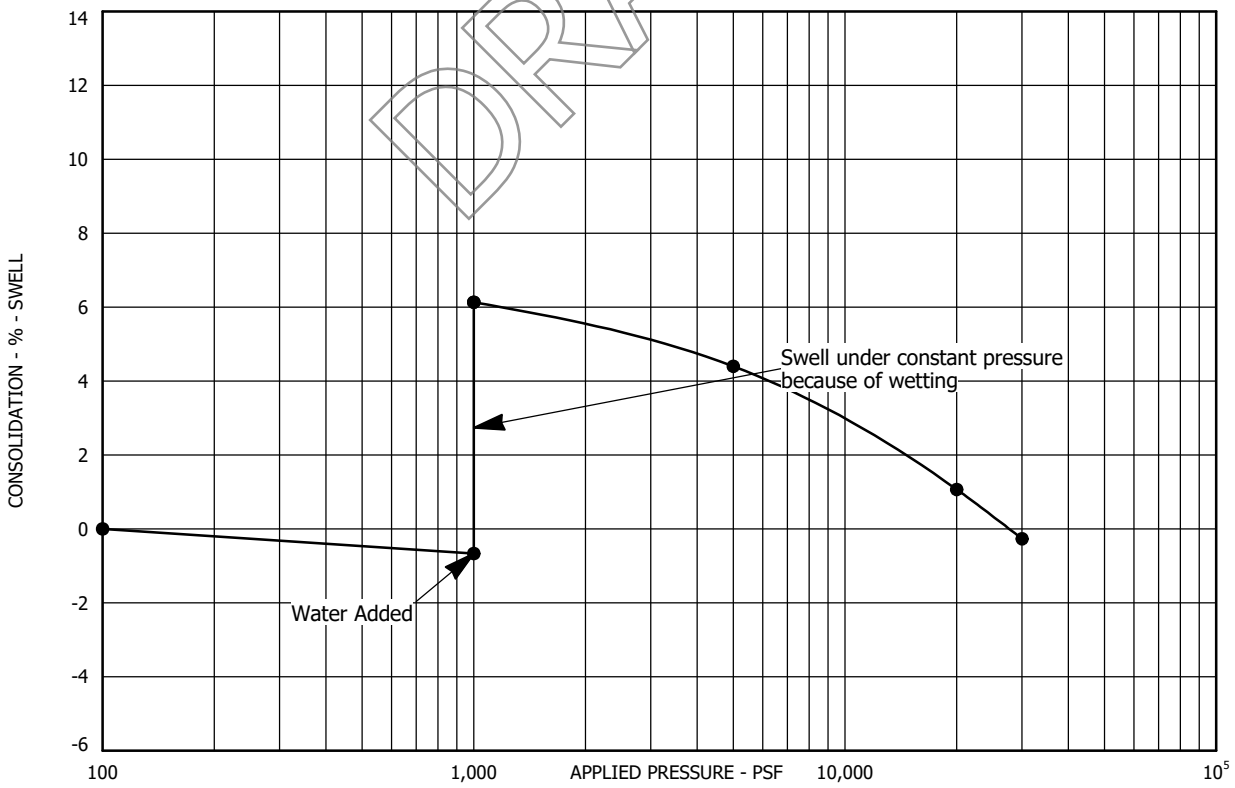
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-134
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 107 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 16

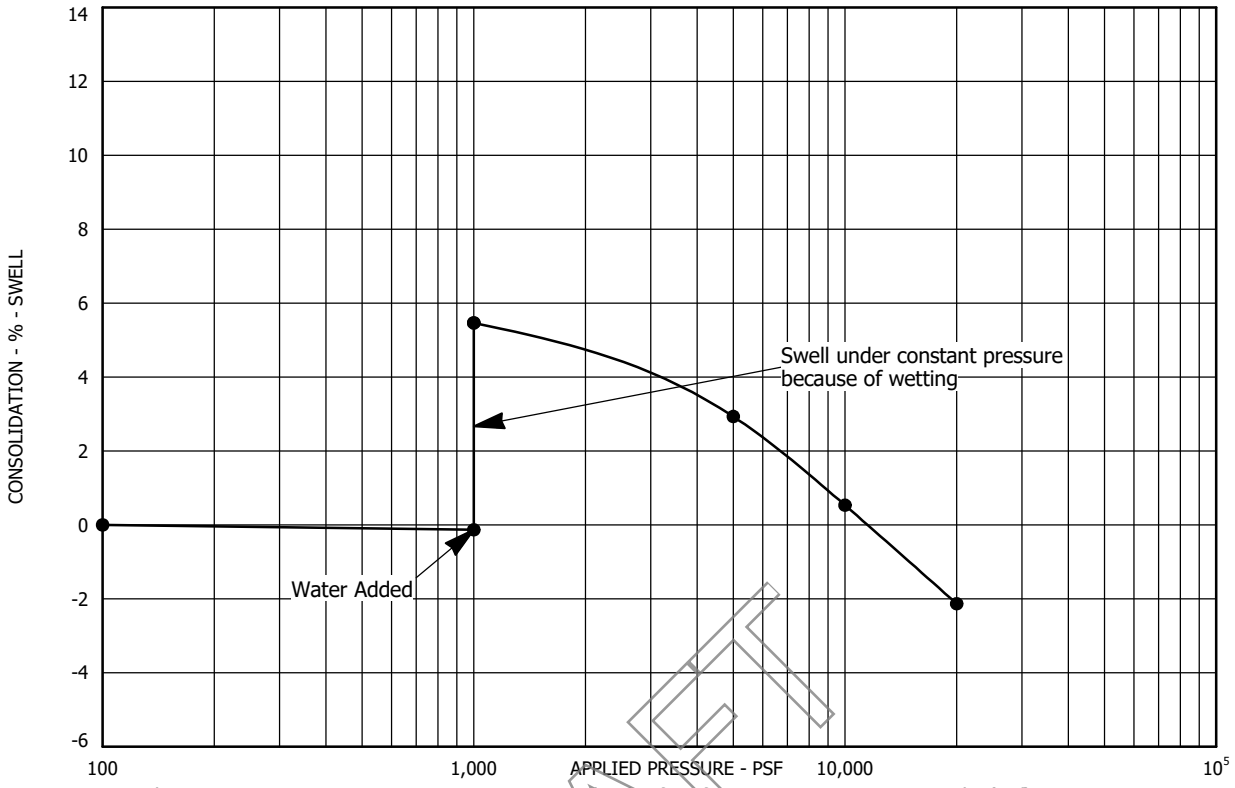
DRAFT



Sample Location: Test Boring No. 108 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 13

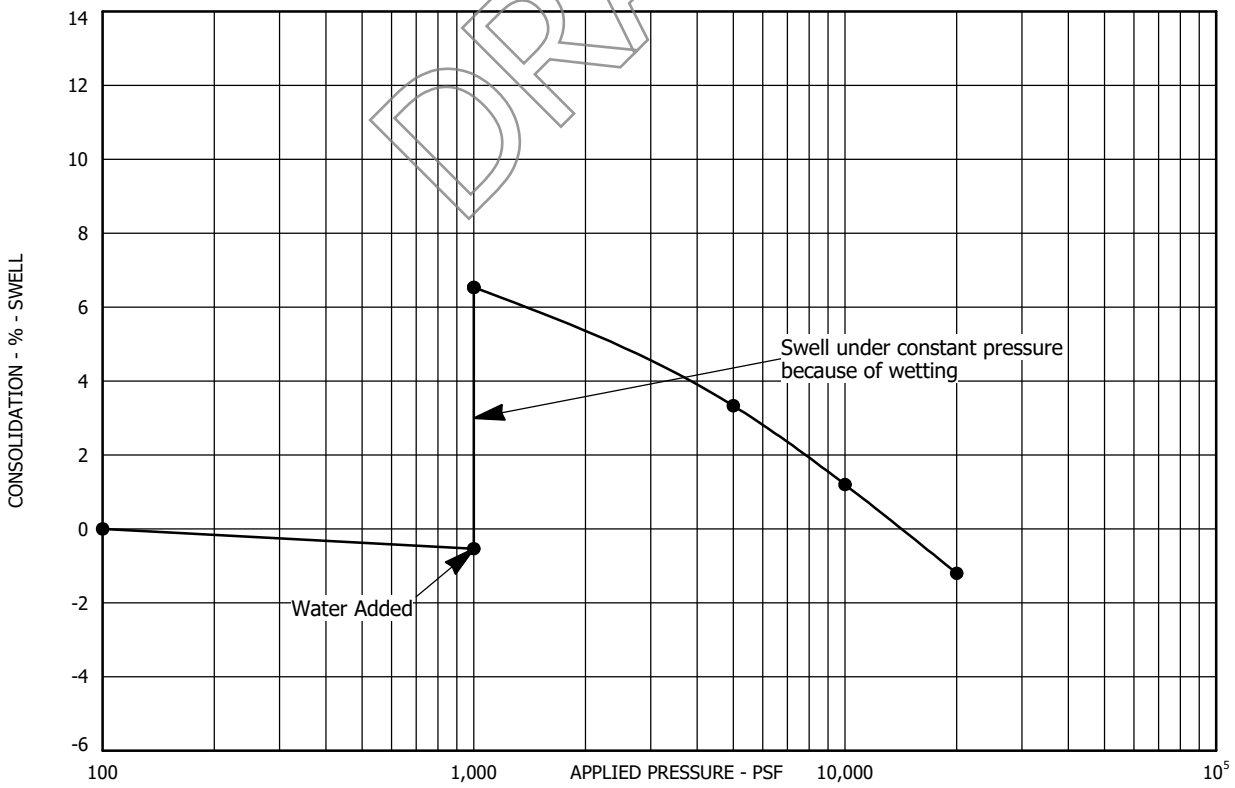
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-135
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 108 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

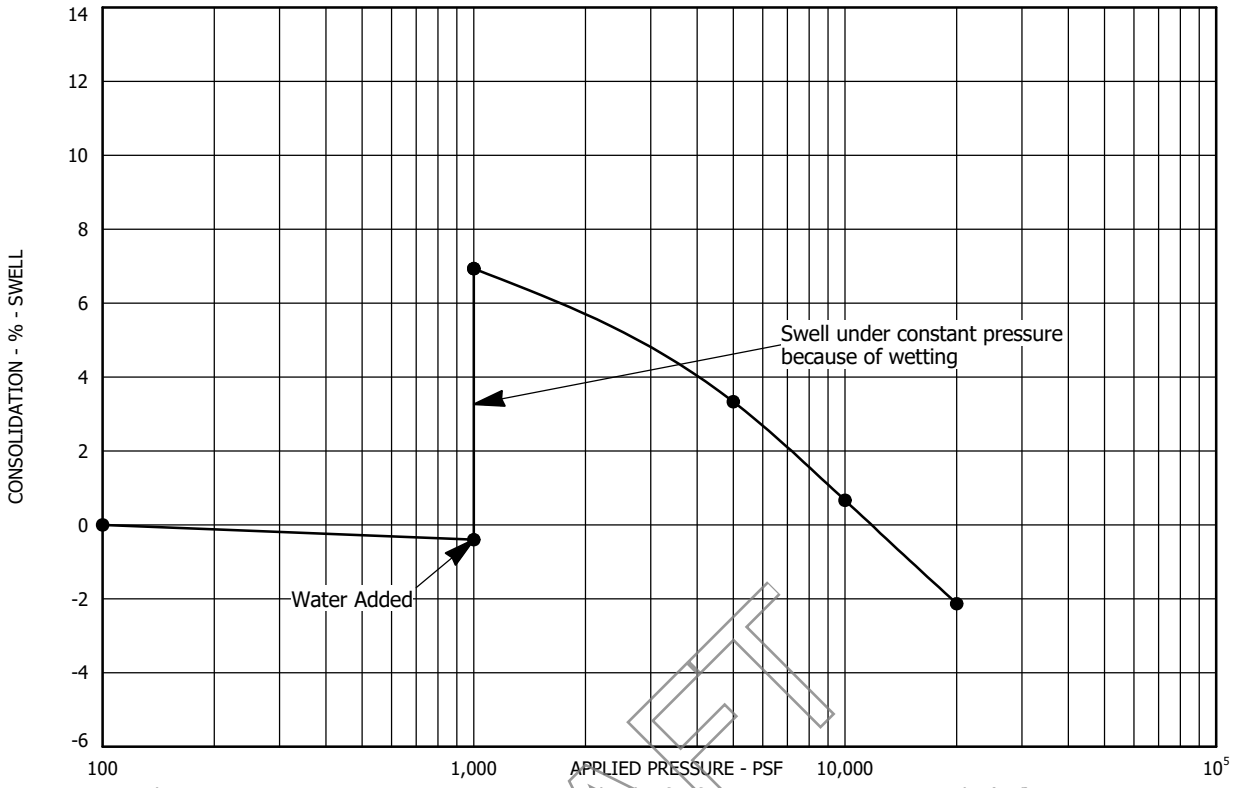
DRAFT



Sample Location: Test Boring No. 108 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 18

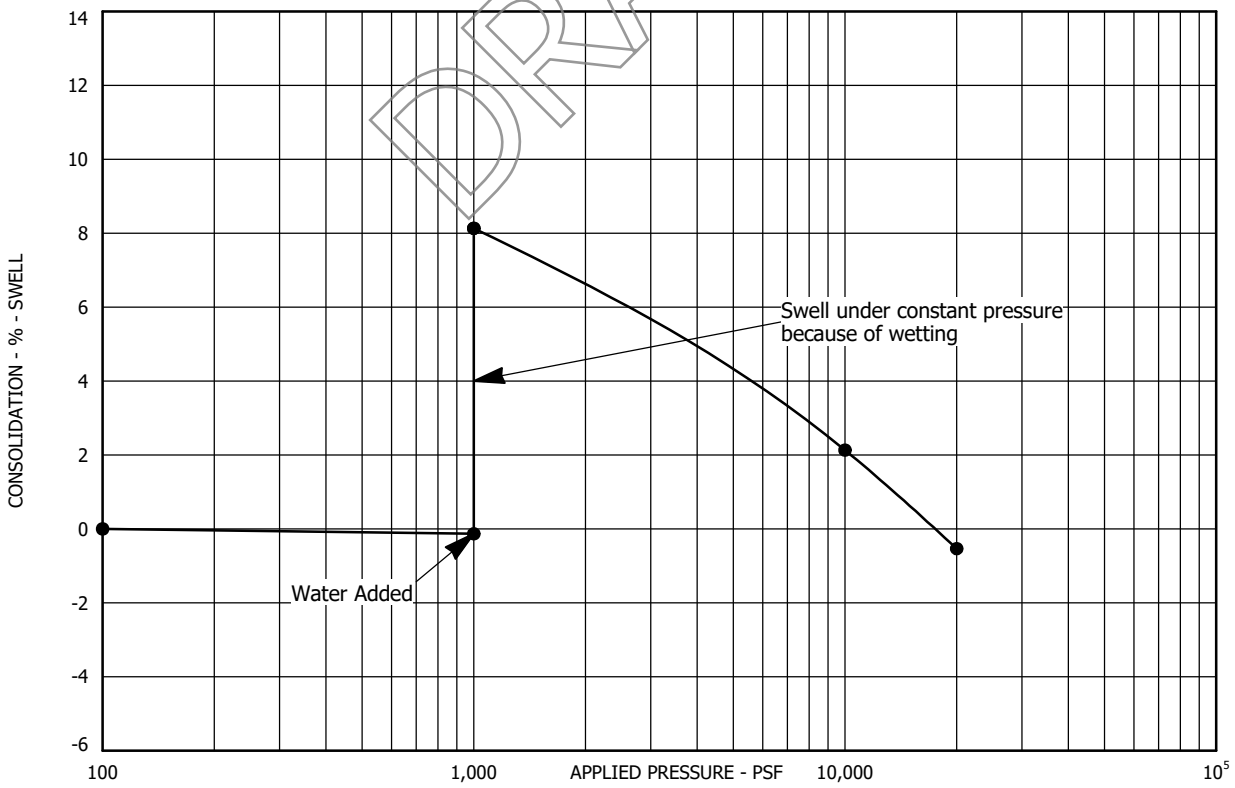
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-136
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 109 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 10

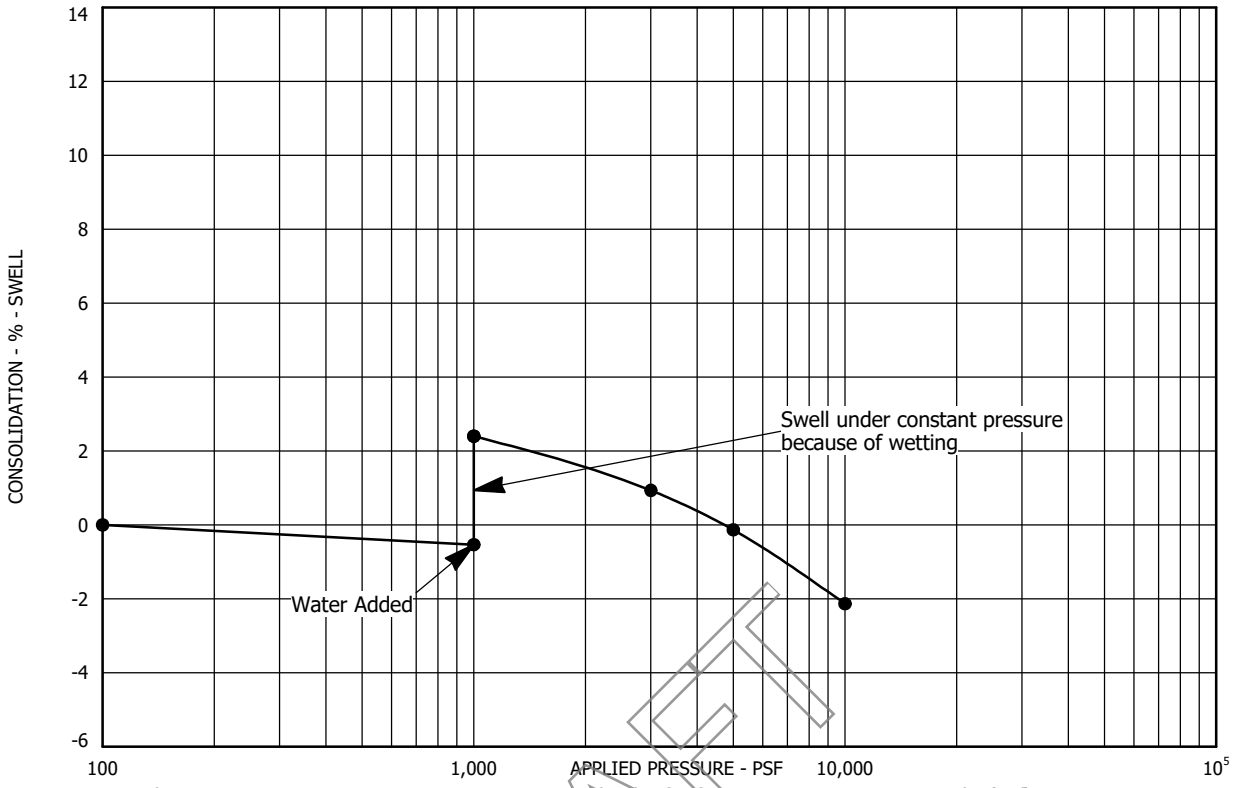
DRAFT



Sample Location: Test Boring No. 109 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 15

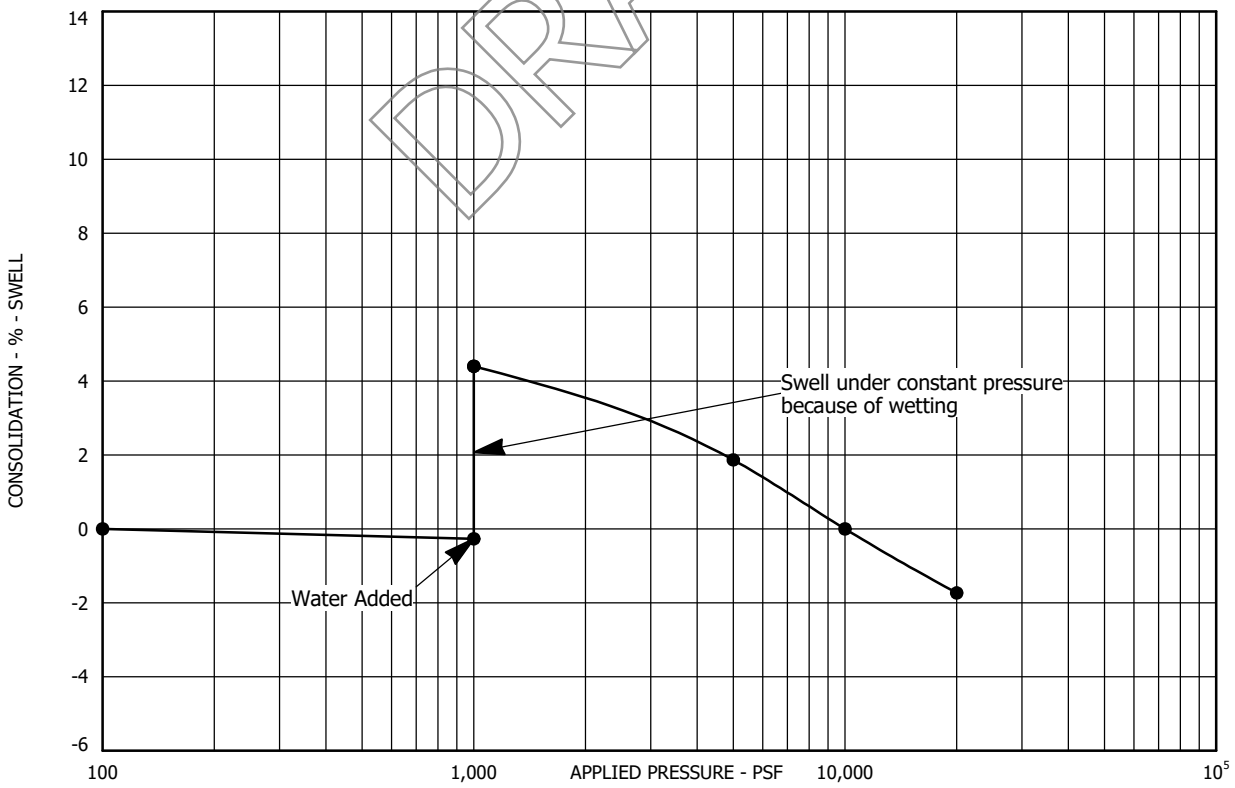
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-137
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 110 at a depth of 4 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 17

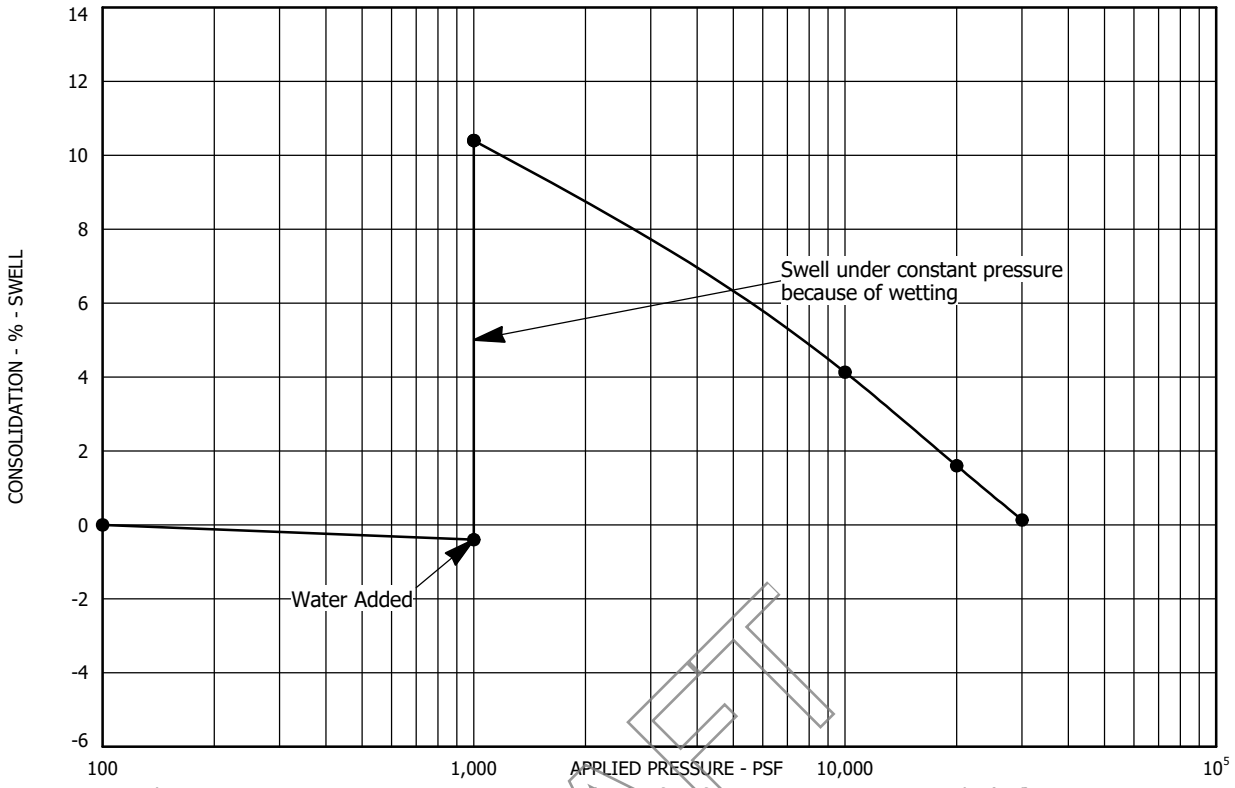
DRAFT



Sample Location: Test Boring No. 110 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 16

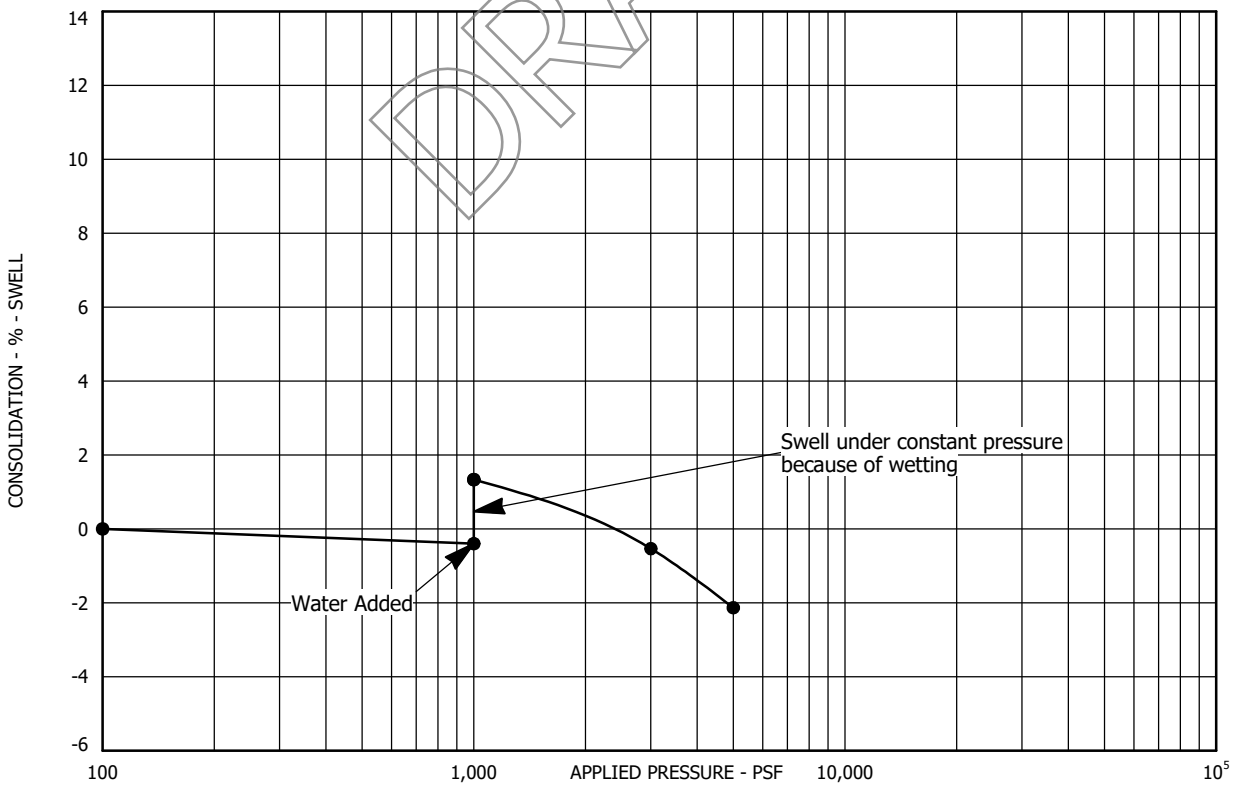
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-138
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 110 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 12

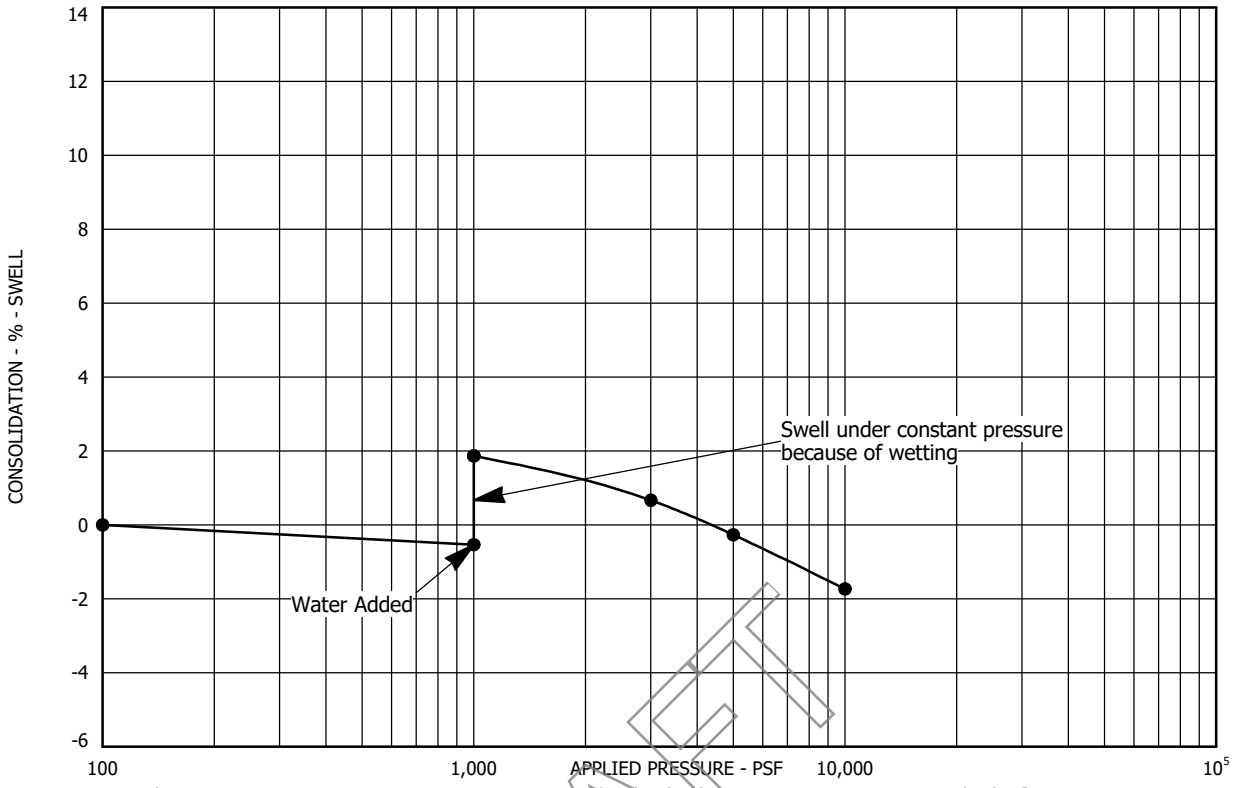
DRAFT



Sample Location: Test Boring No. 111 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 16

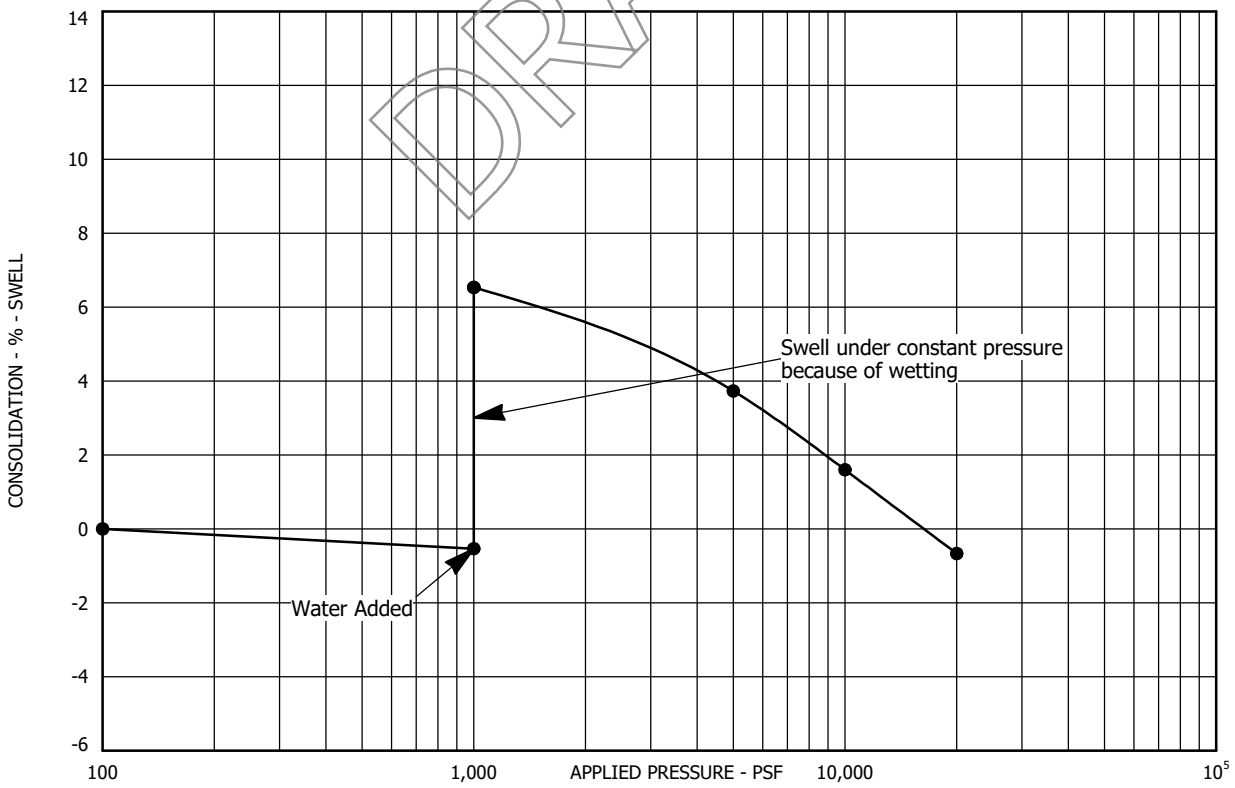
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-139
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 111 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 18

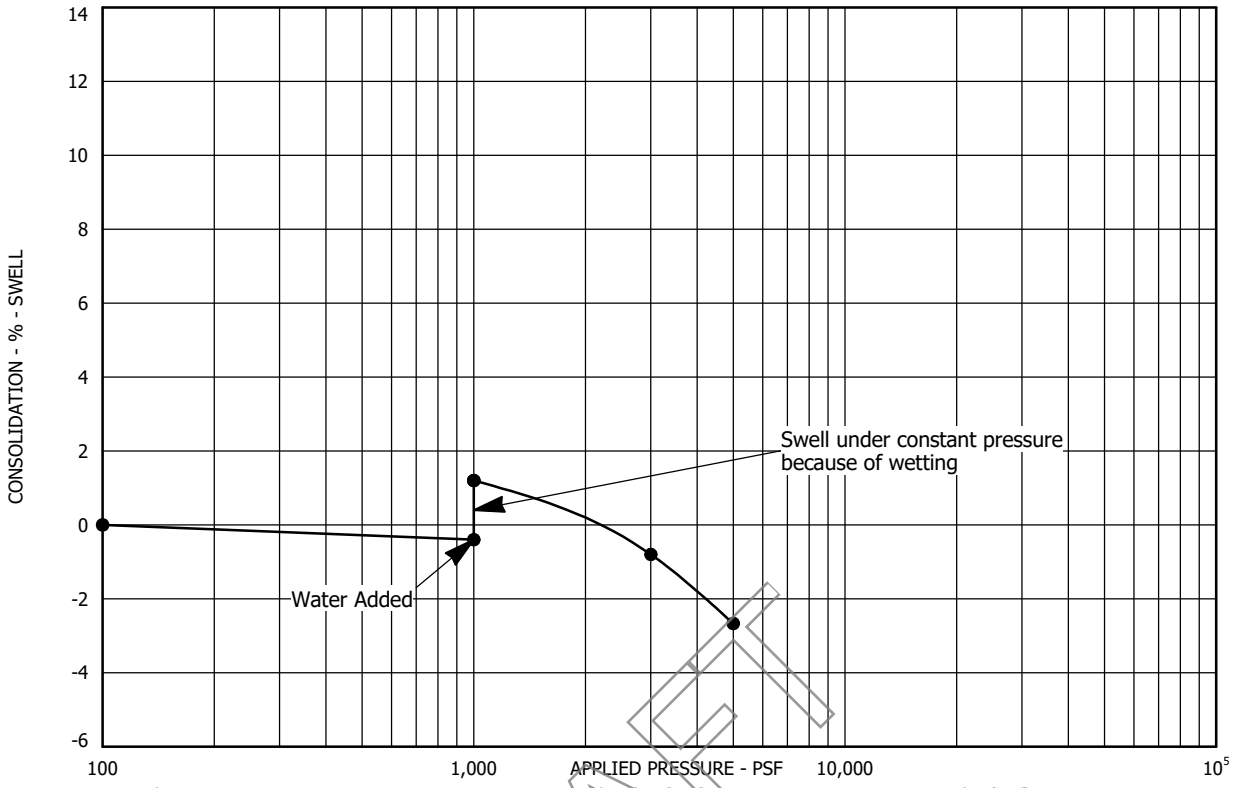
DRAFT



Sample Location: Test Boring No. 111 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 14

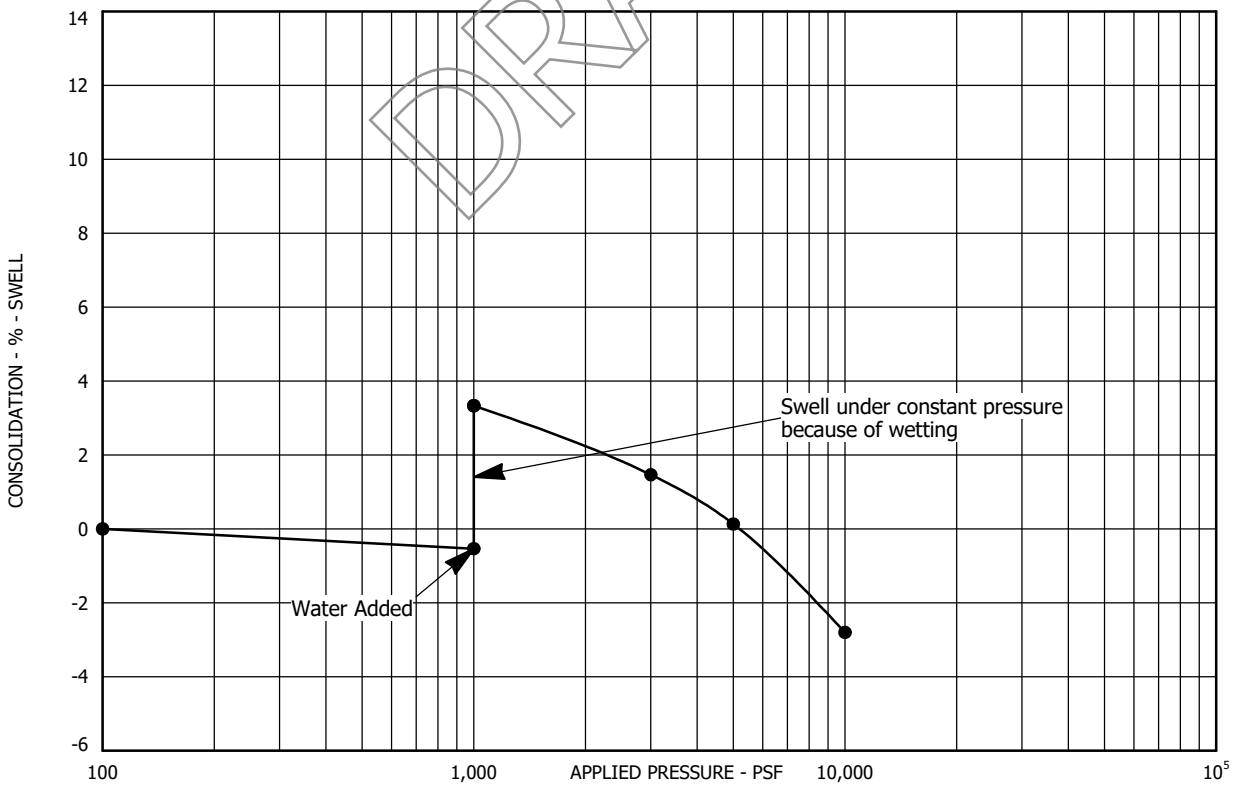
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-140
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 112 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 15

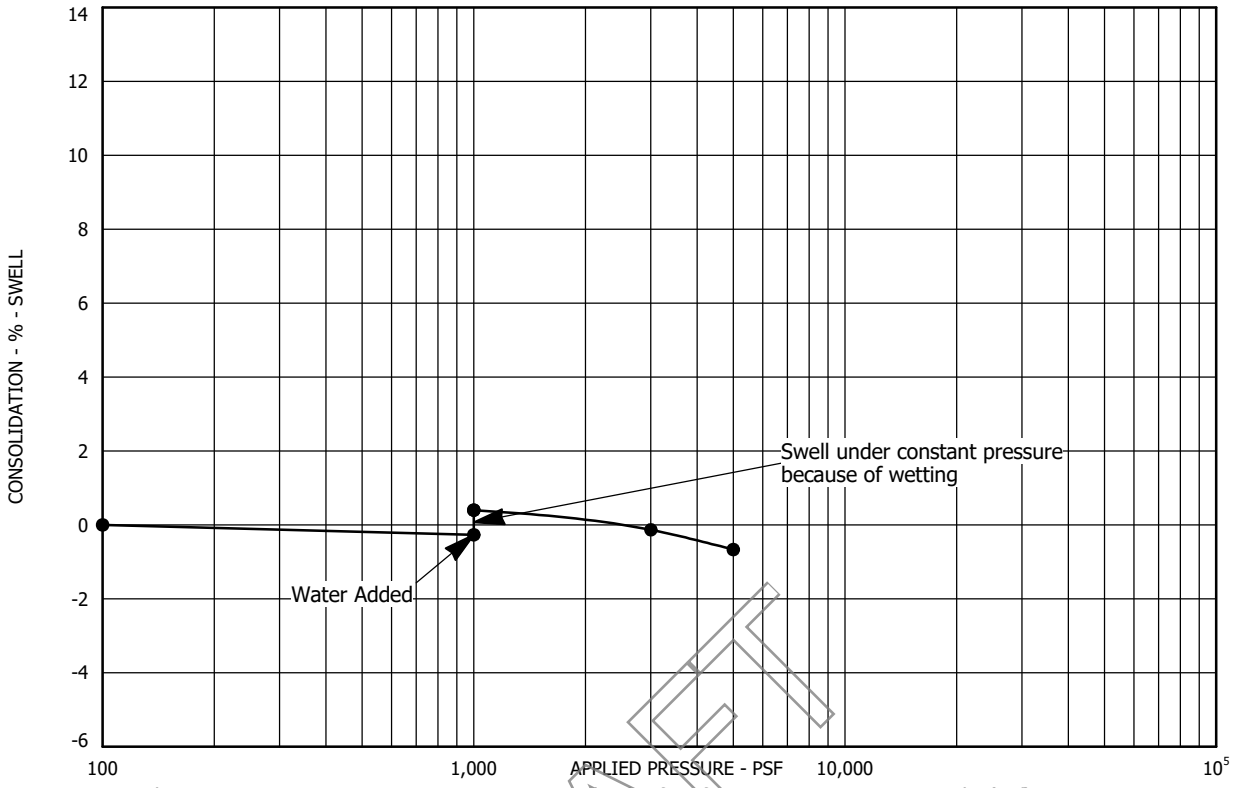
DRAFT



Sample Location: Test Boring No. 112 at a depth of 9 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 20

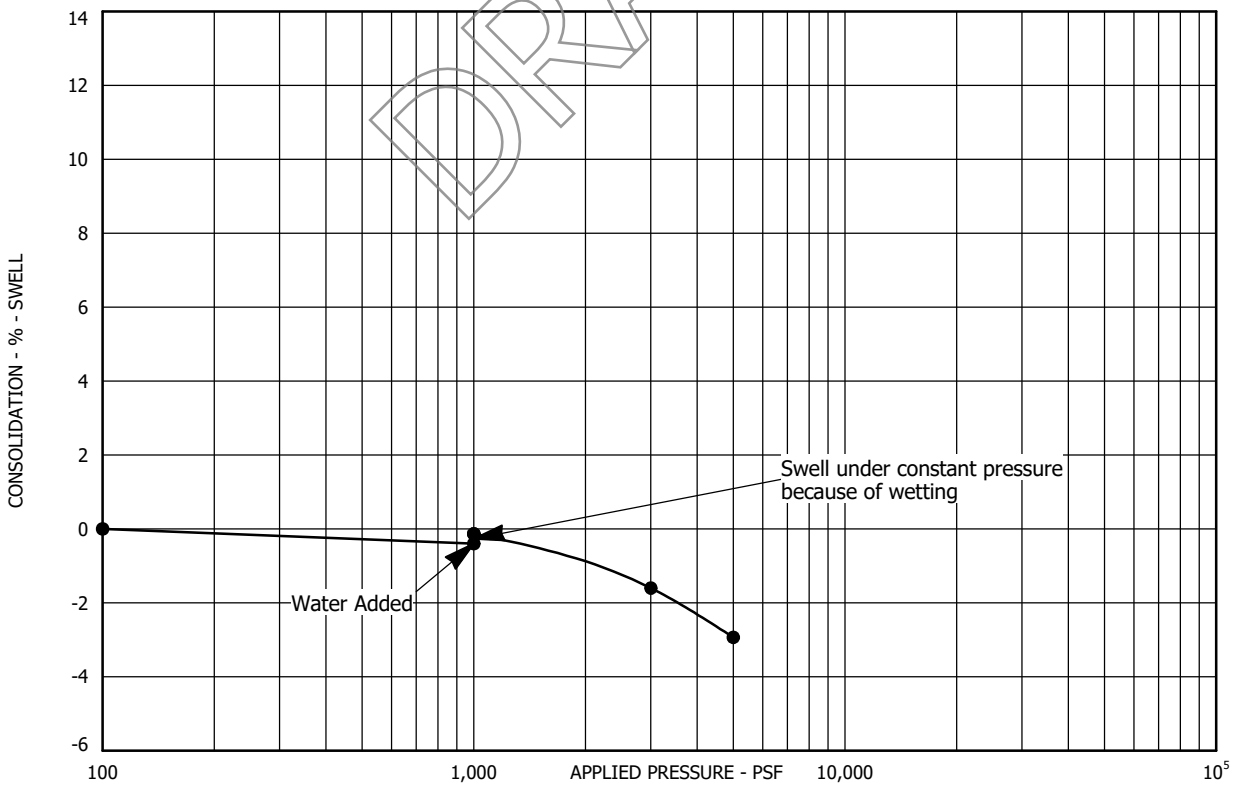
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-141
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 112 at a depth of 19 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 127
Moisture Content (%): 10

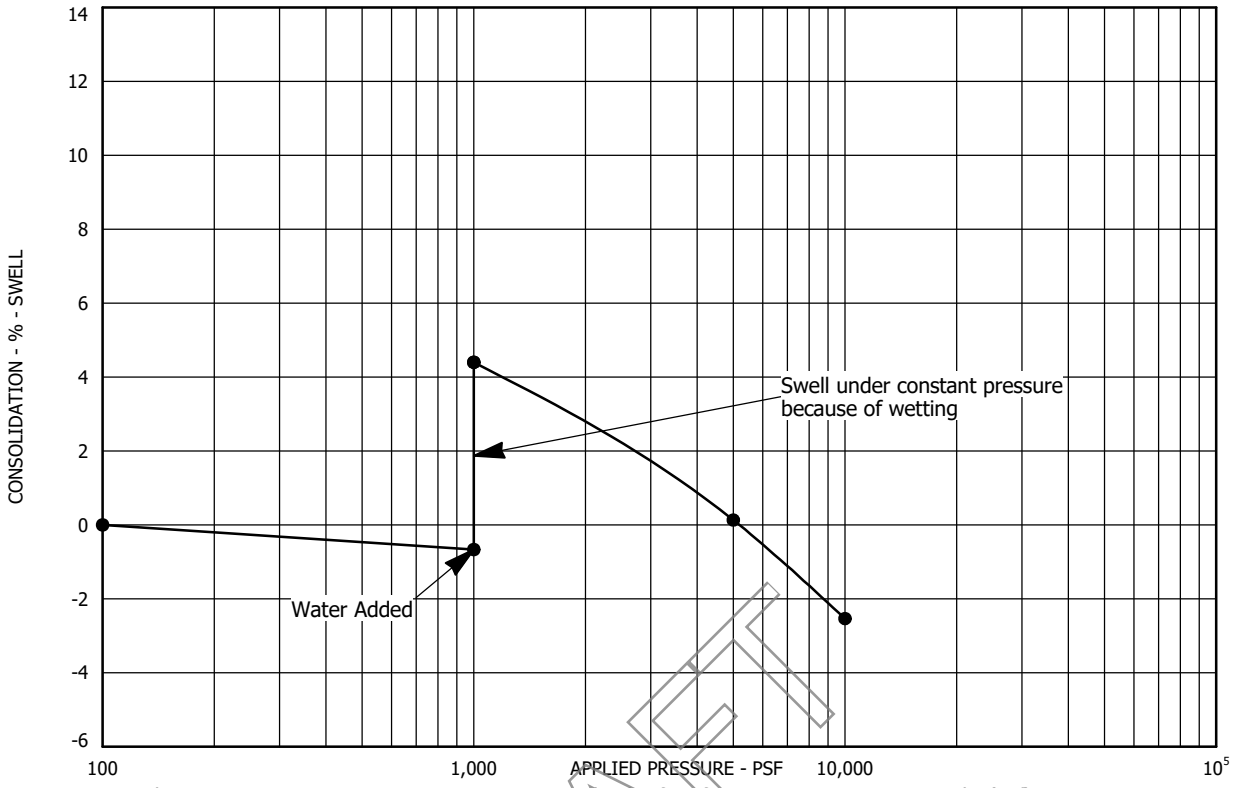
DRAFT



Sample Location: Test Boring No. 113 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 18

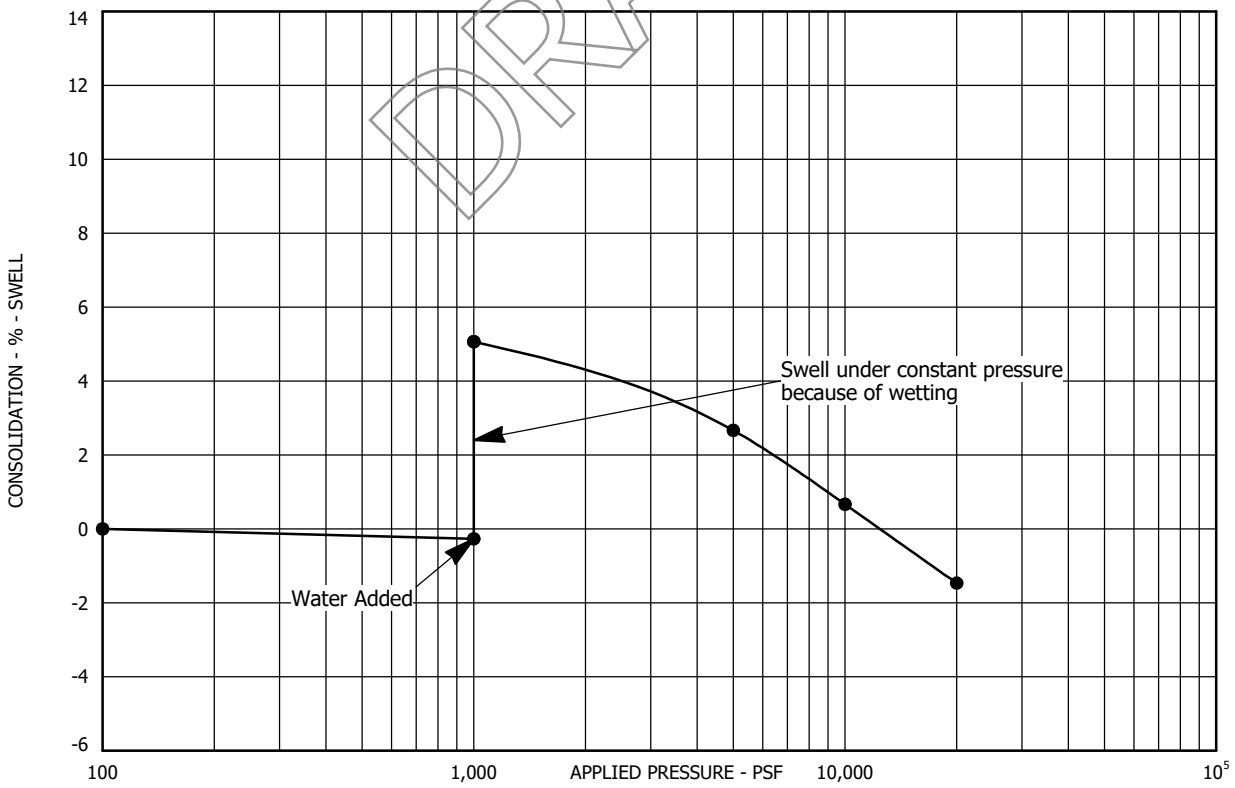
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-142
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 113 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 18

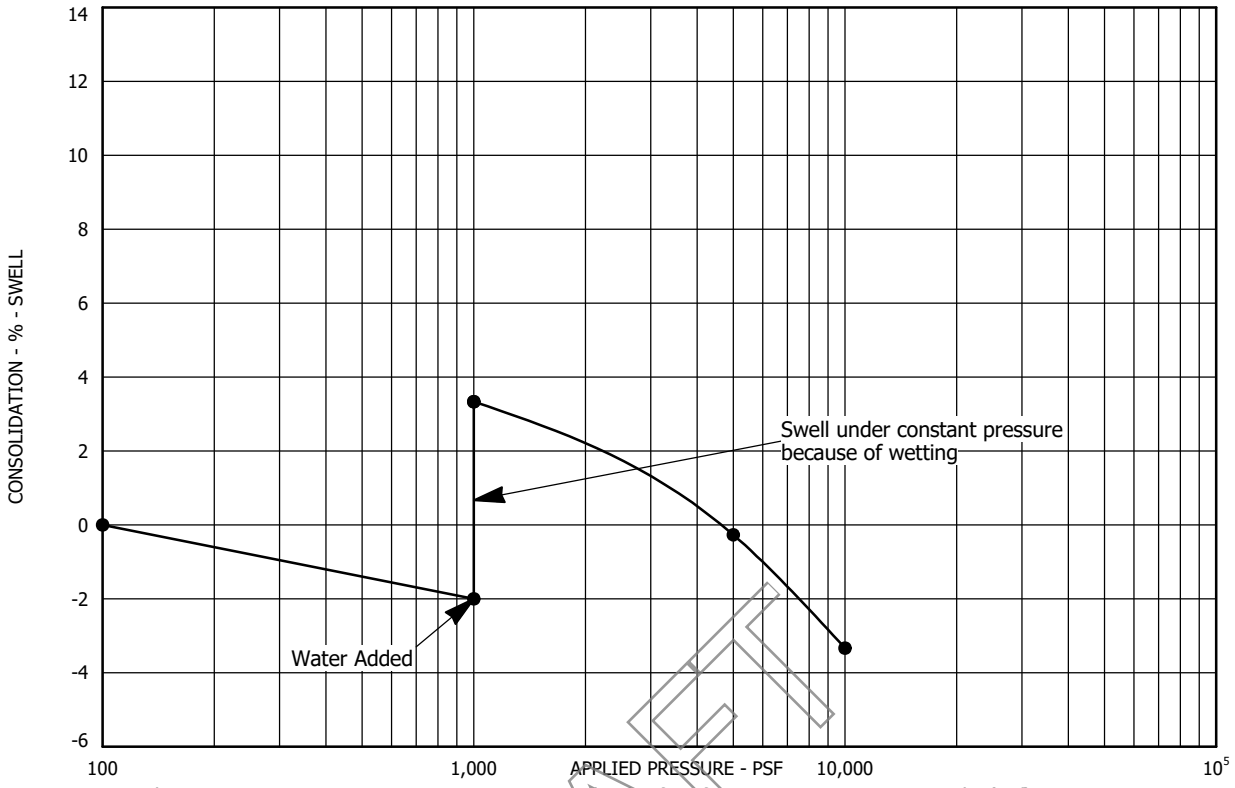
DRAFT



Sample Location: Test Boring No. 113 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 13

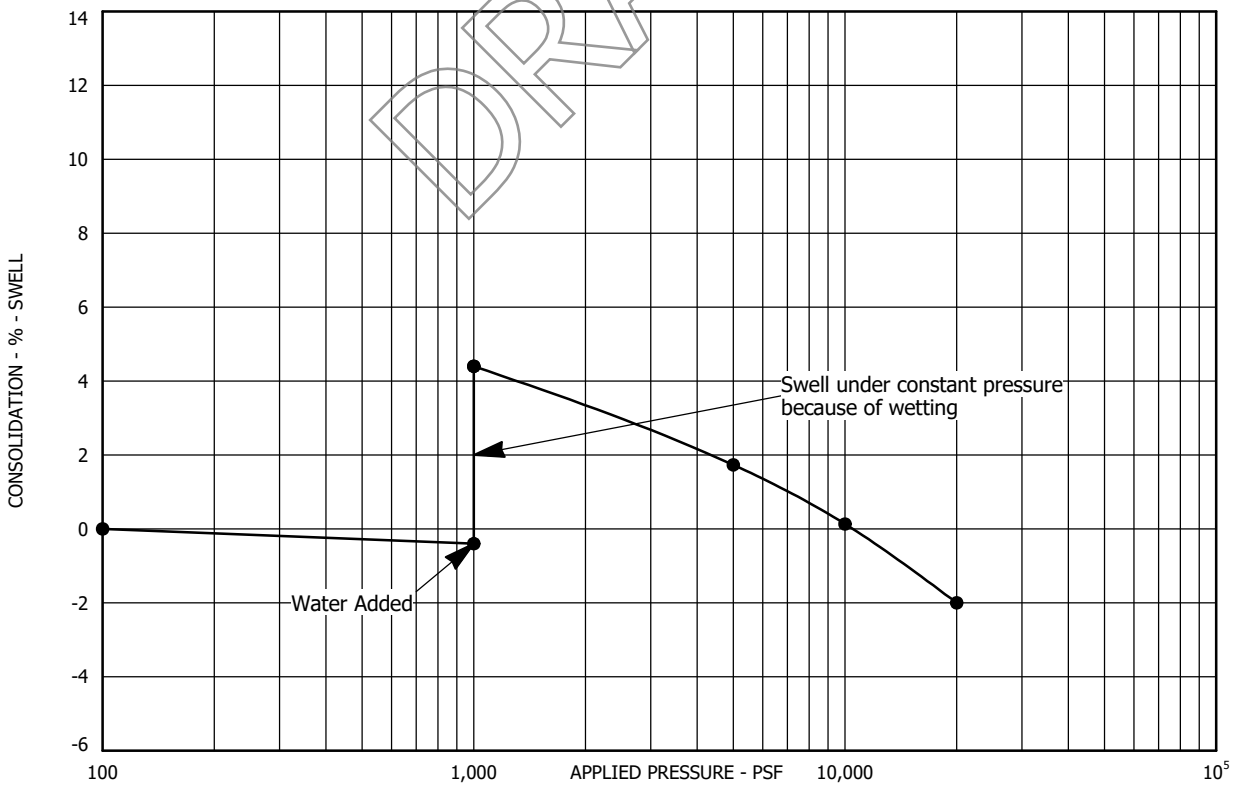
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-143
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 114 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 106
Moisture Content (%): 21

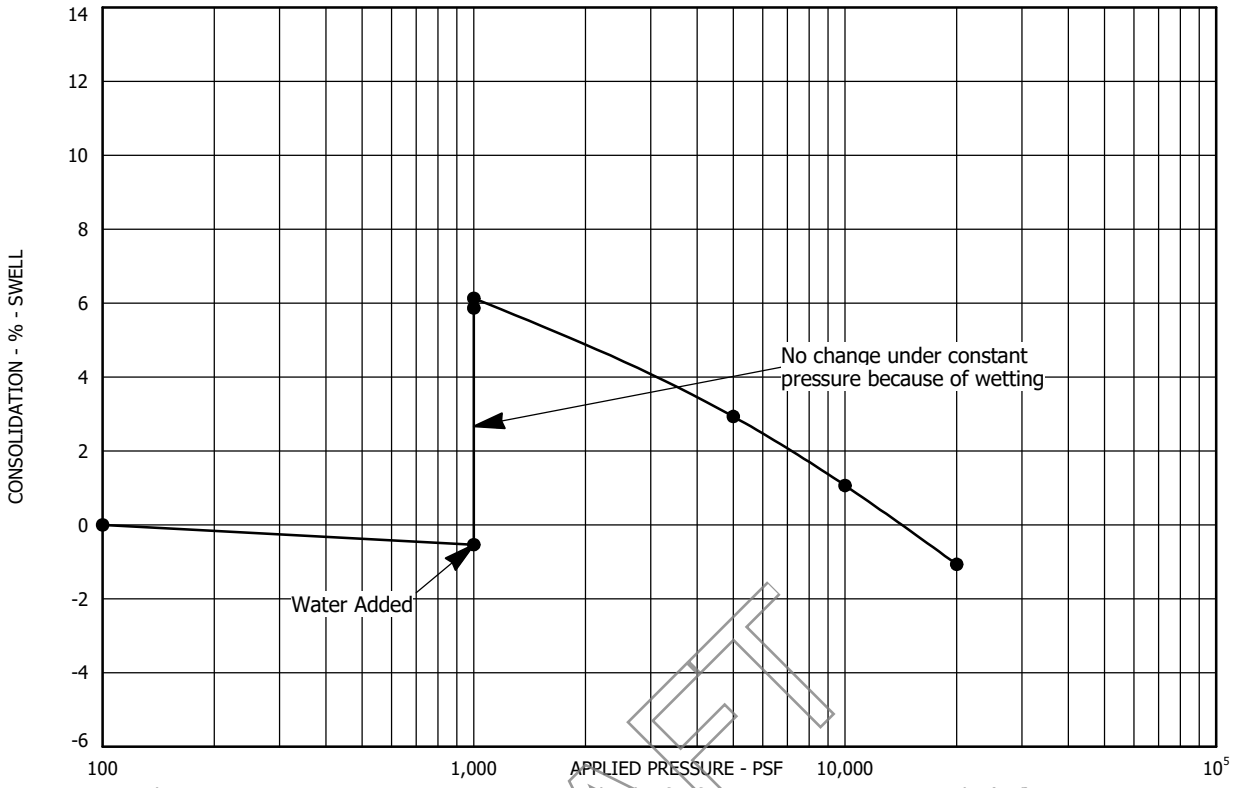
DRAFT



Sample Location: Test Boring No. 114 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 18

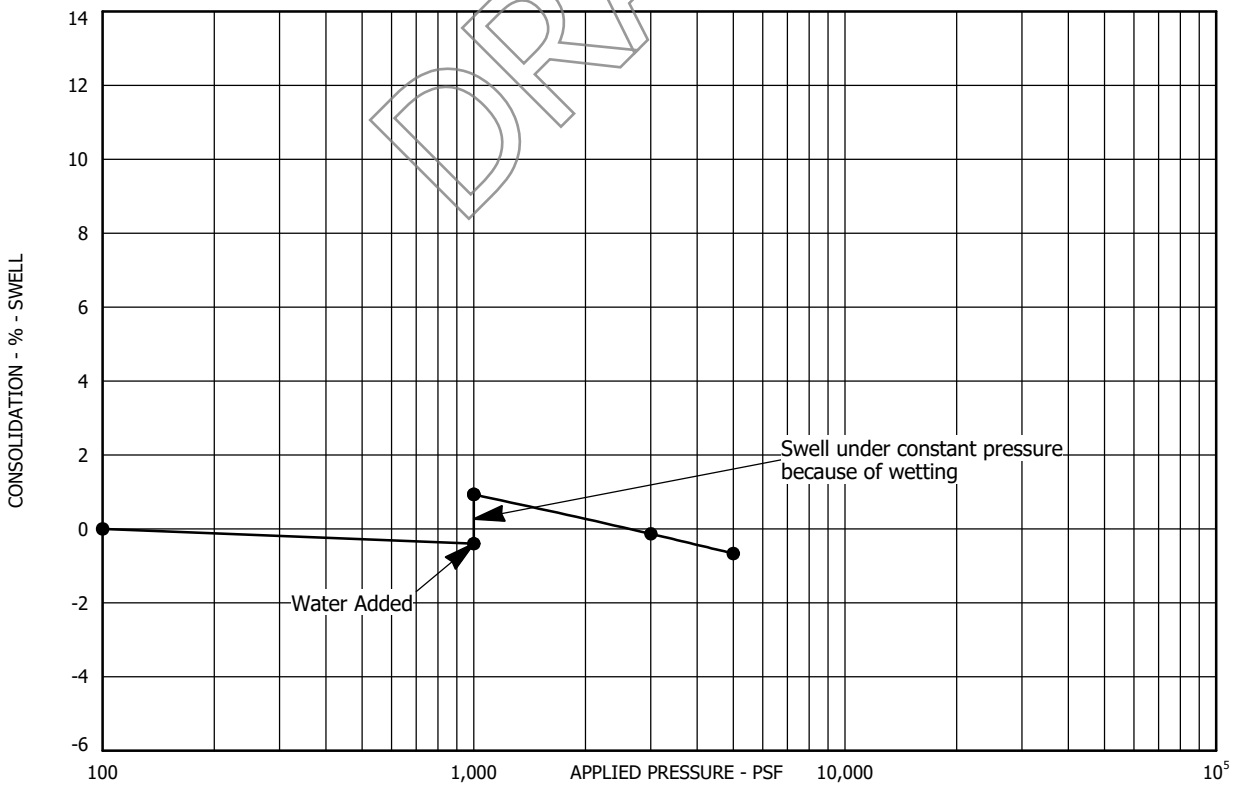
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-144
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 115 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 120
Moisture Content (%): 9

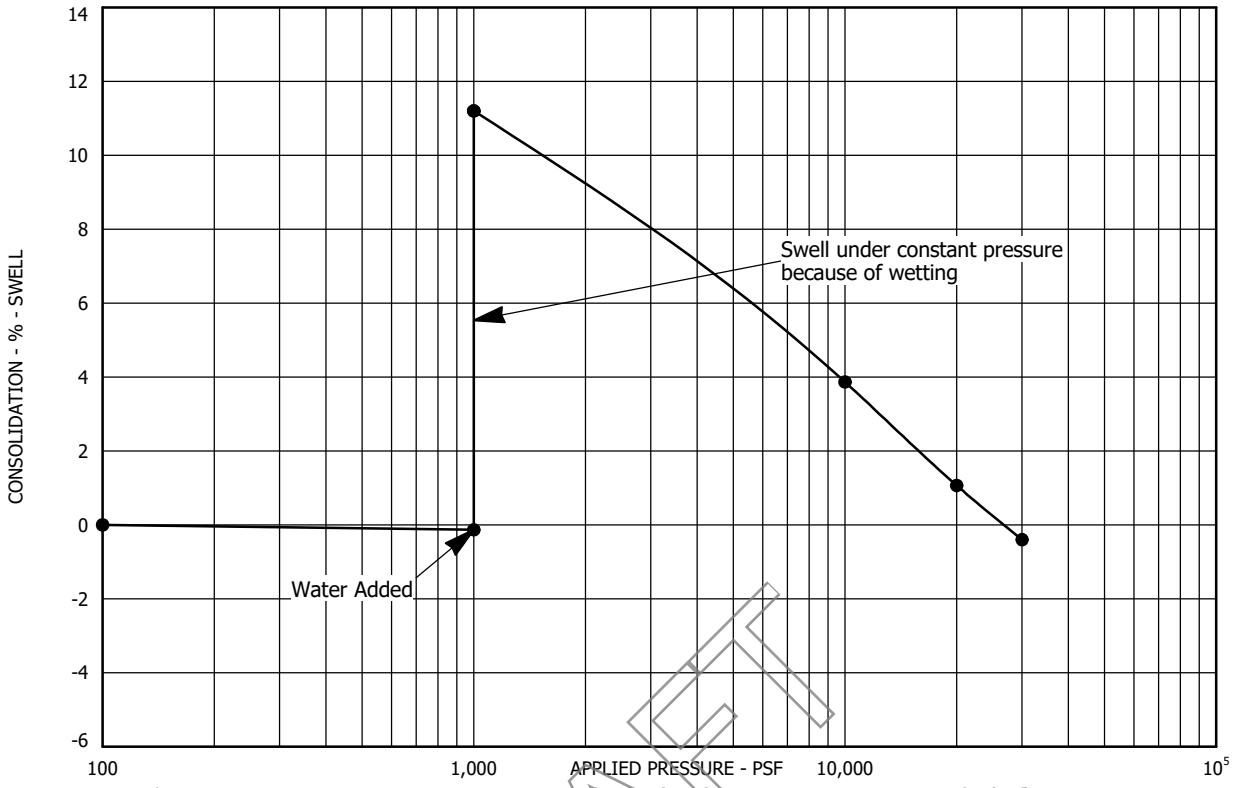
DRAFT



Sample Location: Test Boring No. 115 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 14

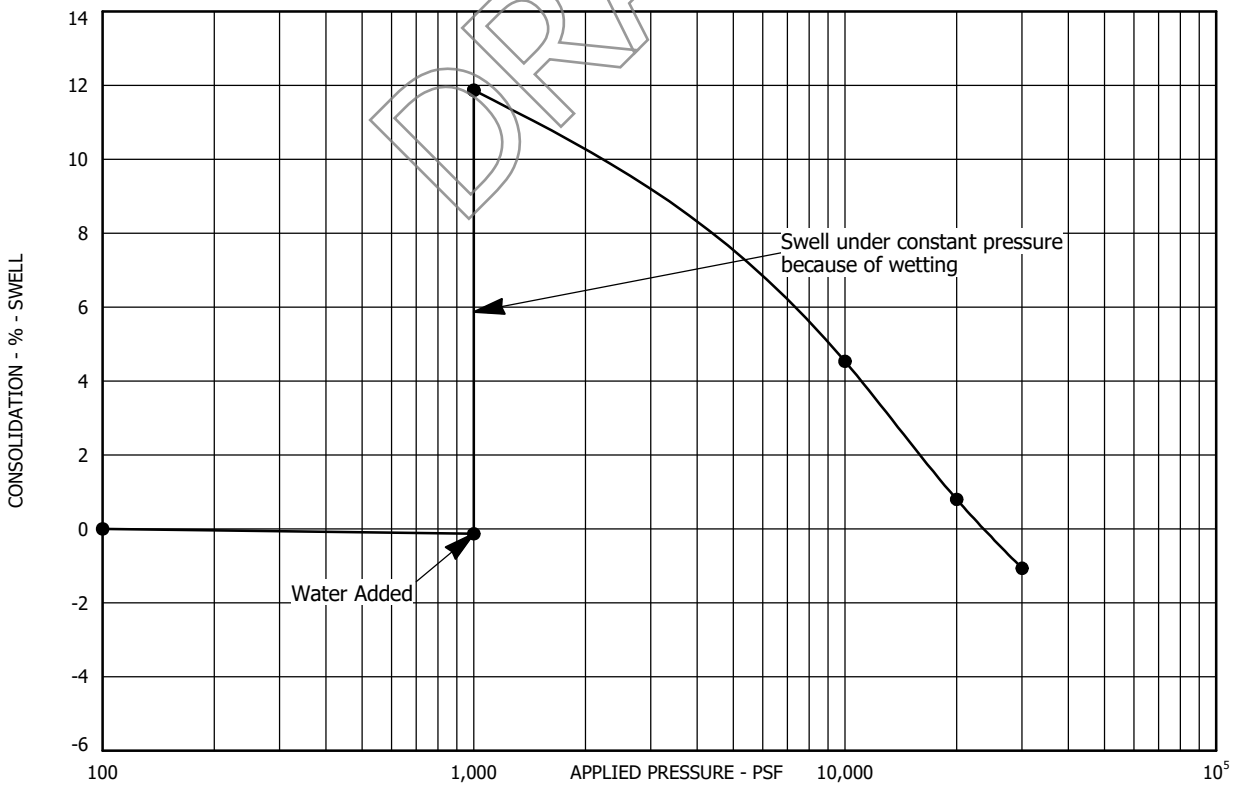
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-145
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 115 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 11

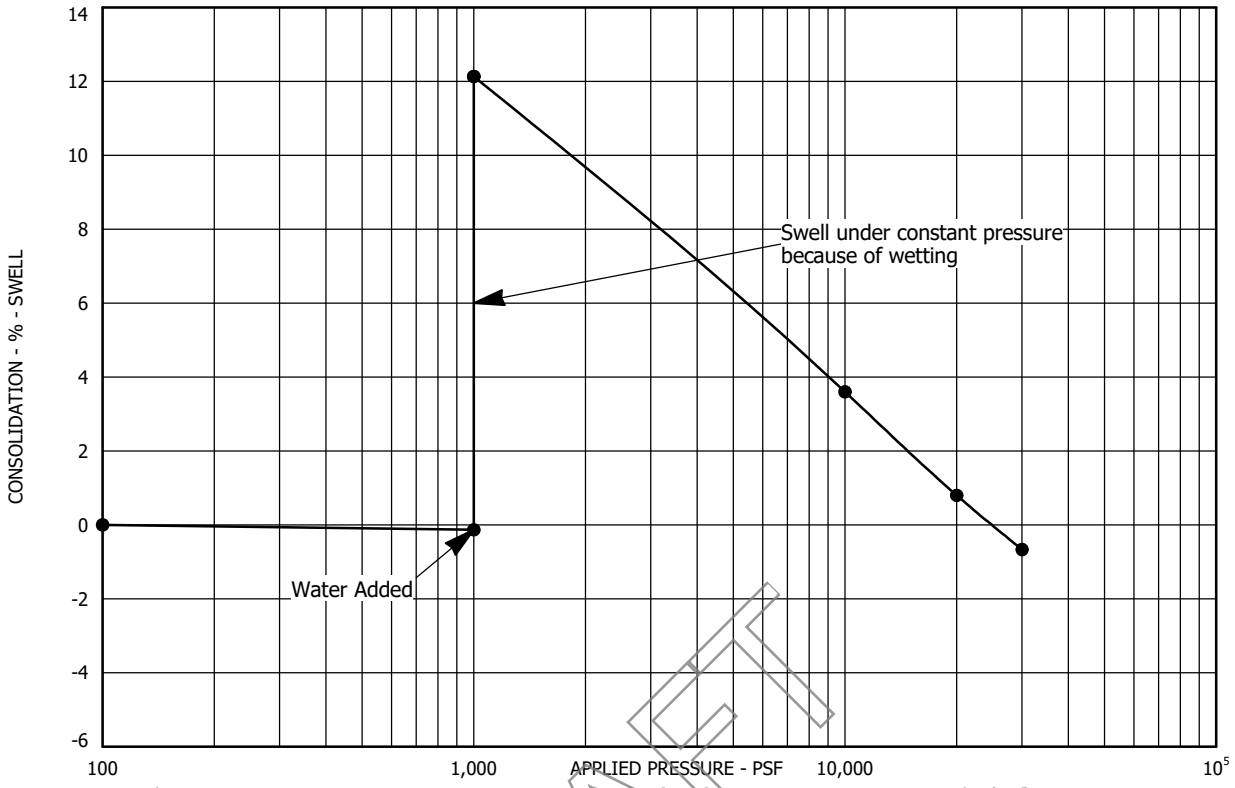
DRAFT



Sample Location: Test Boring No. 116 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 14

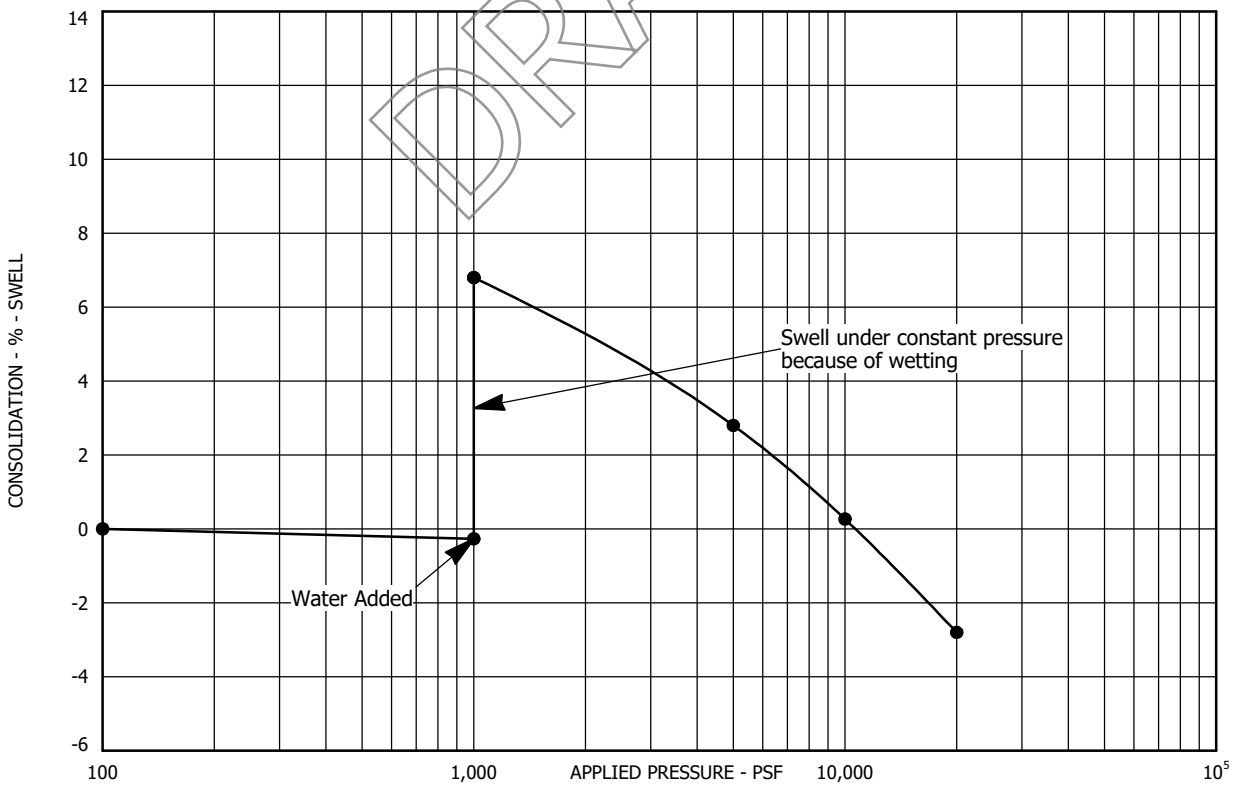
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-146
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 116 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 128
Moisture Content (%): 8

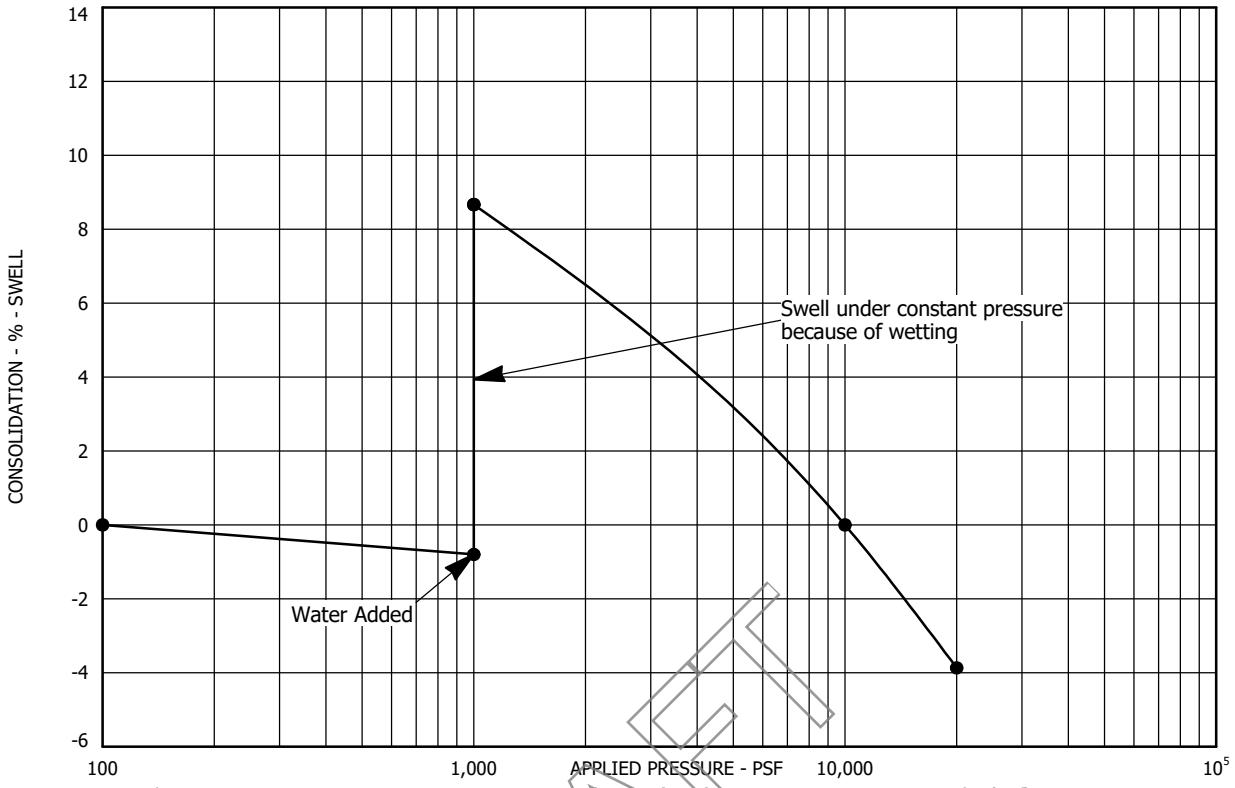
DRAFT



Sample Location: Test Boring No. 117 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 18

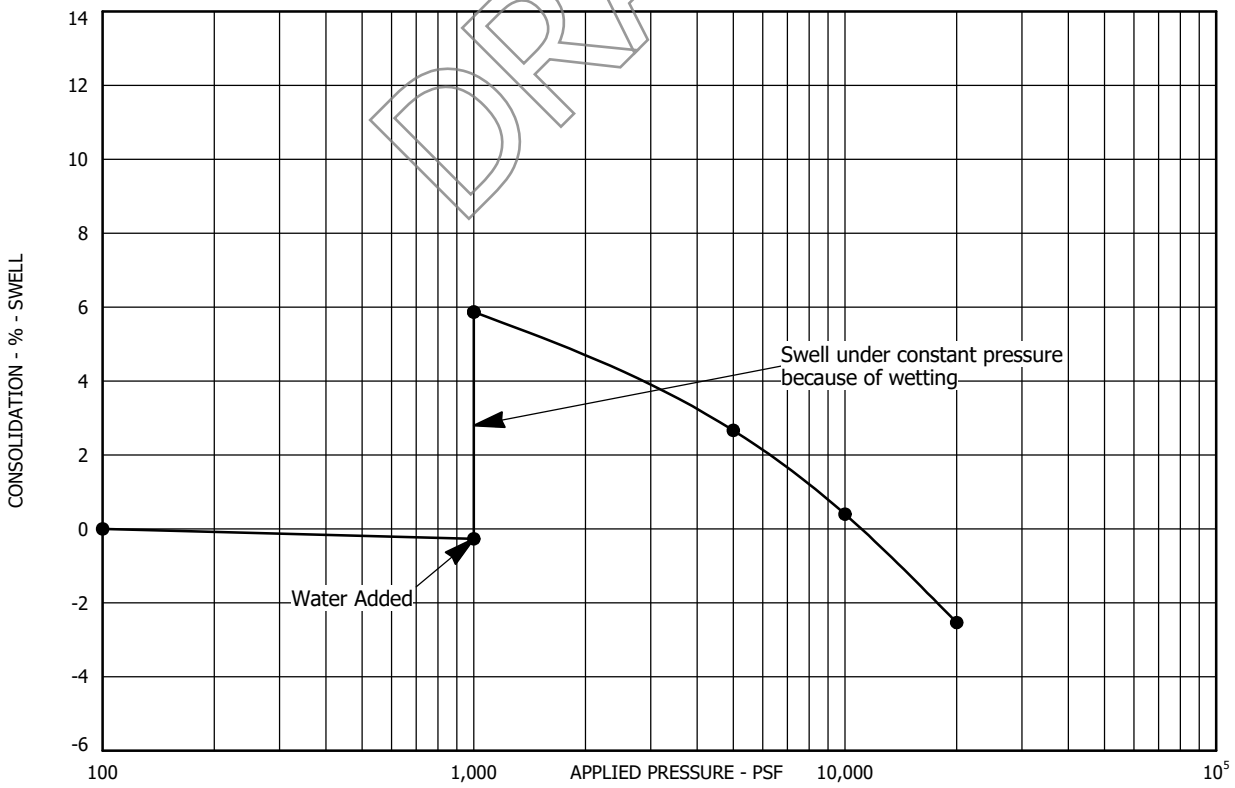
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-147
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 117 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 112
Moisture Content (%): 18

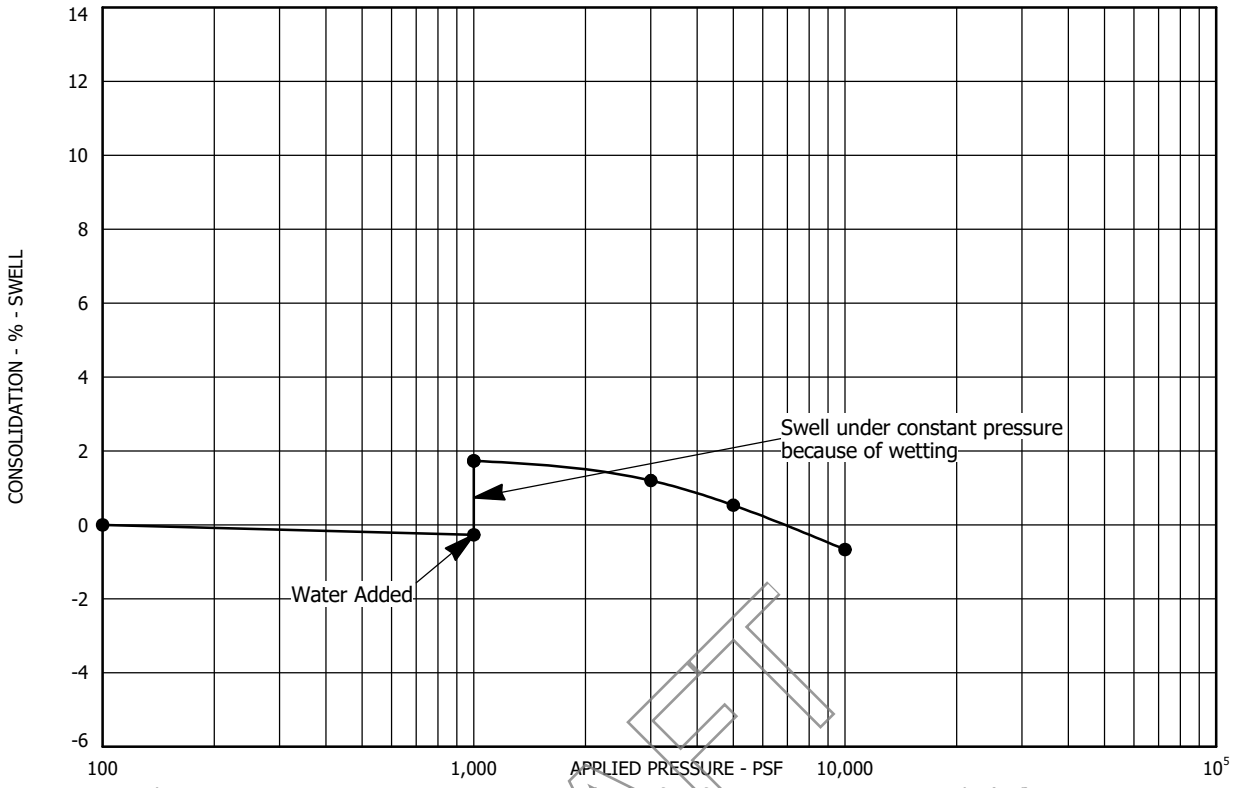
DRAFT



Sample Location: Test Boring No. 118 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 17

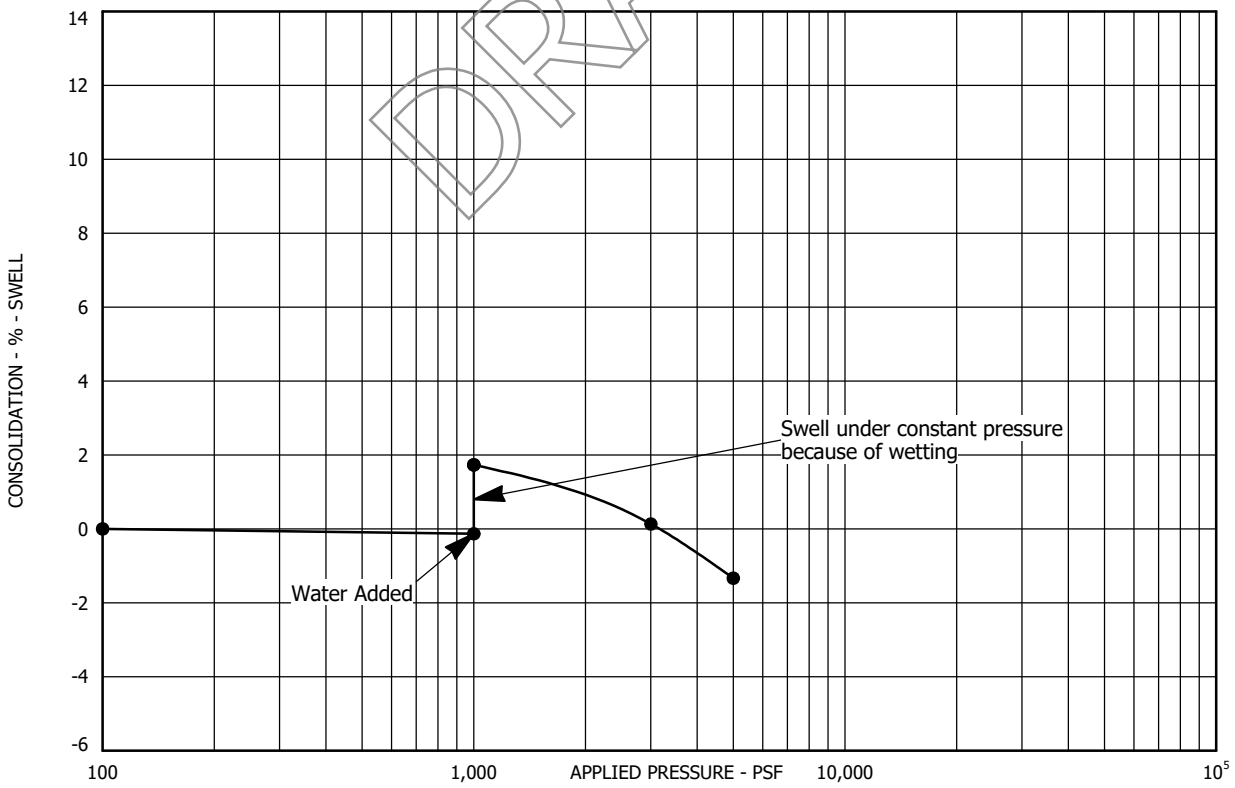
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-148
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 118 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 13

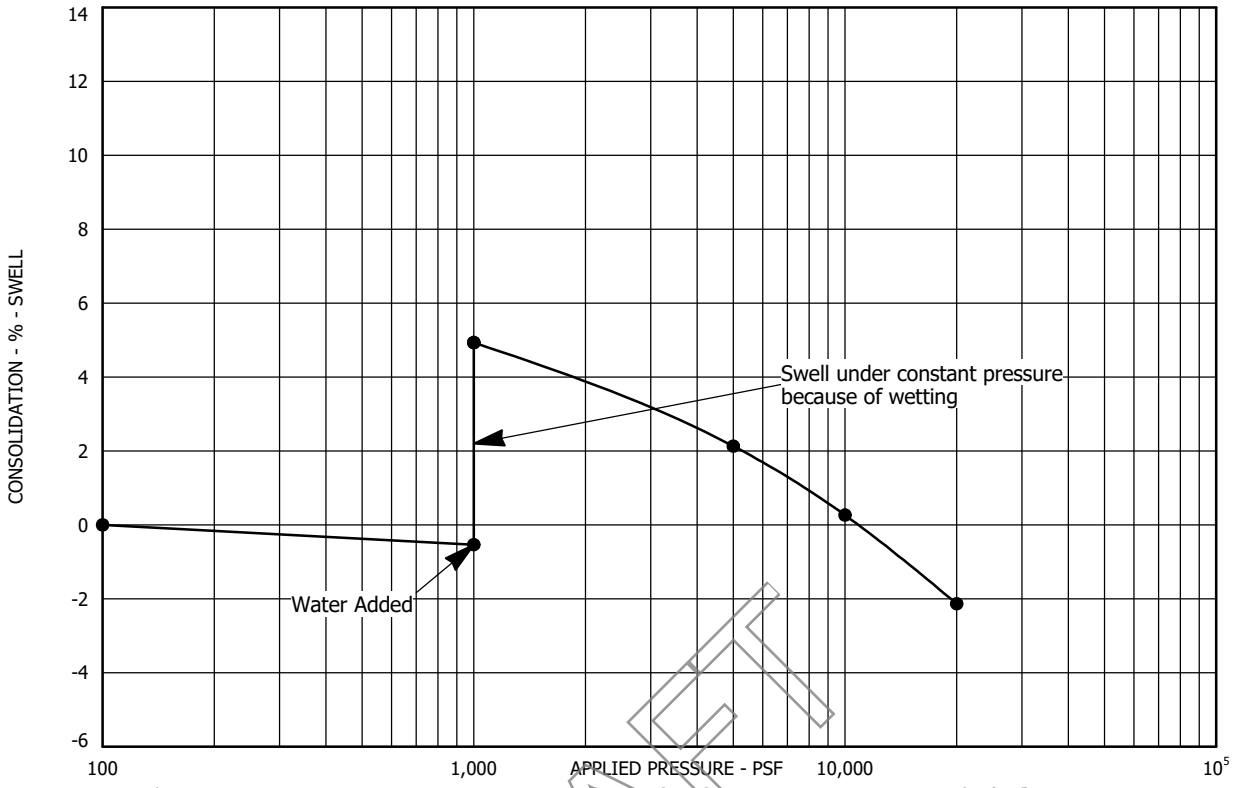
DRAFT



Sample Location: Test Boring No. 119 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 9

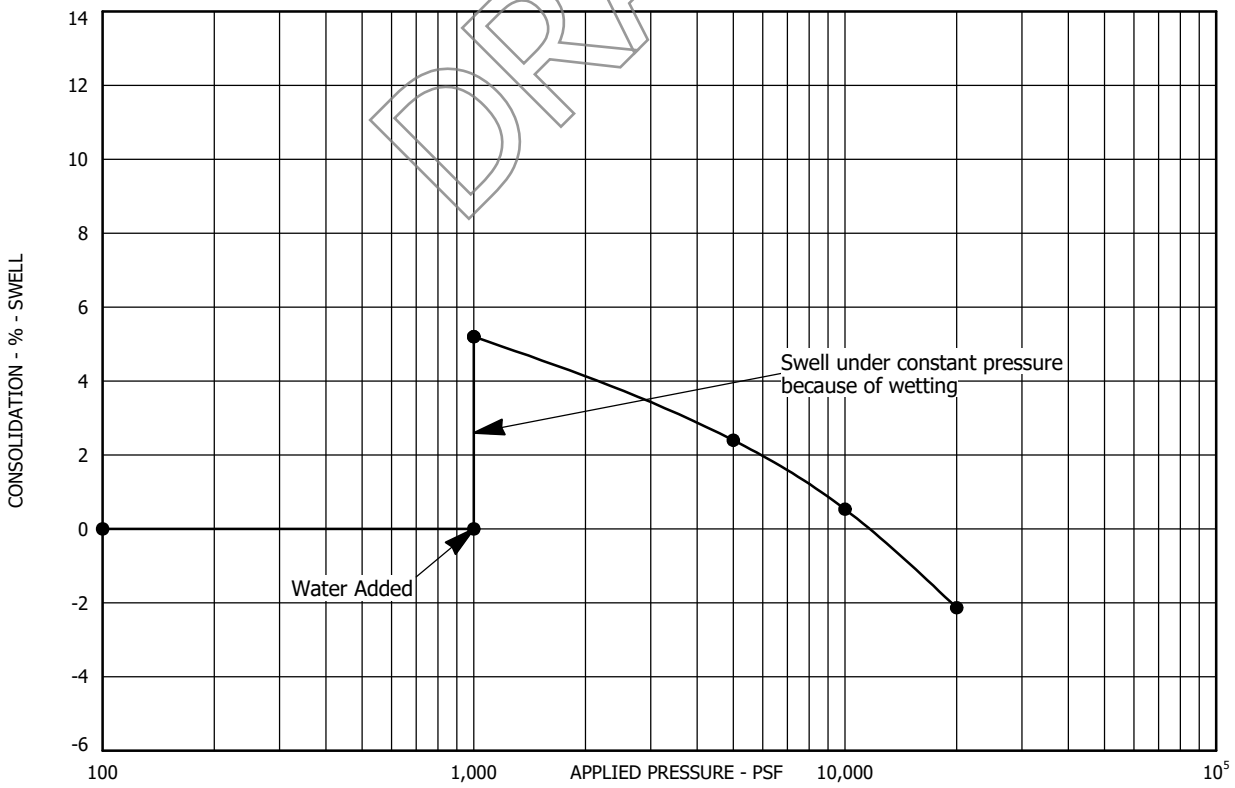
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-149
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 119 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

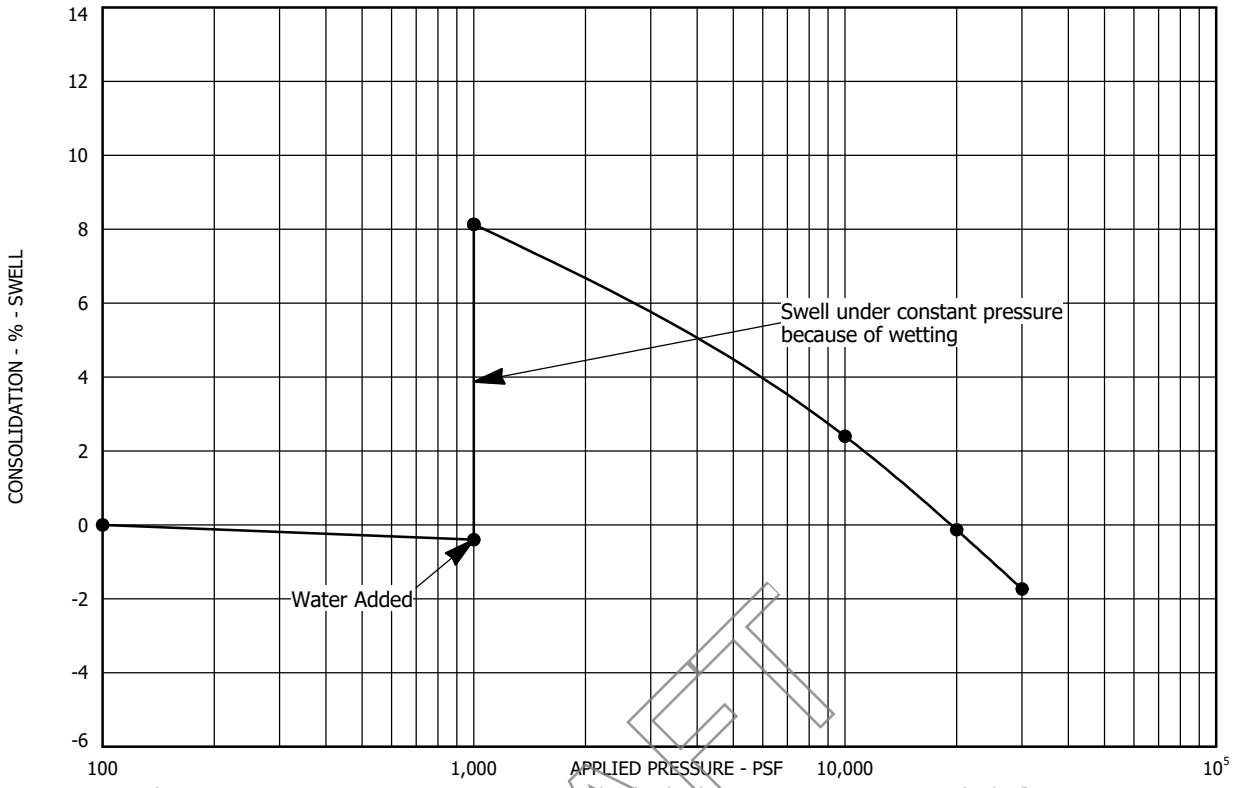
DRAFT



Sample Location: Test Boring No. 119 at a depth of 24 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 113
Moisture Content (%): 17

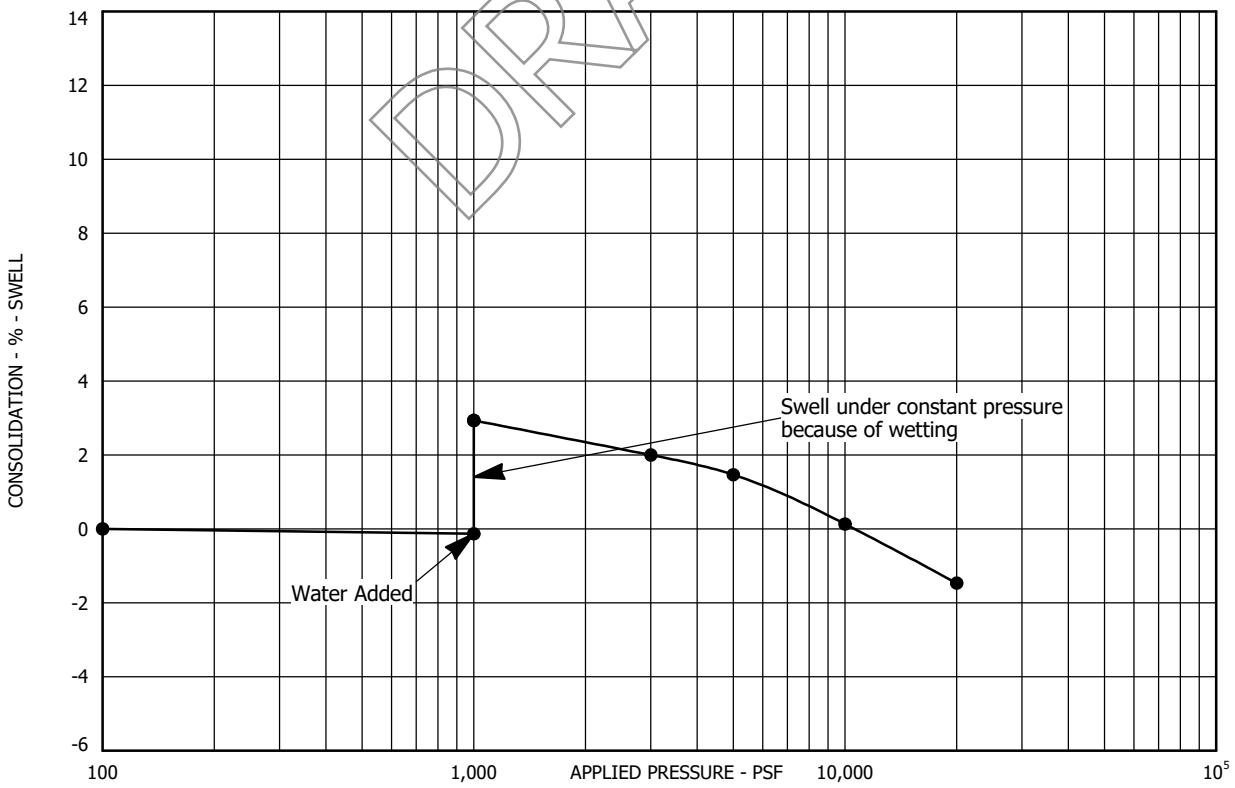
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-150
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 120 at a depth of 7 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

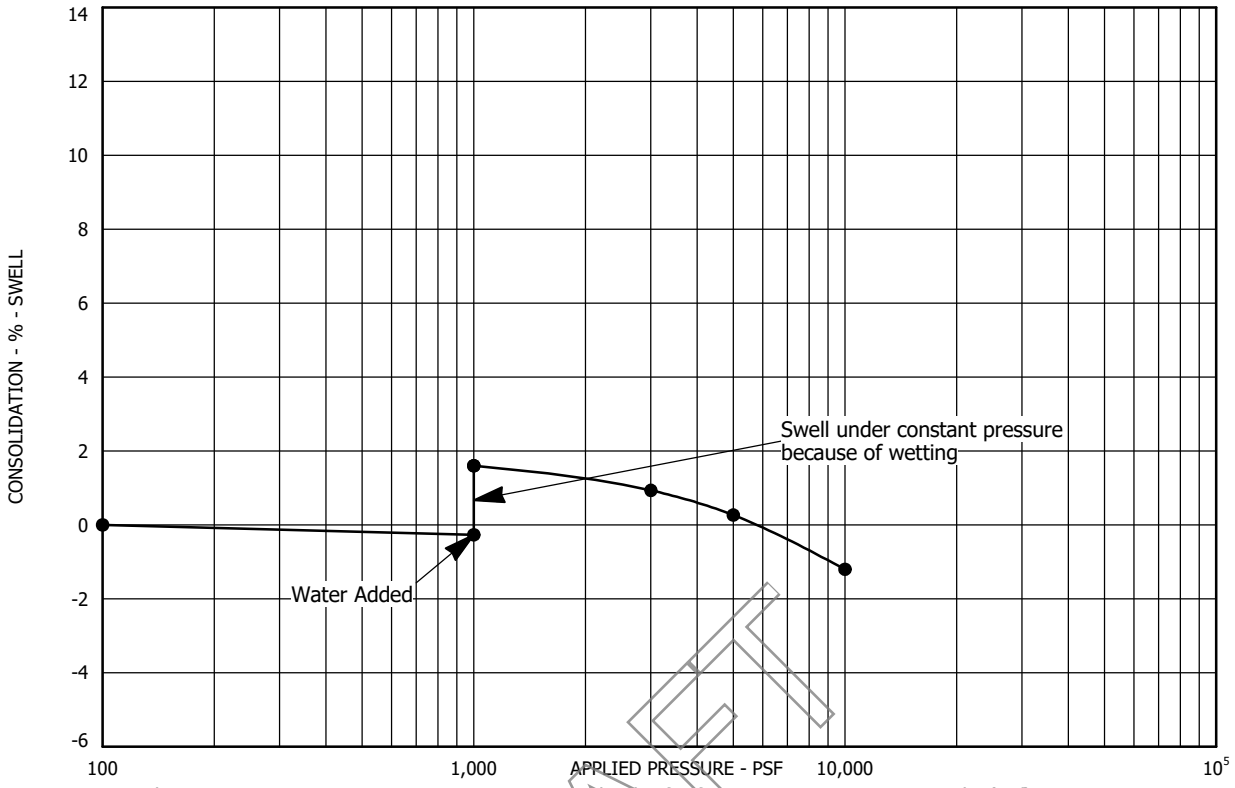
DRAFT



Sample Location: Test Boring No. 120 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 126
Moisture Content (%): 9

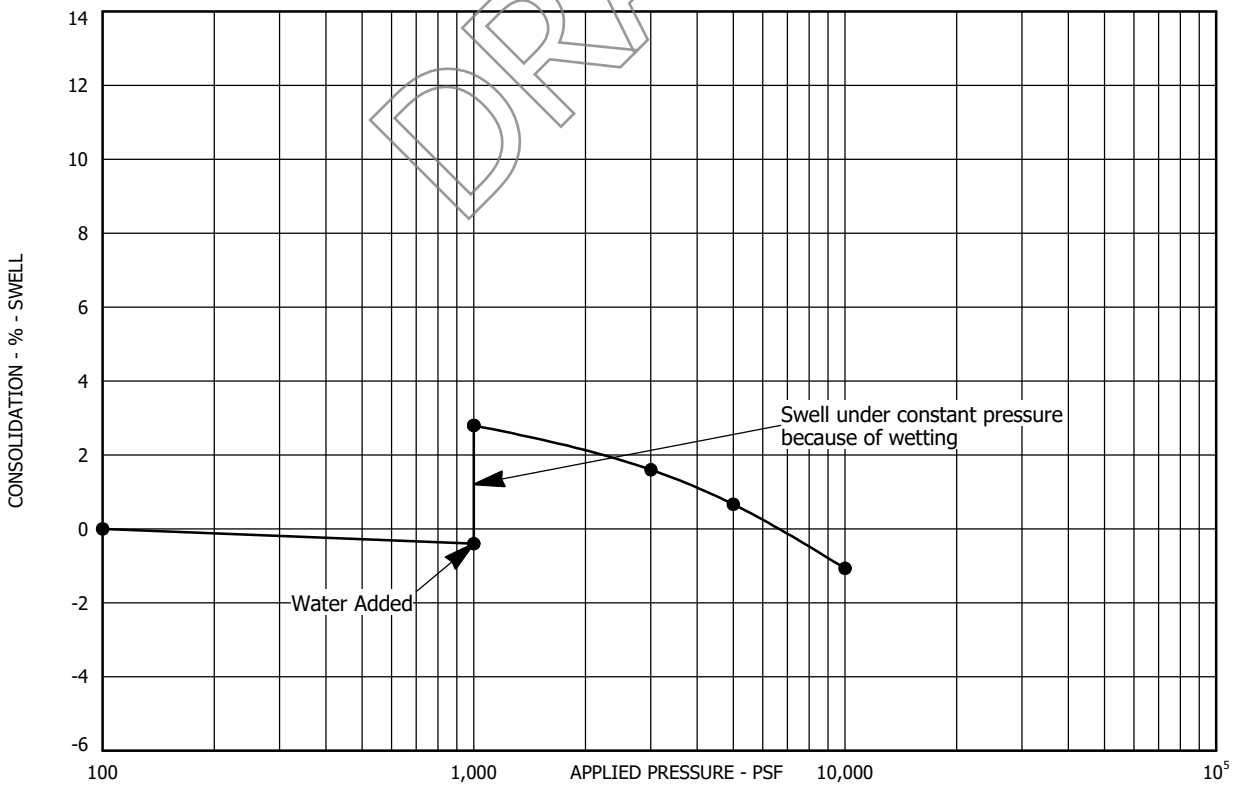
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-151
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 121 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 14

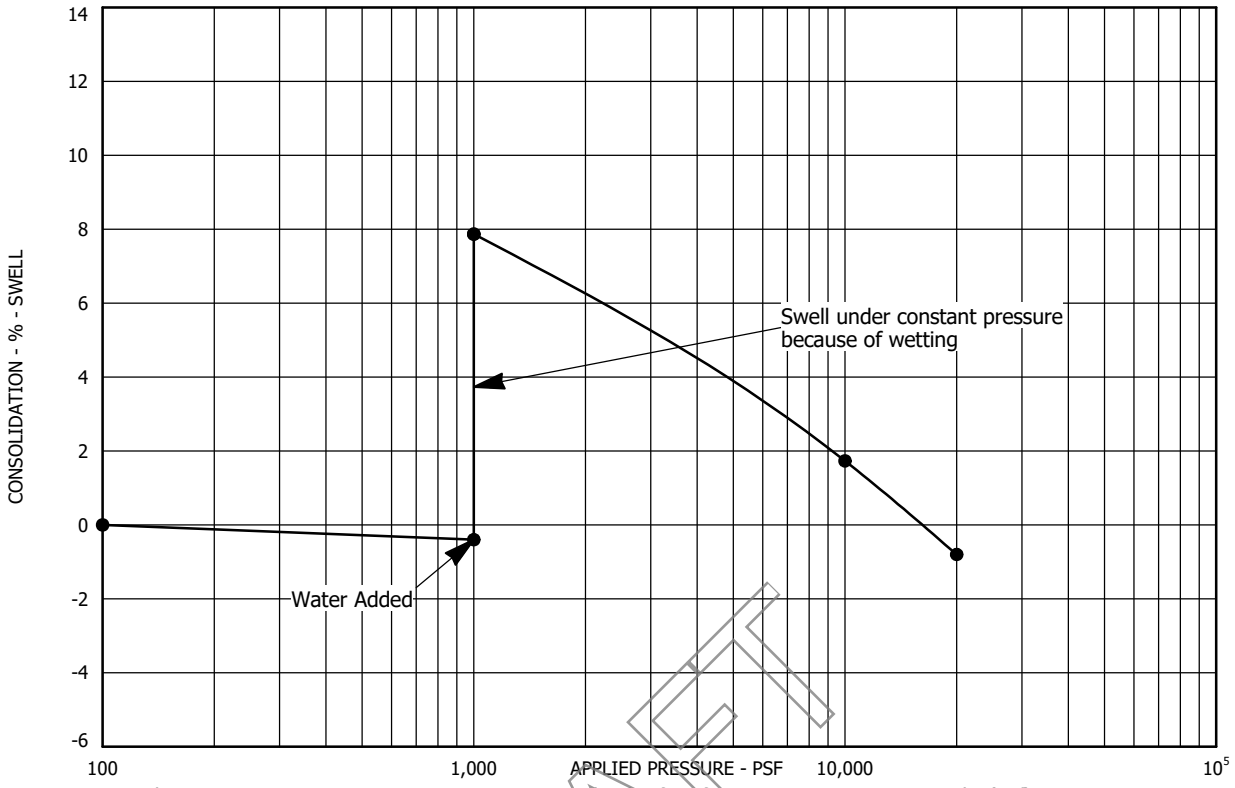
DRAFT



Sample Location: Test Boring No. 121 at a depth of 19 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 114
Moisture Content (%): 14

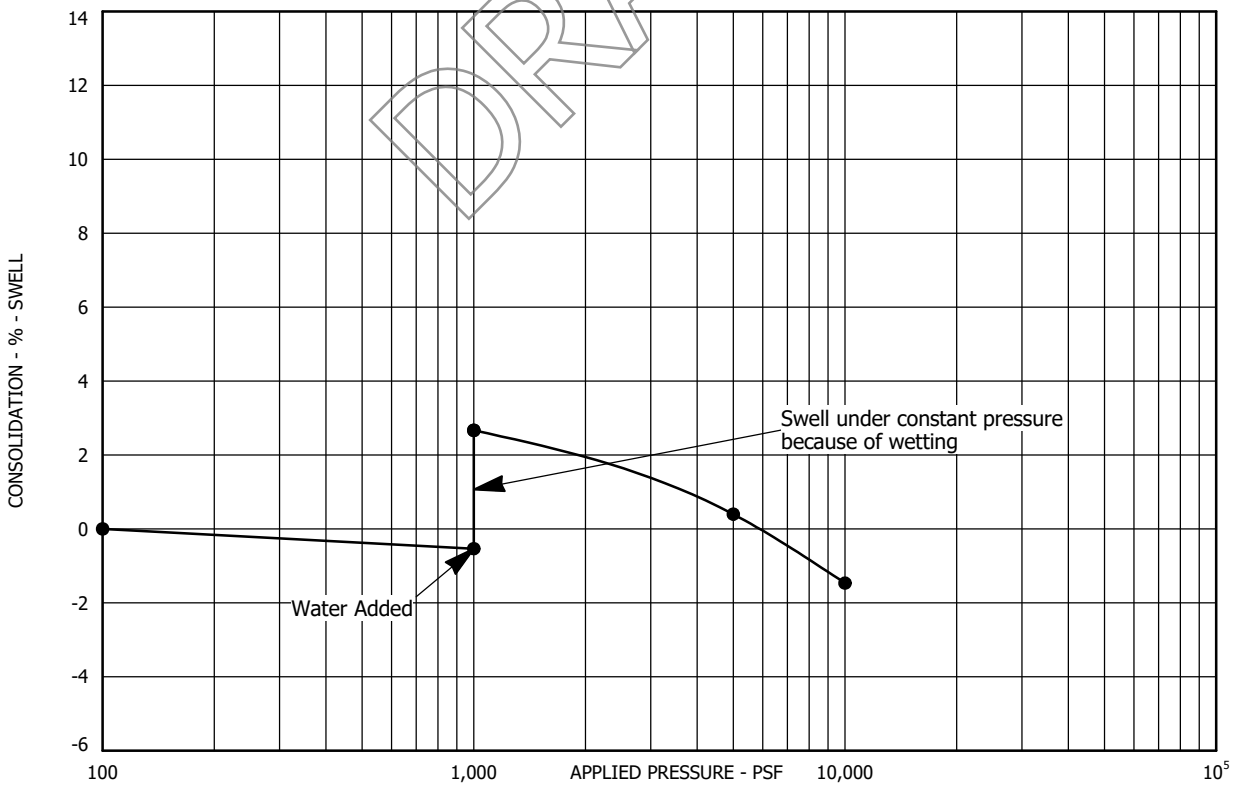
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-152
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 121 at a depth of 29 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 115
Moisture Content (%): 14

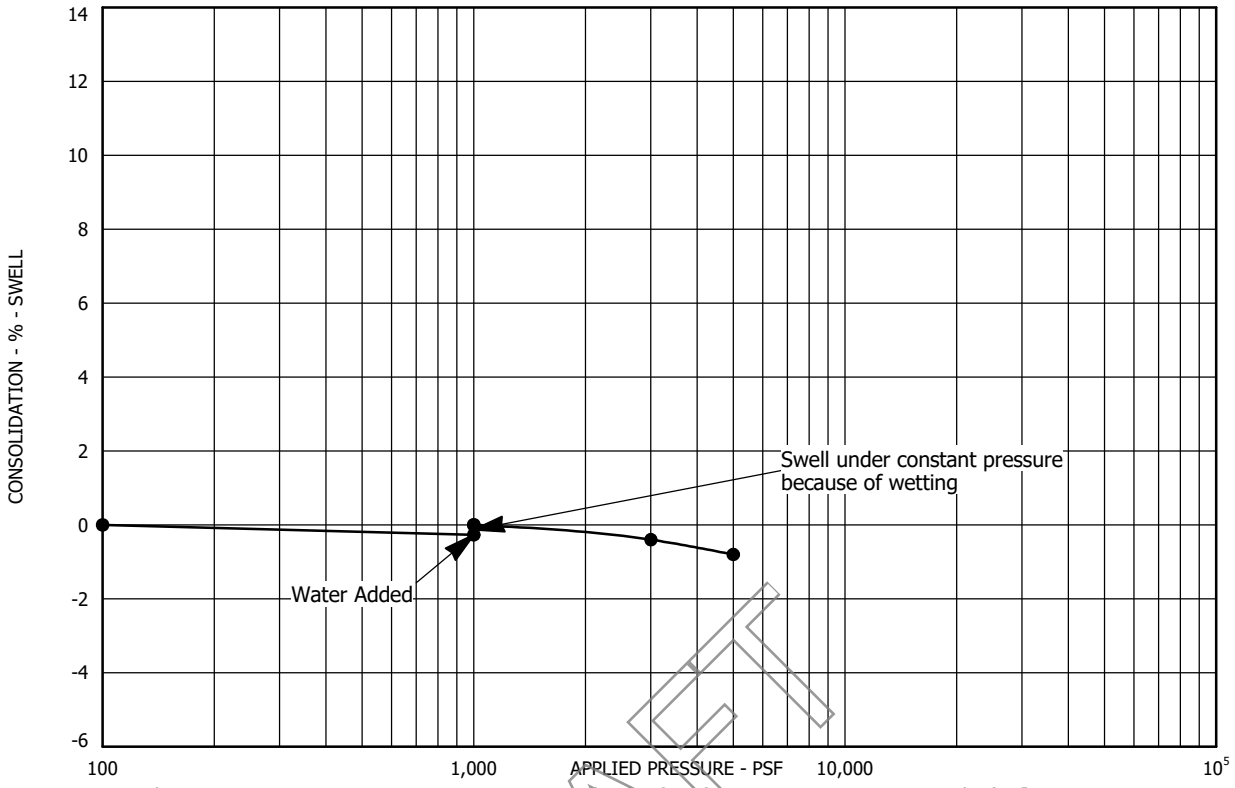
DRAFT



Sample Location: Test Boring No. 122 at a depth of 7 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

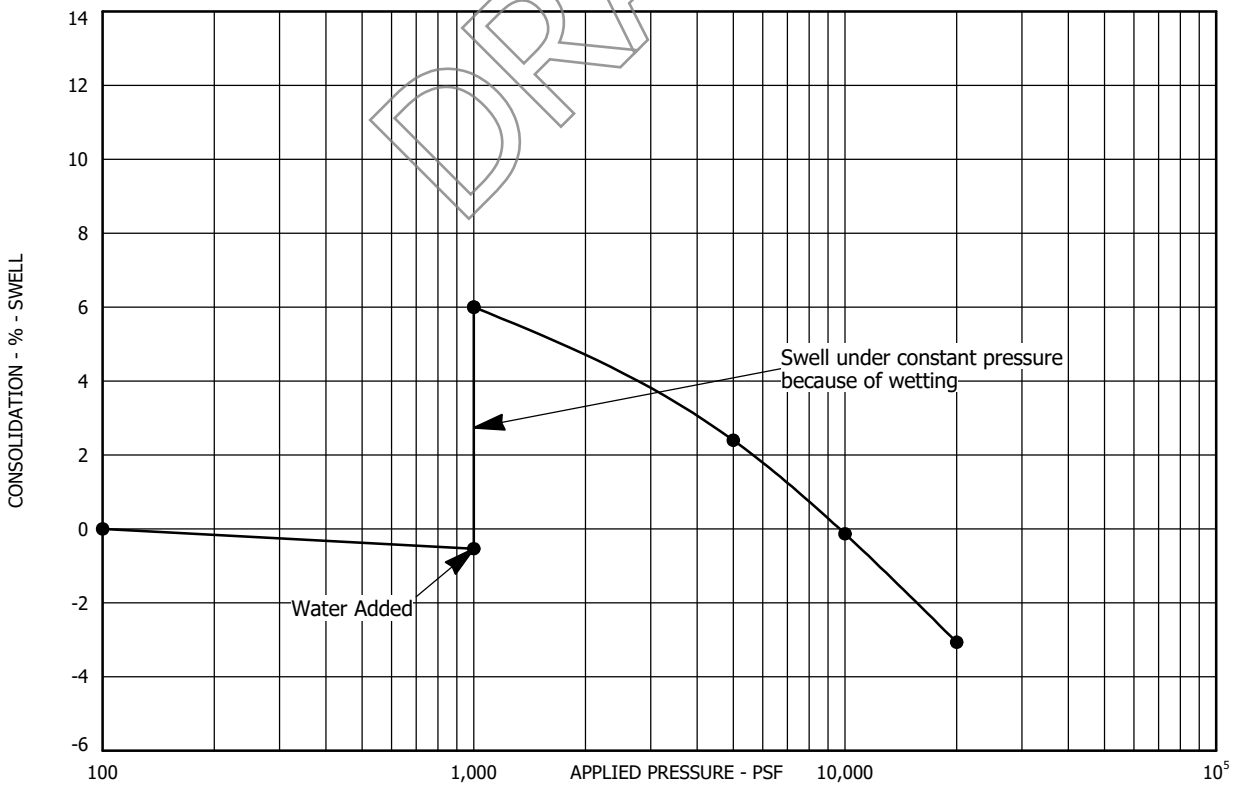
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-153
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 122 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 16

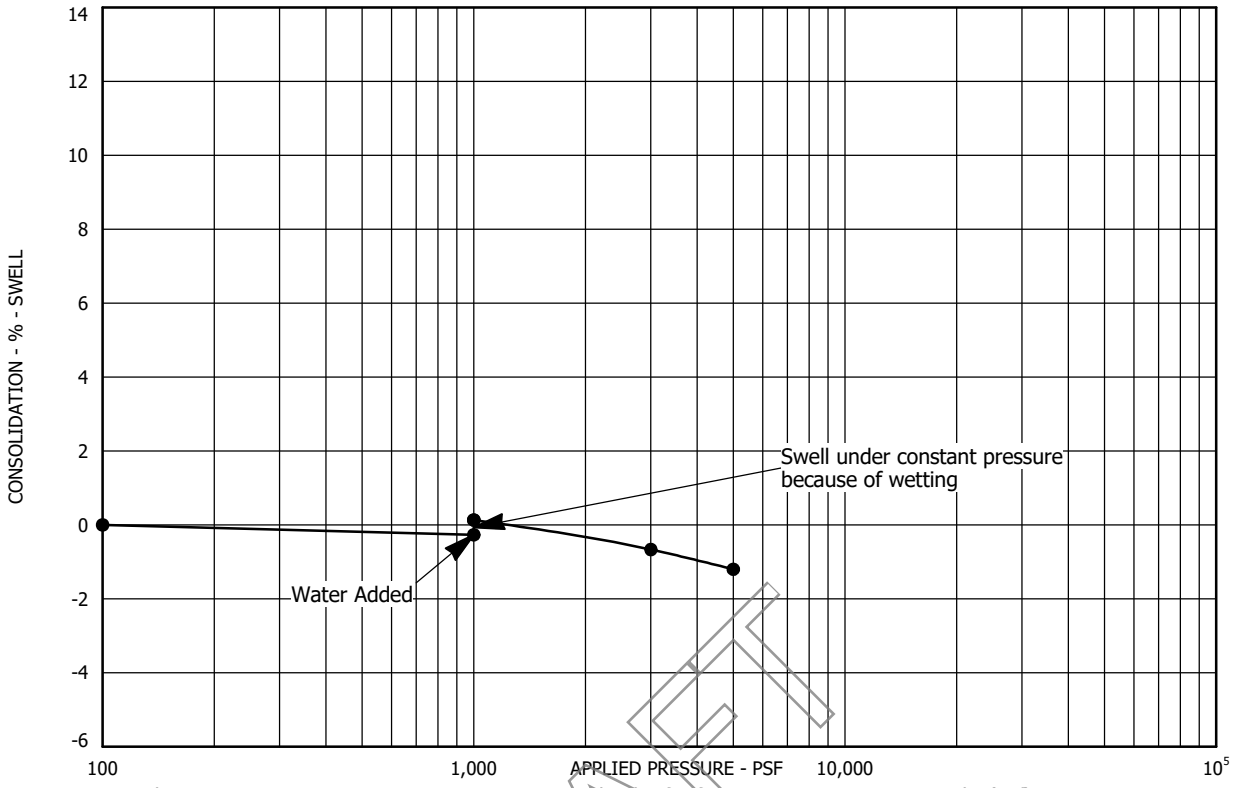
DRAFT



Sample Location: Test Boring No. 122 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

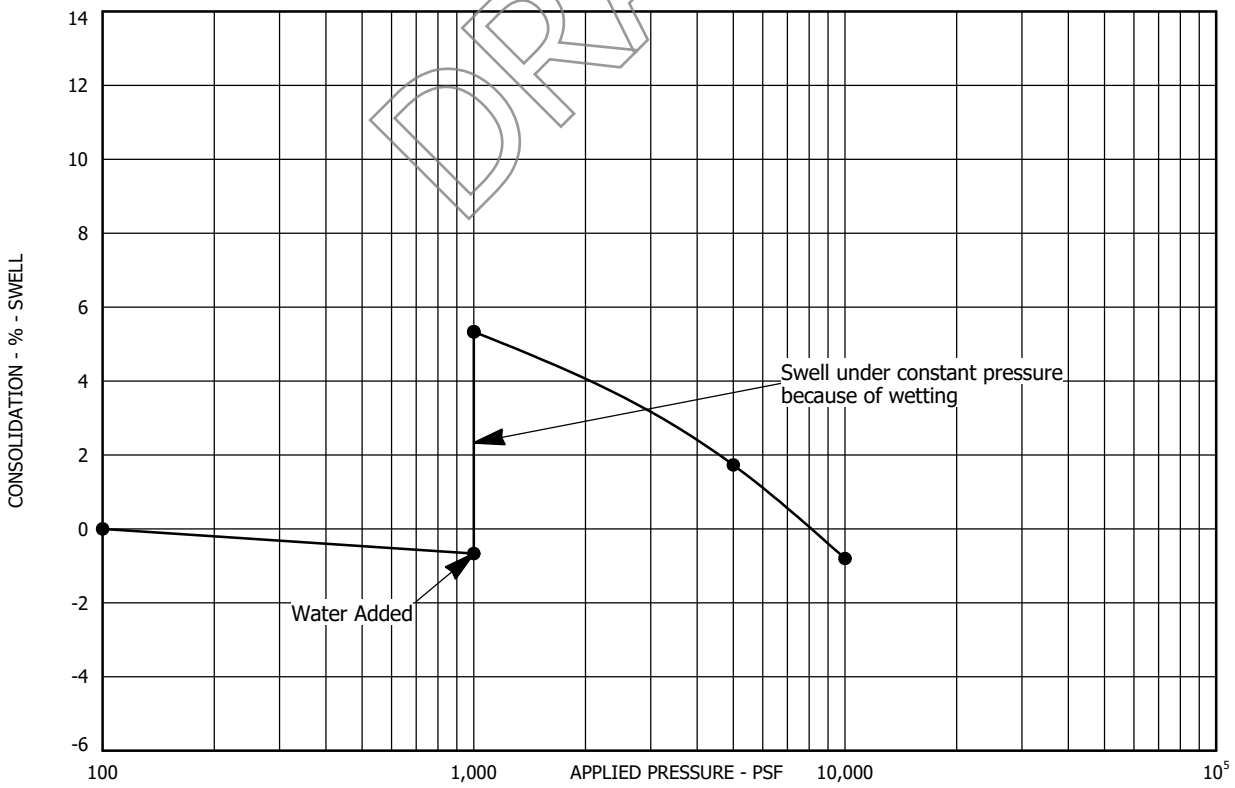
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-154
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 123 at a depth of 4 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 9

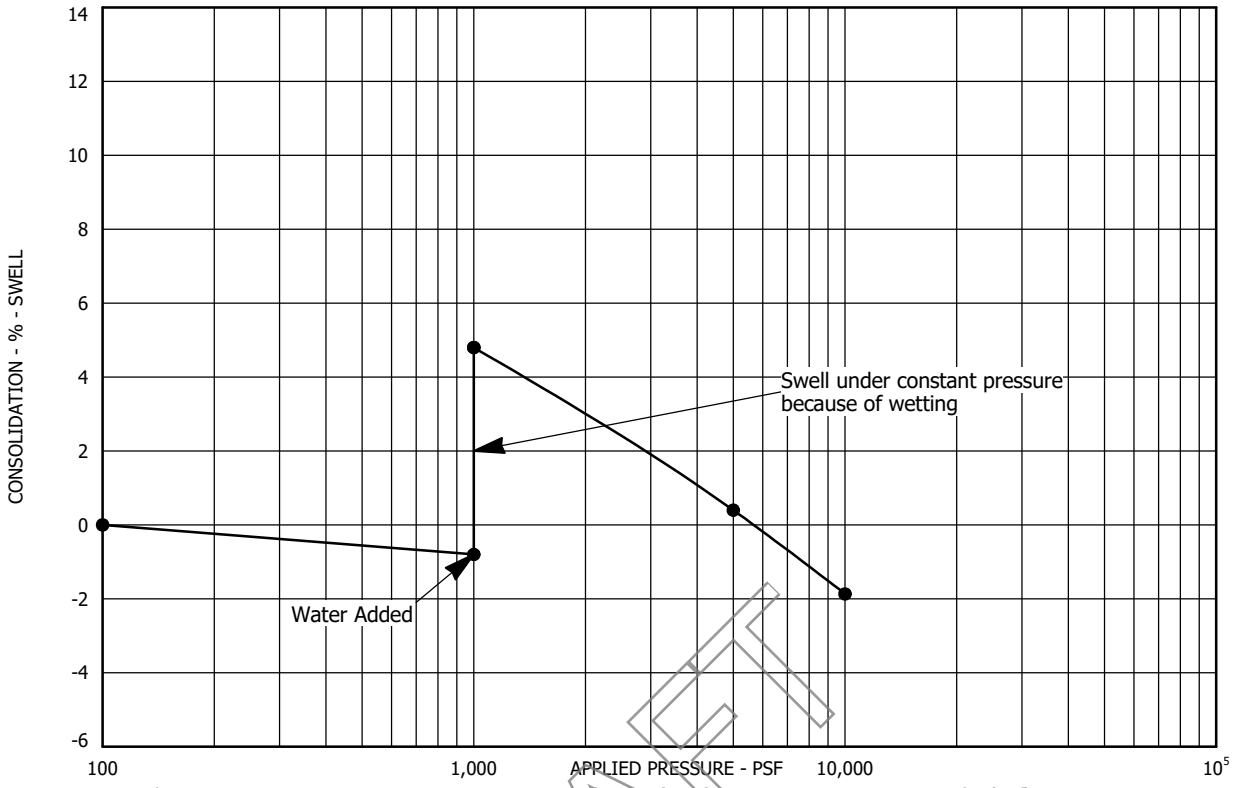
DRAFT



Sample Location: Test Boring No. 123 at a depth of 11 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 17

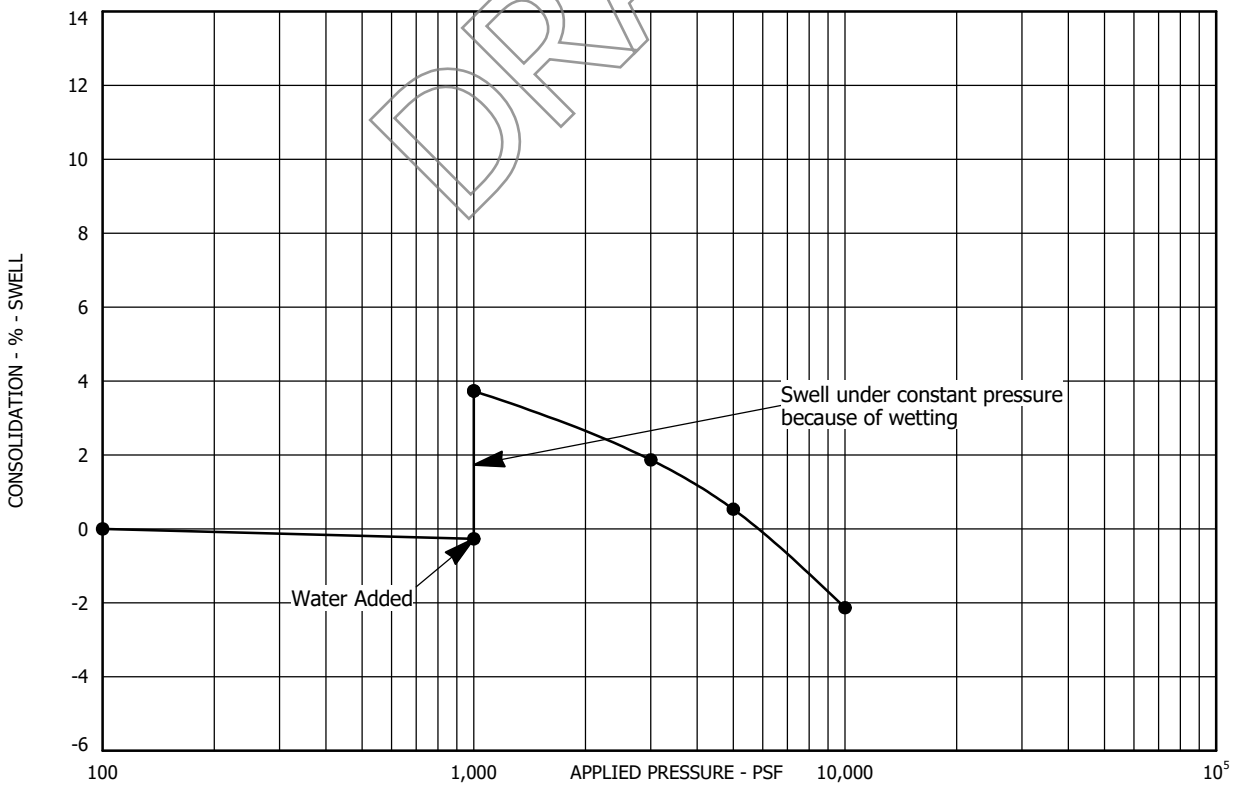
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-155
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 123 at a depth of 19 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 17

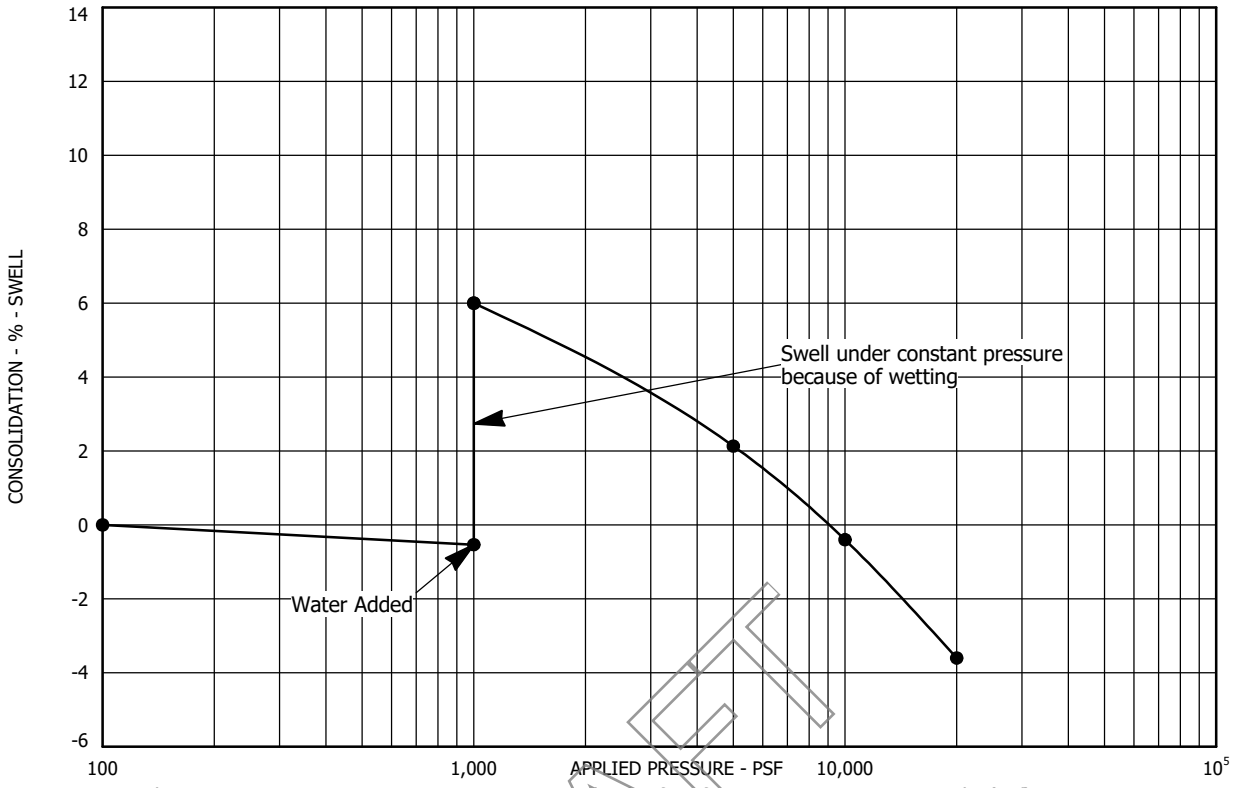
DRAFT



Sample Location: Test Boring No. 124 at a depth of 9 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 104
Moisture Content (%): 20

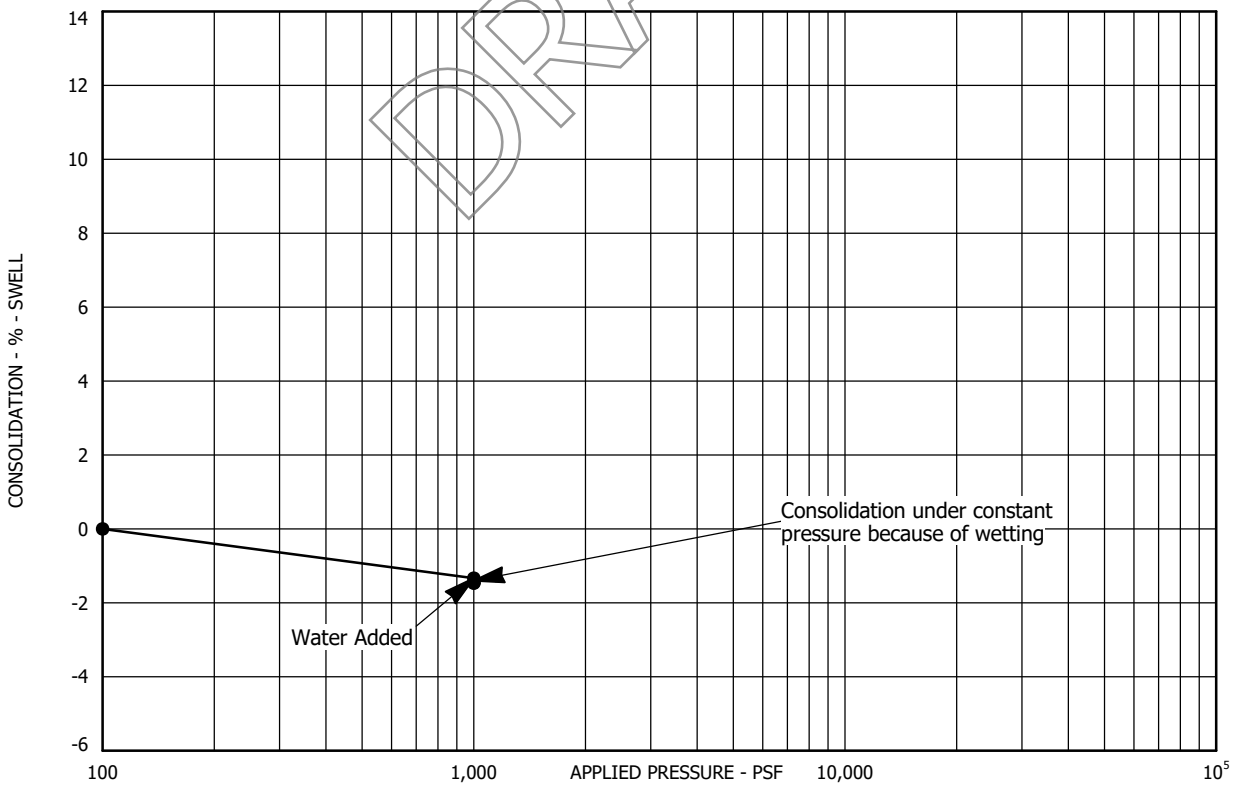
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-156
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 124 at a depth of 14 feet
Sample Description: Claystone, trace sand
Dry Unit Weight (pcf): 102
Moisture Content (%): 24

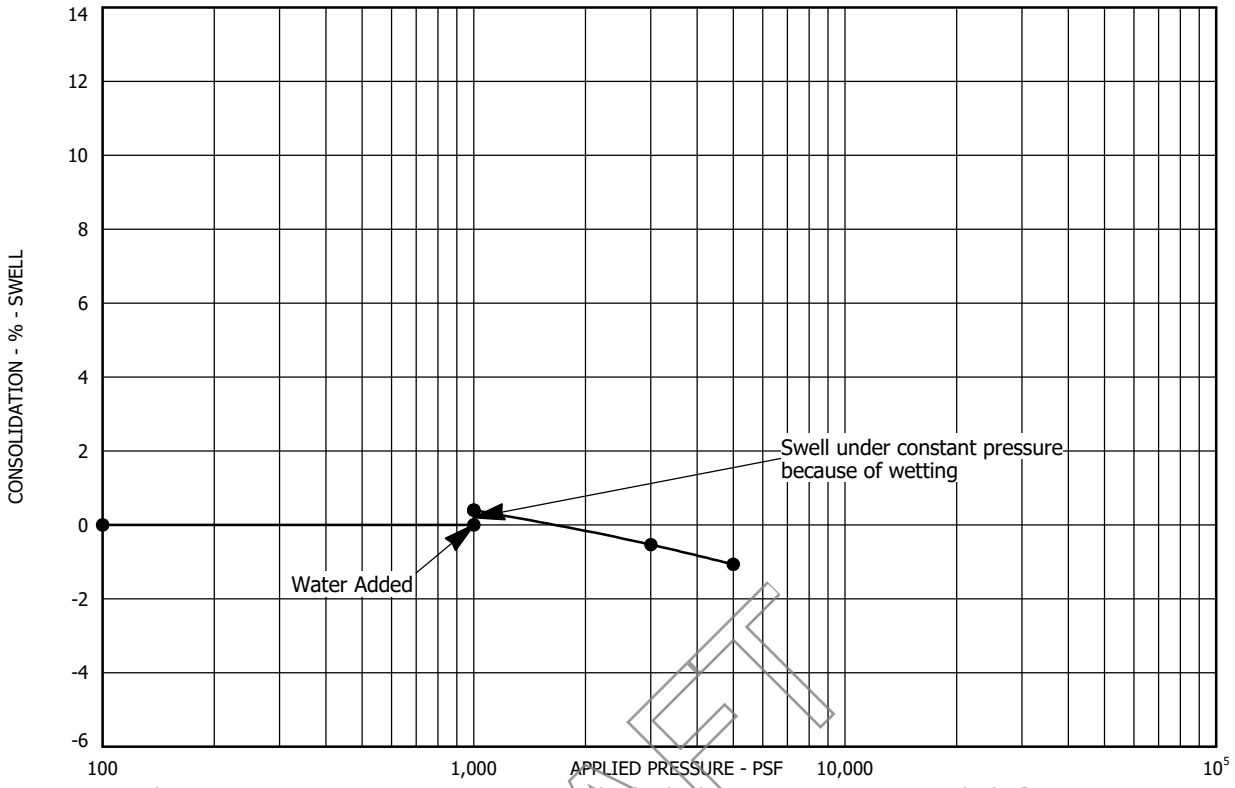
DRAFT



Sample Location: Test Boring No. 125 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 111
Moisture Content (%): 18

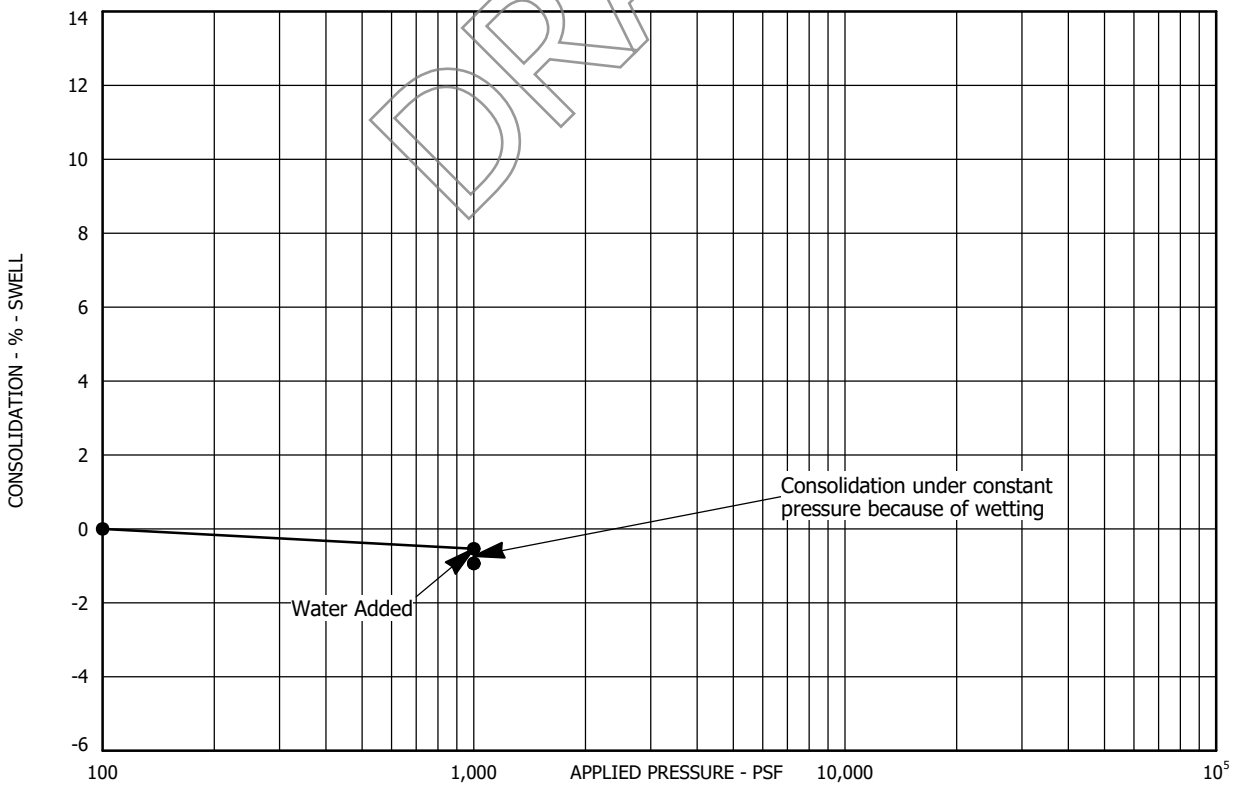
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-157
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 125 at a depth of 7 feet
Sample Description: Claystone, sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 14

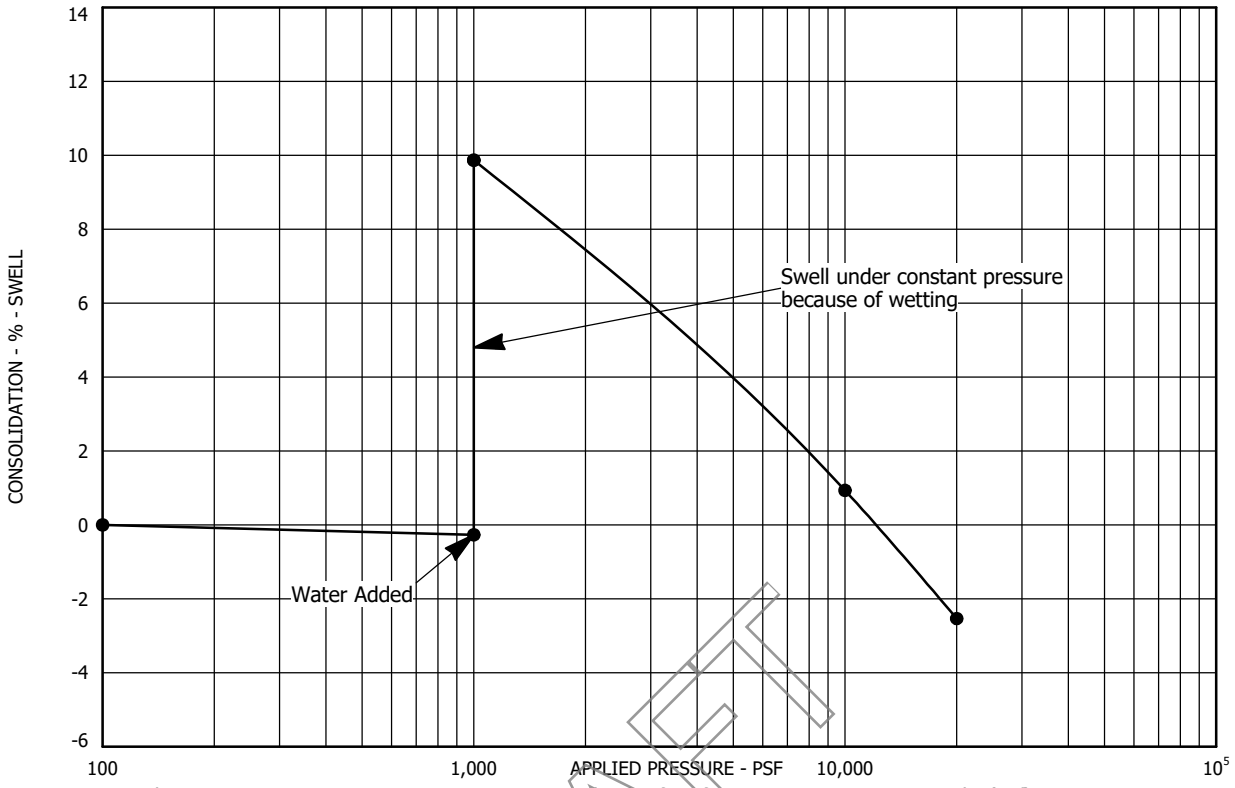
DRAFT



Sample Location: Test Boring No. 125 at a depth of 14 feet
Sample Description: Siltstone, clayey, sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 12

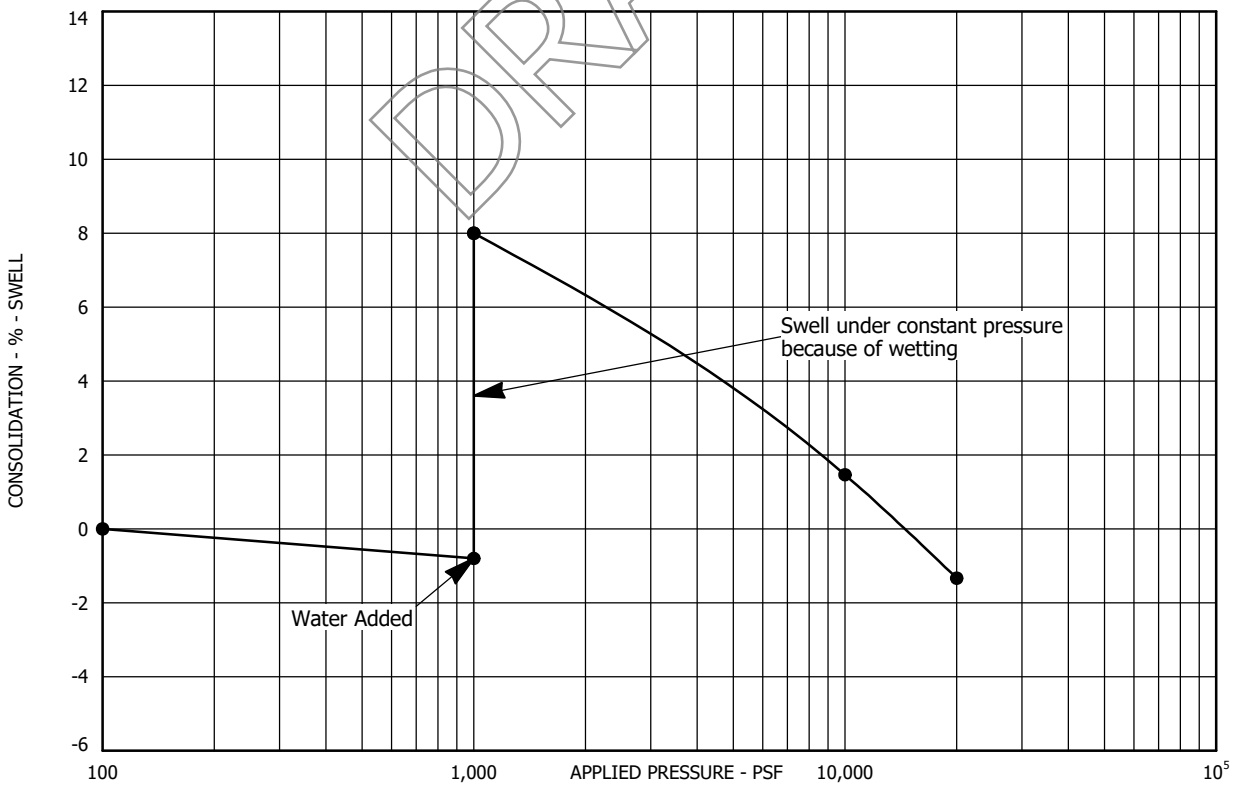
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-158
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 125 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

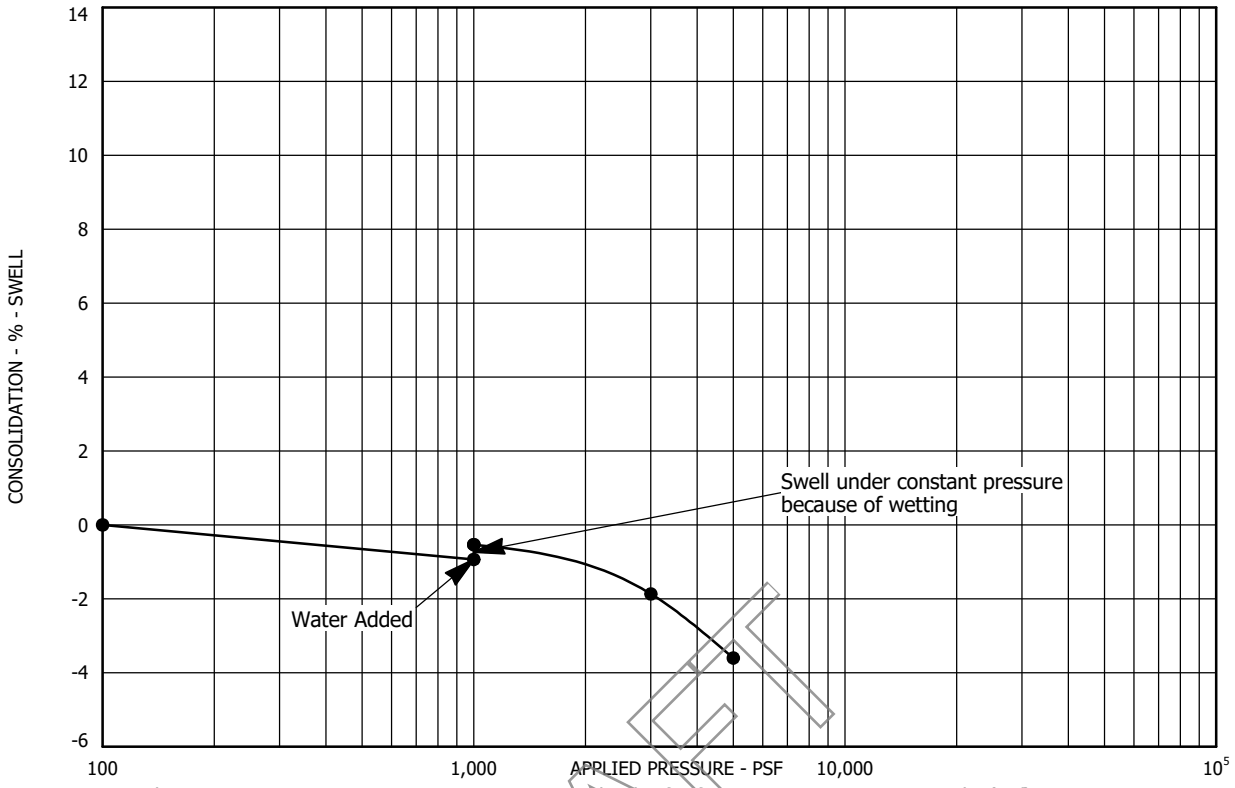
DRAFT



Sample Location: Test Boring No. 125 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 17

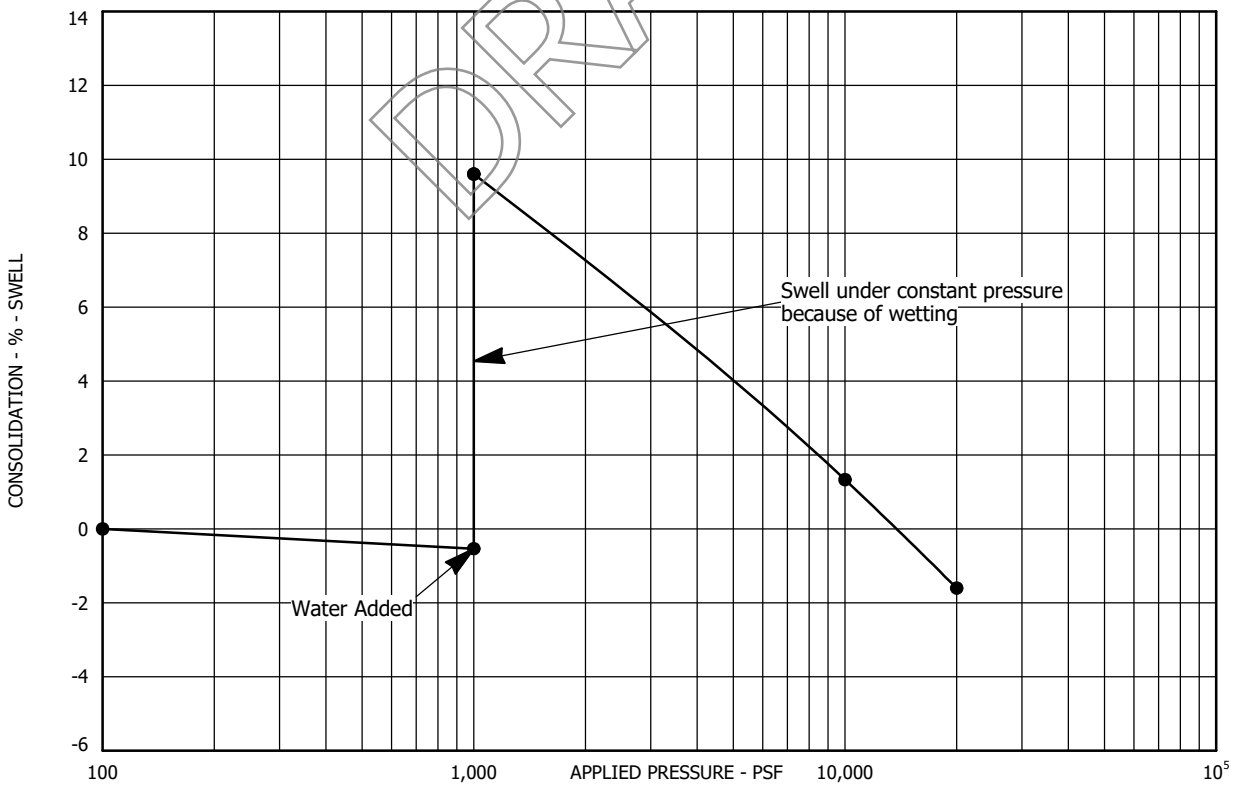
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-159
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 126 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 101
Moisture Content (%): 22

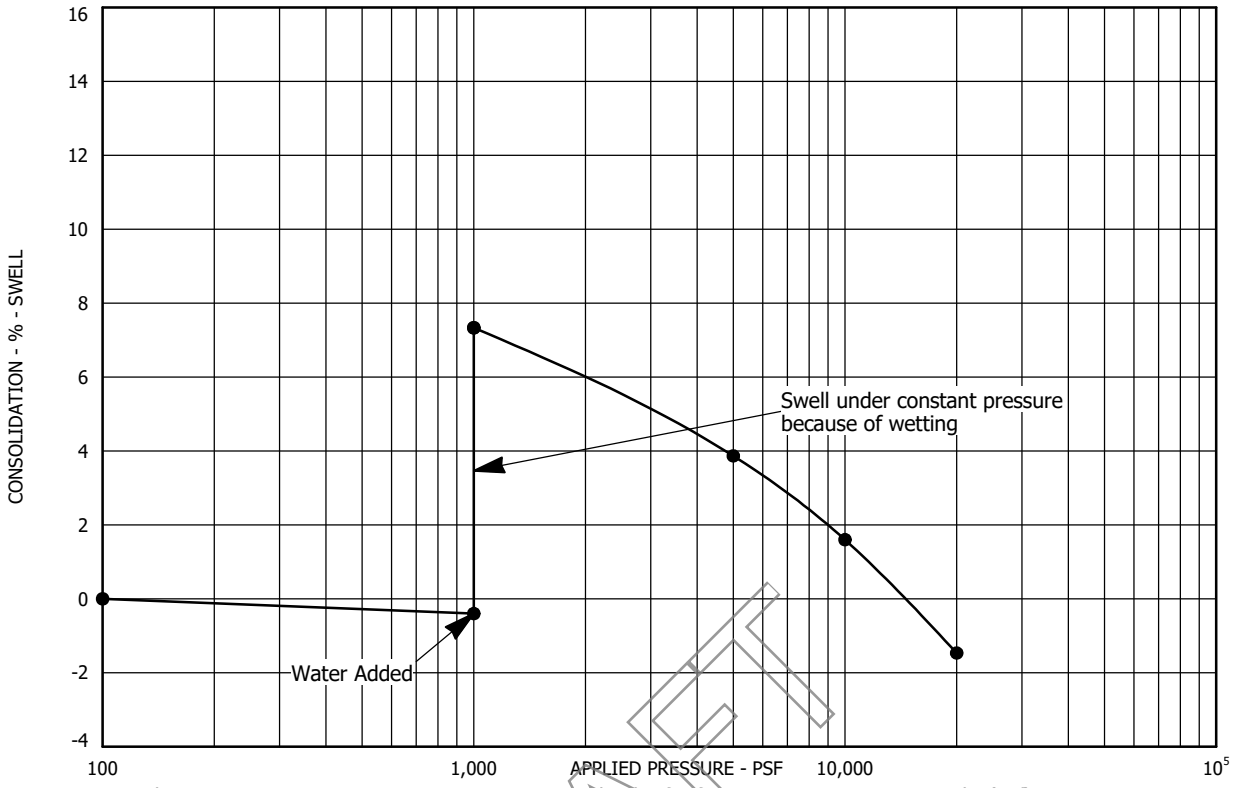
DRAFT



Sample Location: Test Boring No. 126 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 113
Moisture Content (%): 17

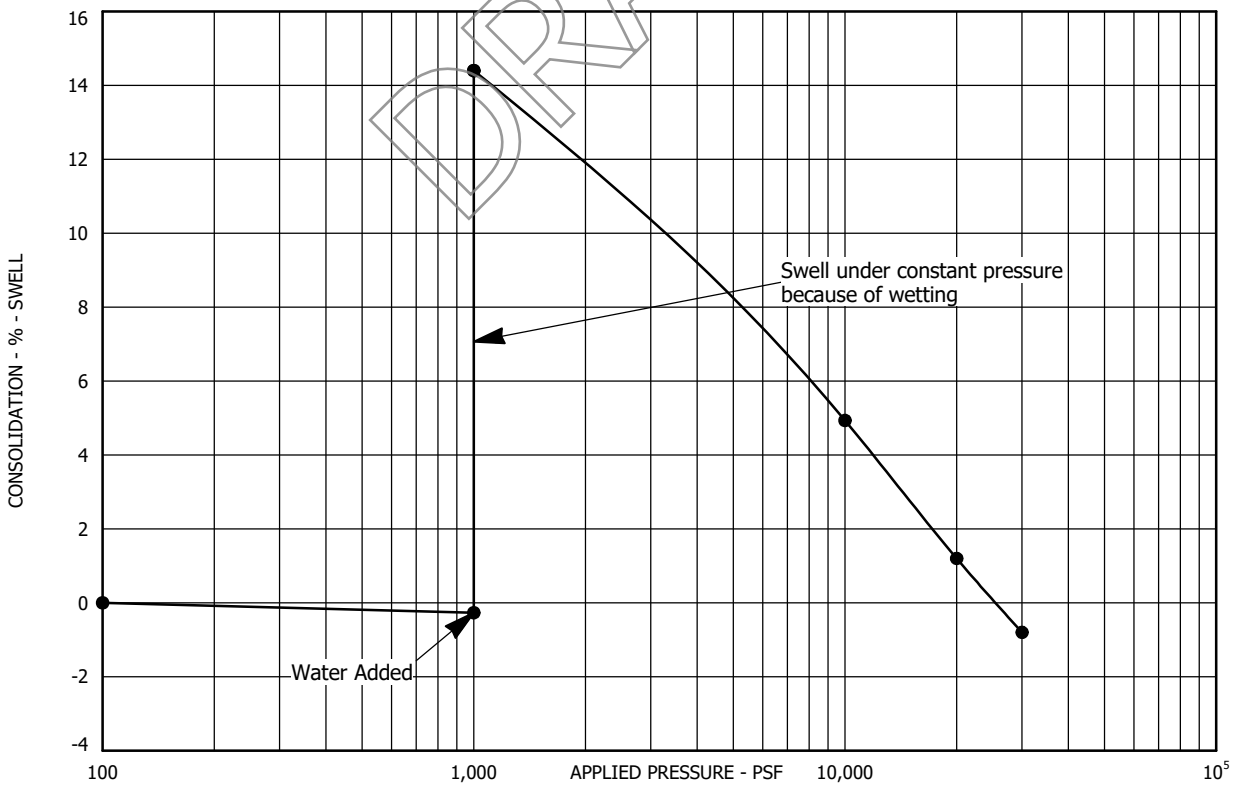
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-160
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 127 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

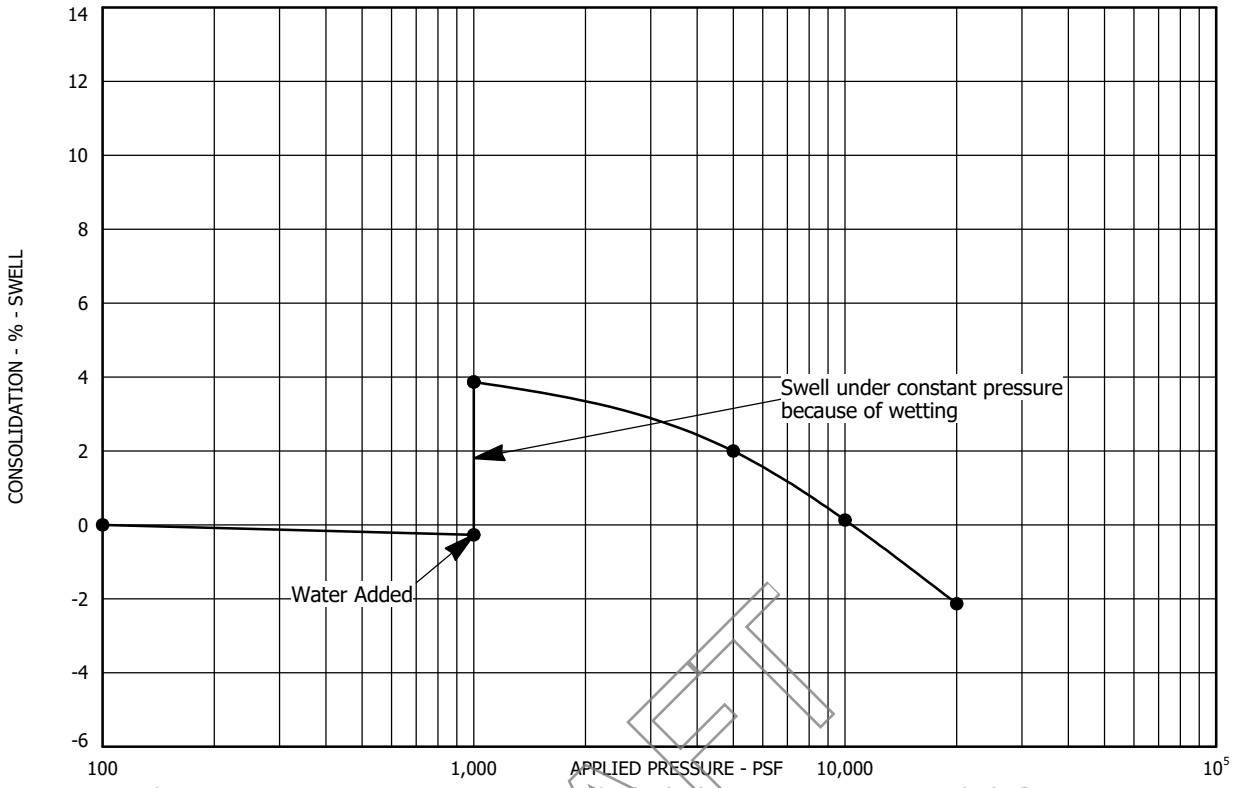
DRAFT



Sample Location: Test Boring No. 127 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 119
Moisture Content (%): 15

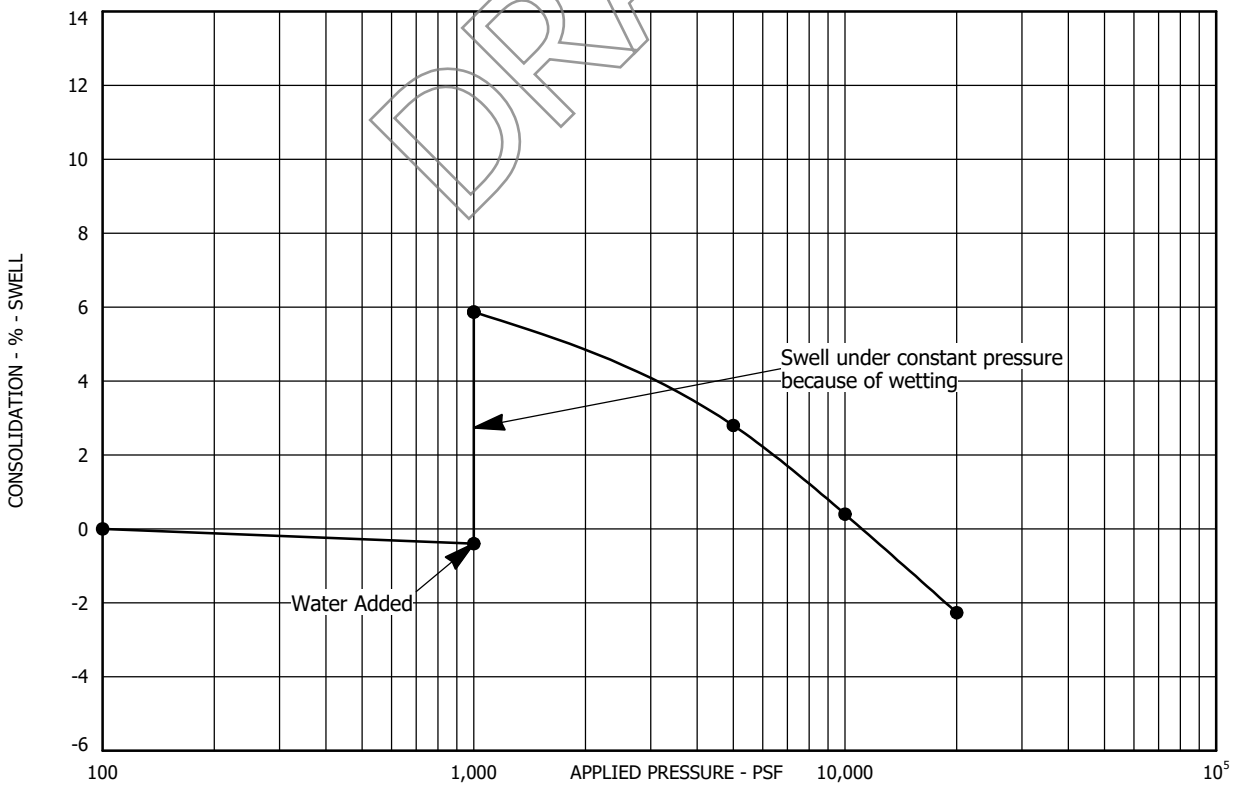
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-161
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 128 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 121
Moisture Content (%): 11

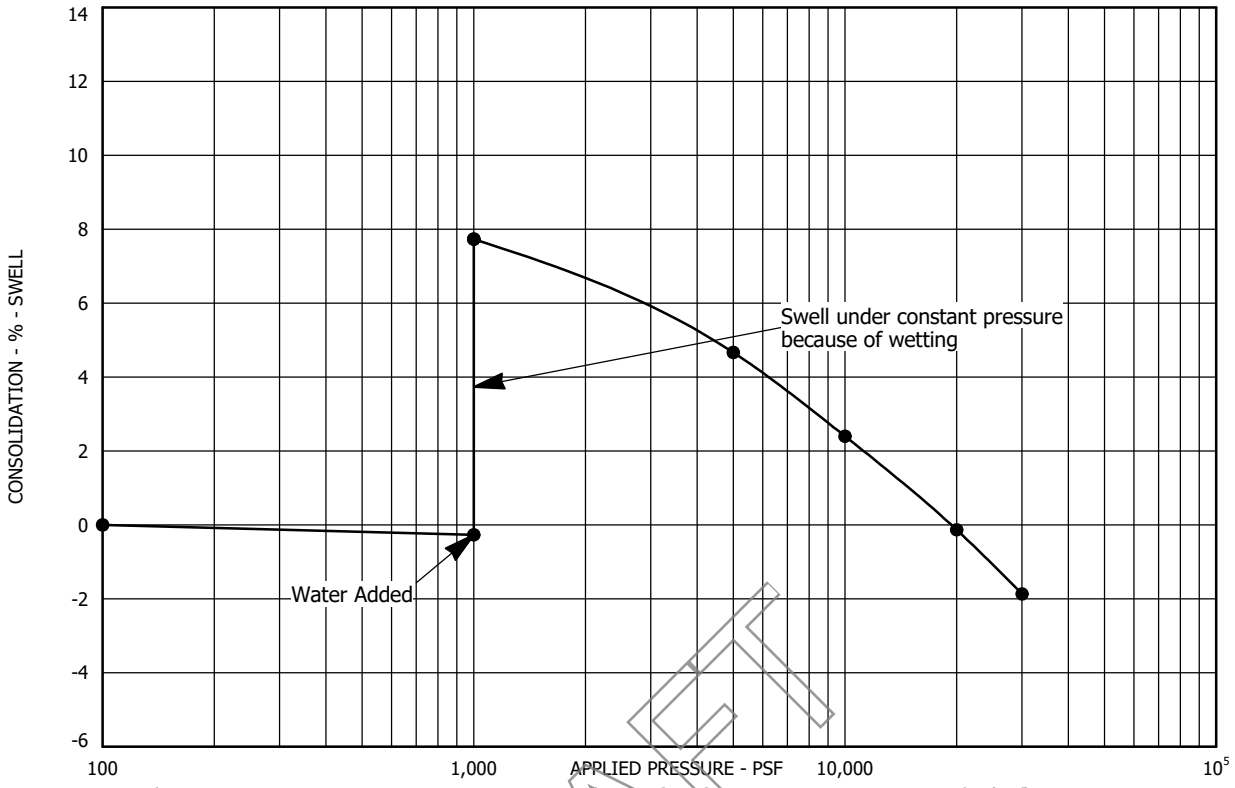
DRAFT



Sample Location: Test Boring No. 128 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 17

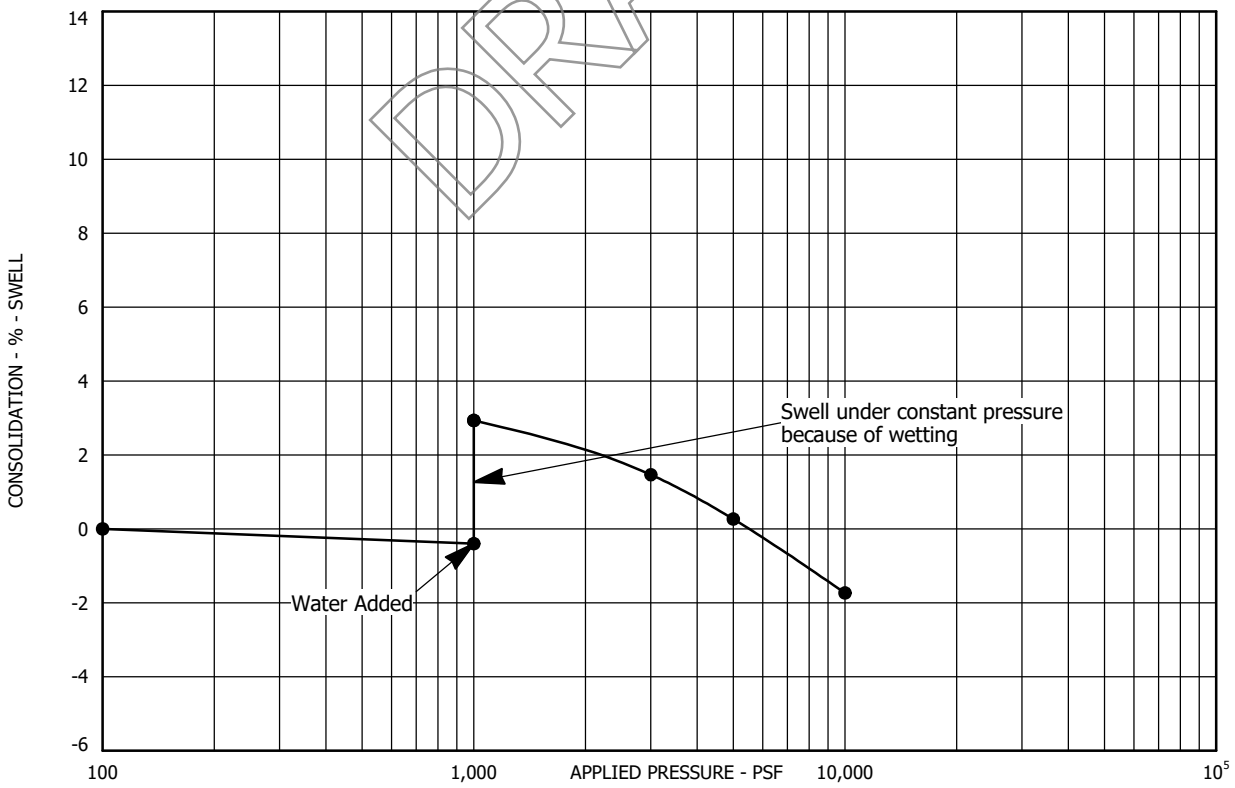
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-162
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 128 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

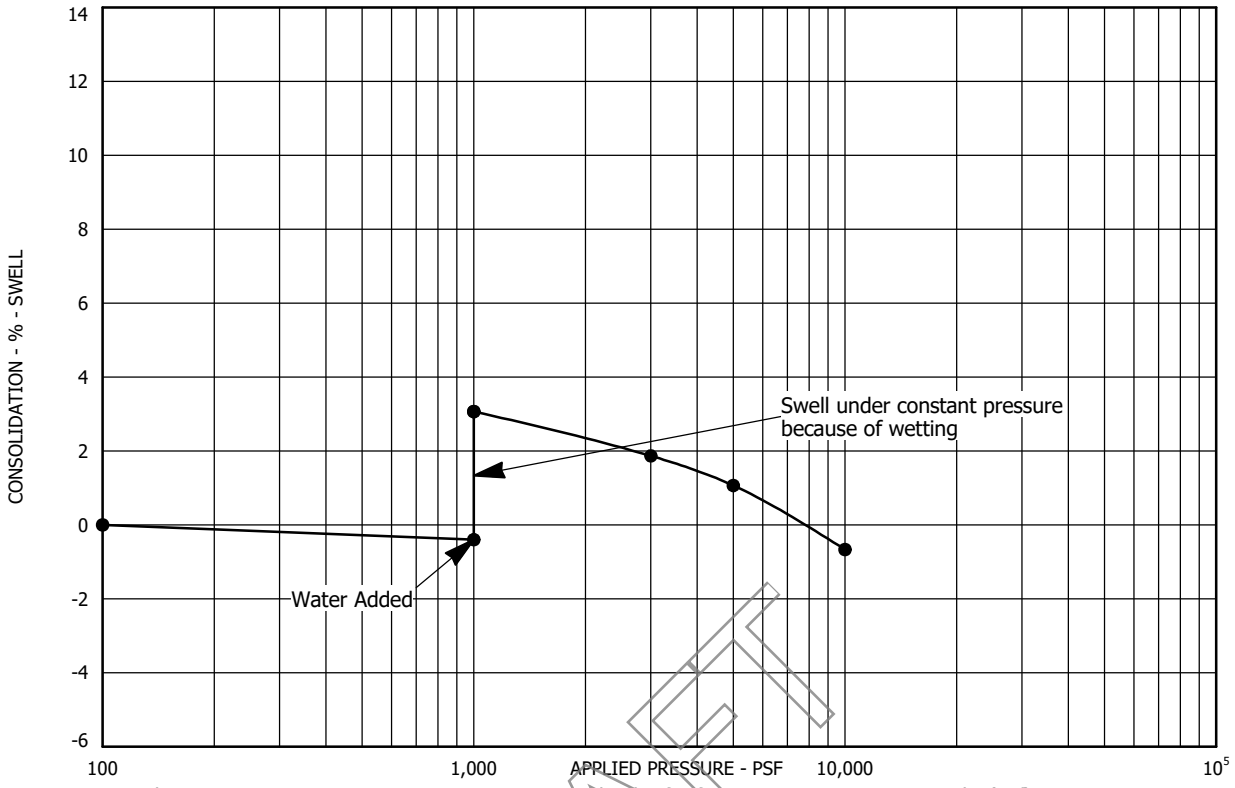
DRAFT



Sample Location: Test Boring No. 129 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 118
Moisture Content (%): 13

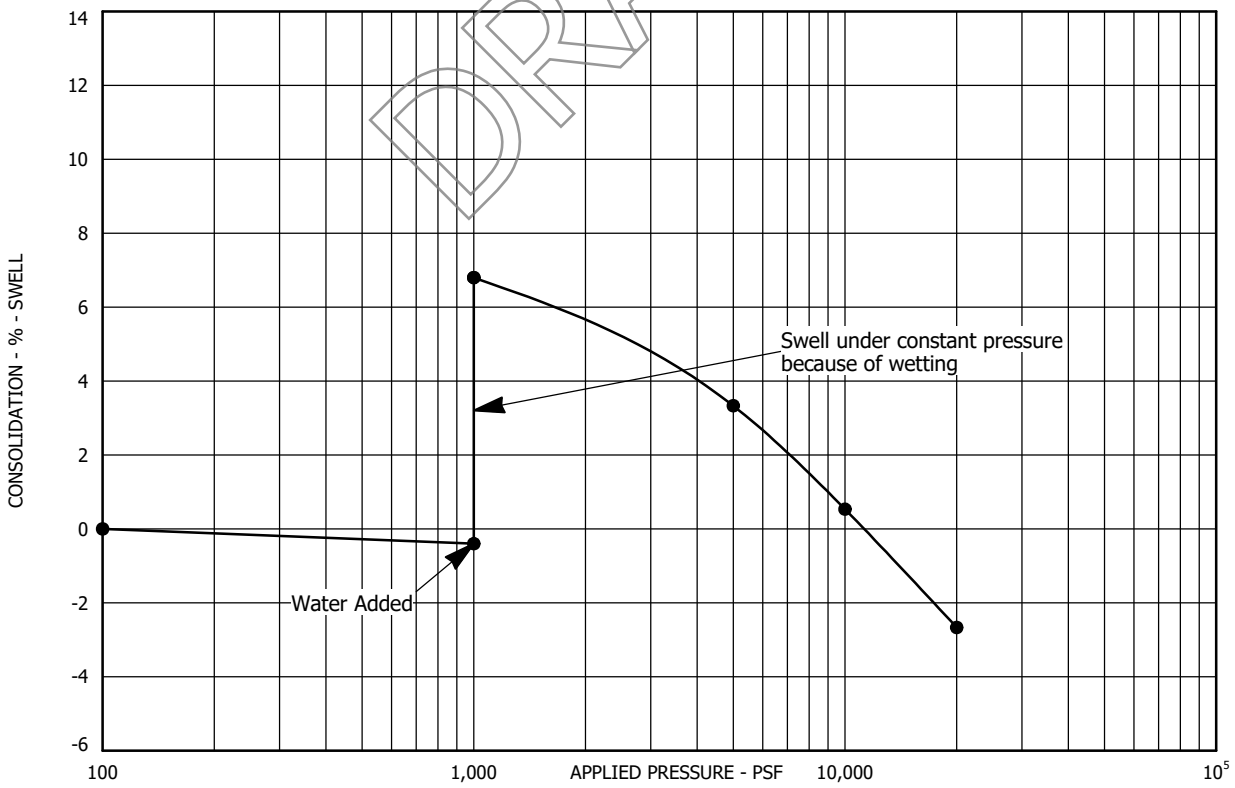
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-163
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 130 at a depth of 4 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 16

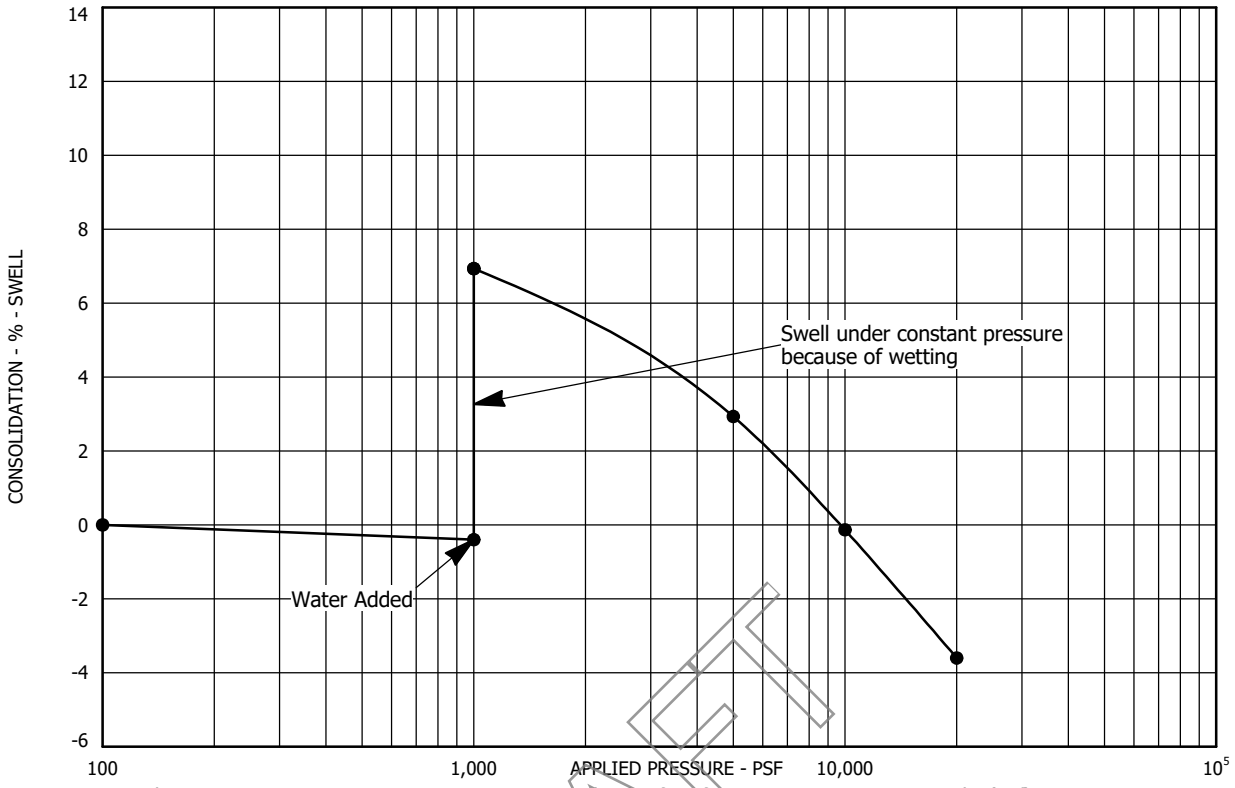
DRAFT



Sample Location: Test Boring No. 130 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 108
Moisture Content (%): 21

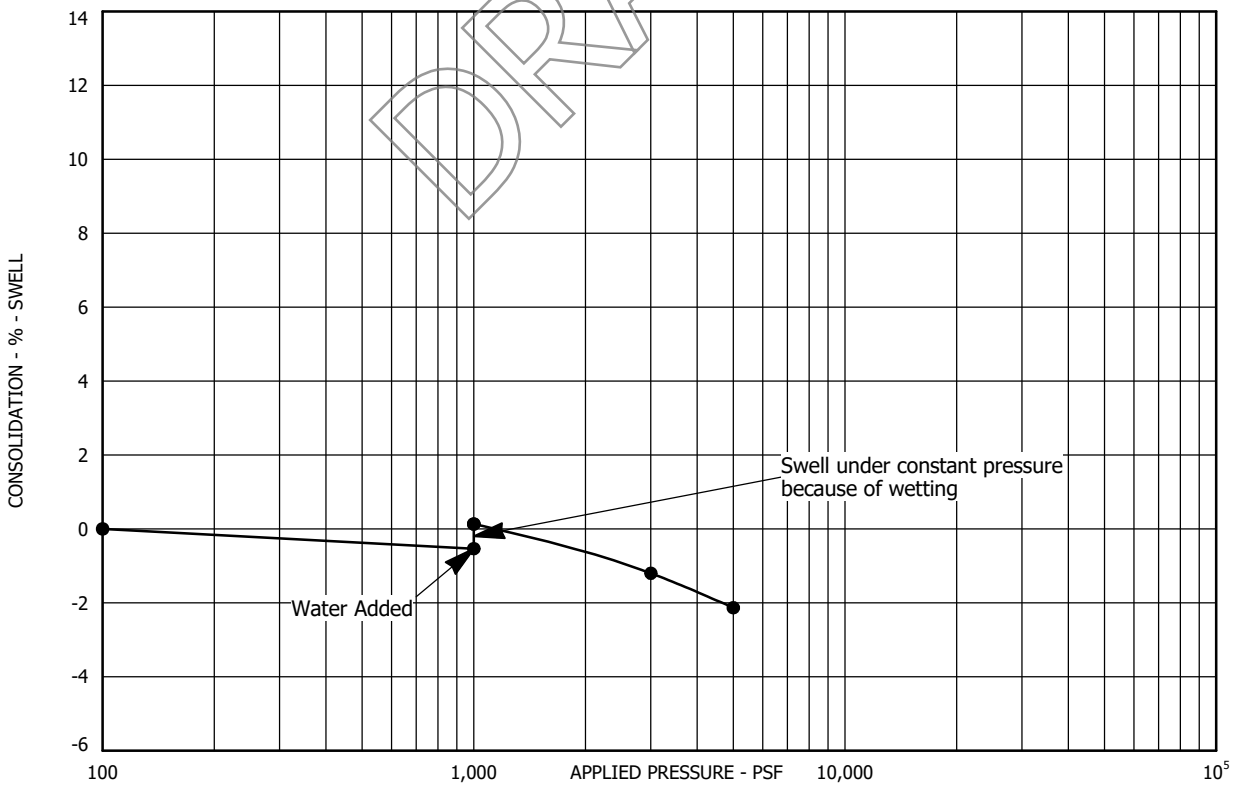
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-164
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 130 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 18

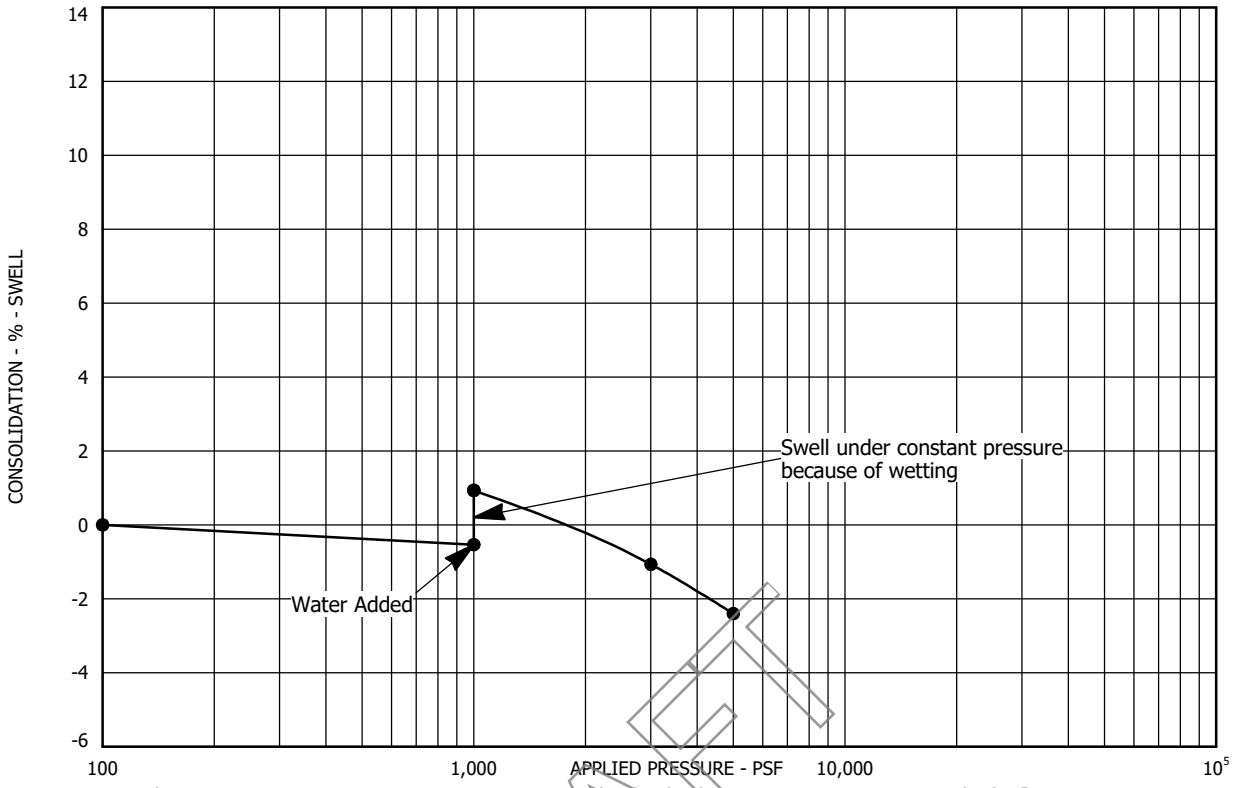
DRAFT



Sample Location: Test Boring No. 131 at a depth of 4 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 109
Moisture Content (%): 19

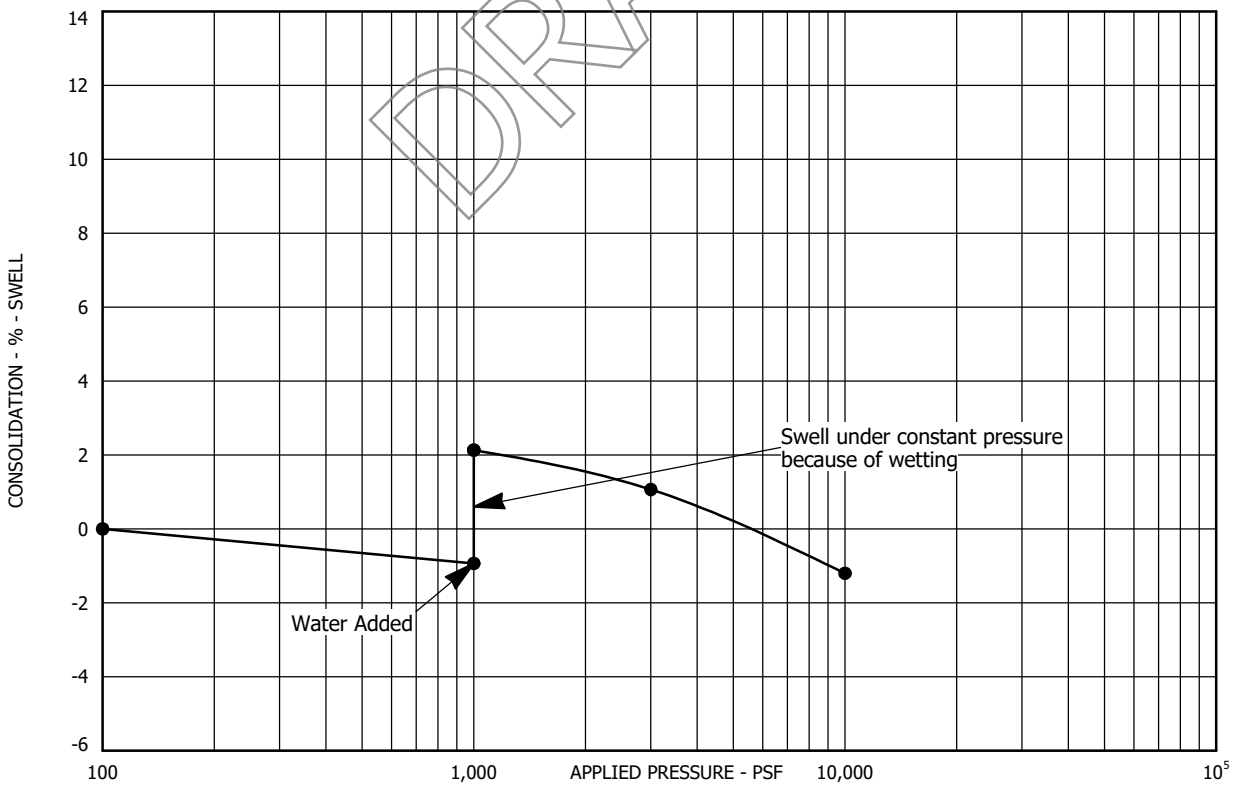
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-165
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 131 at a depth of 9 feet
Sample Description: Clay (Weathered Claystone), sandy
Dry Unit Weight (pcf): 99
Moisture Content (%): 24

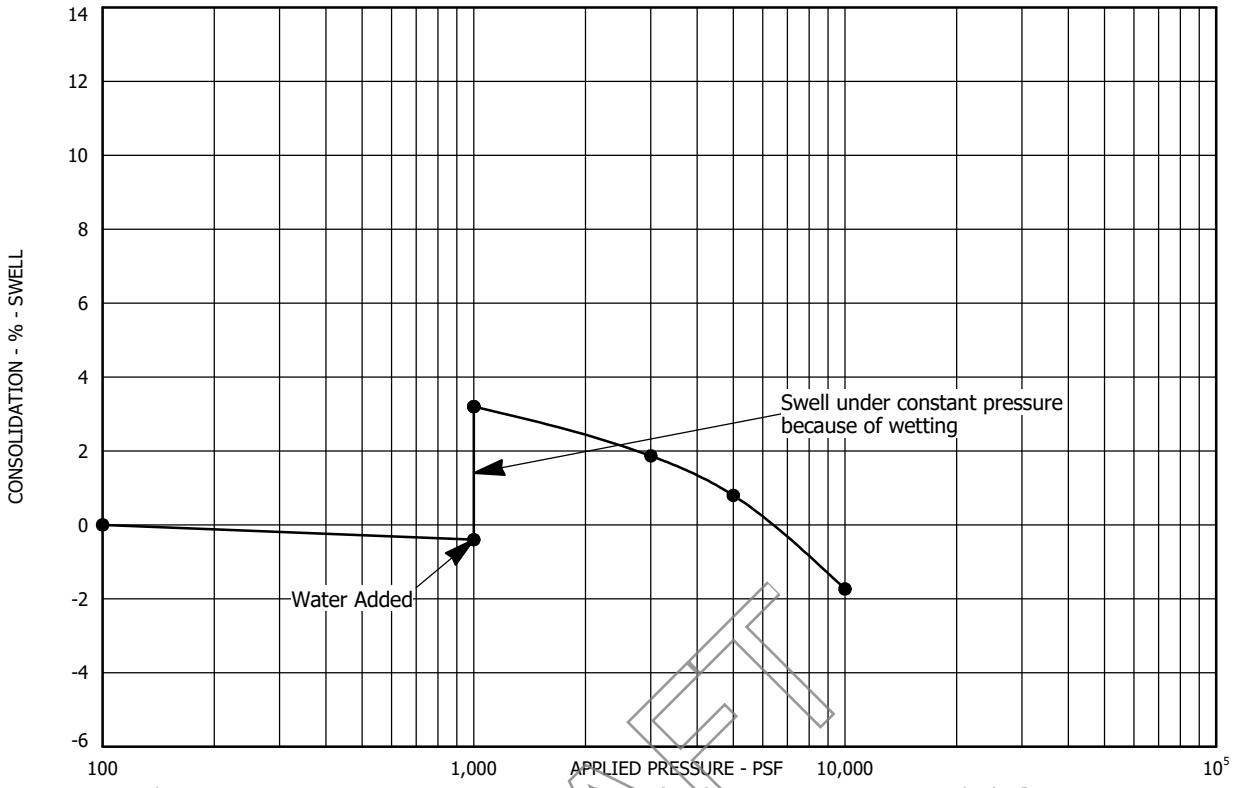
DRAFT



Sample Location: Test Boring No. 131 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 11

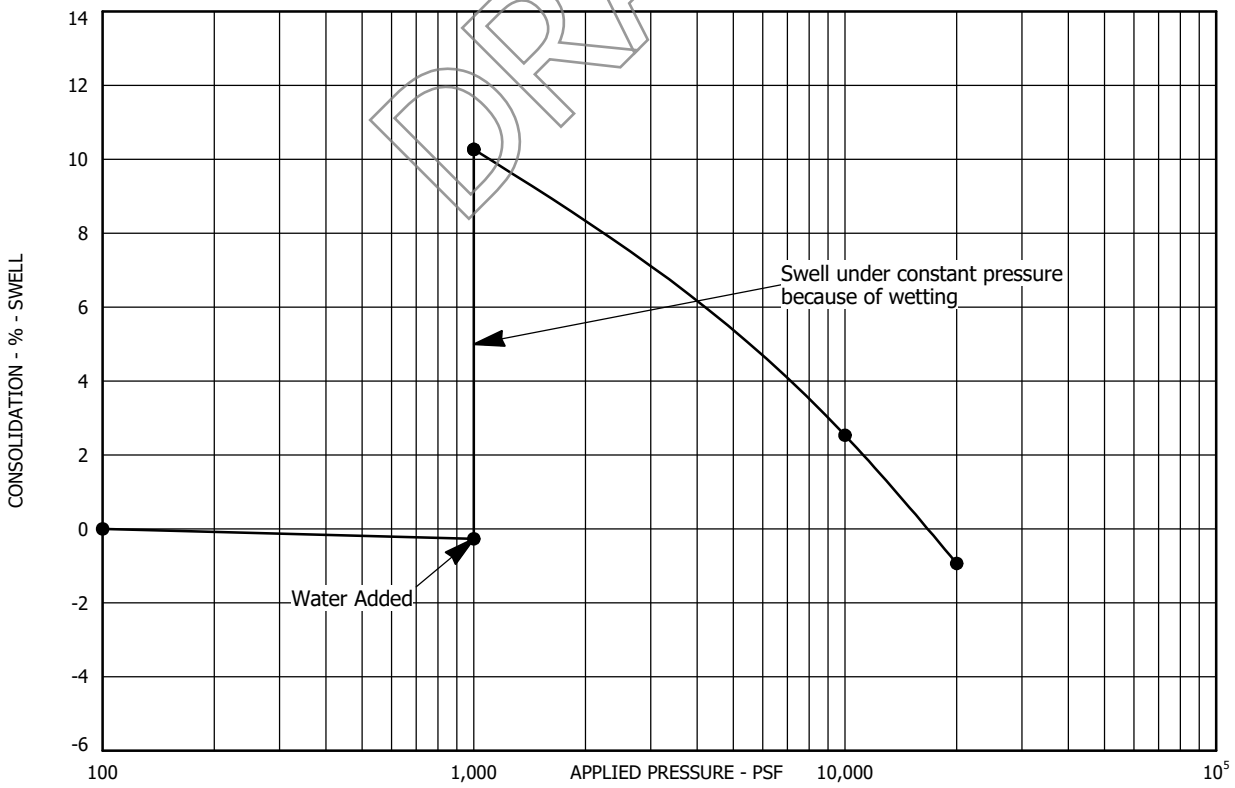
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-166
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 132 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 20

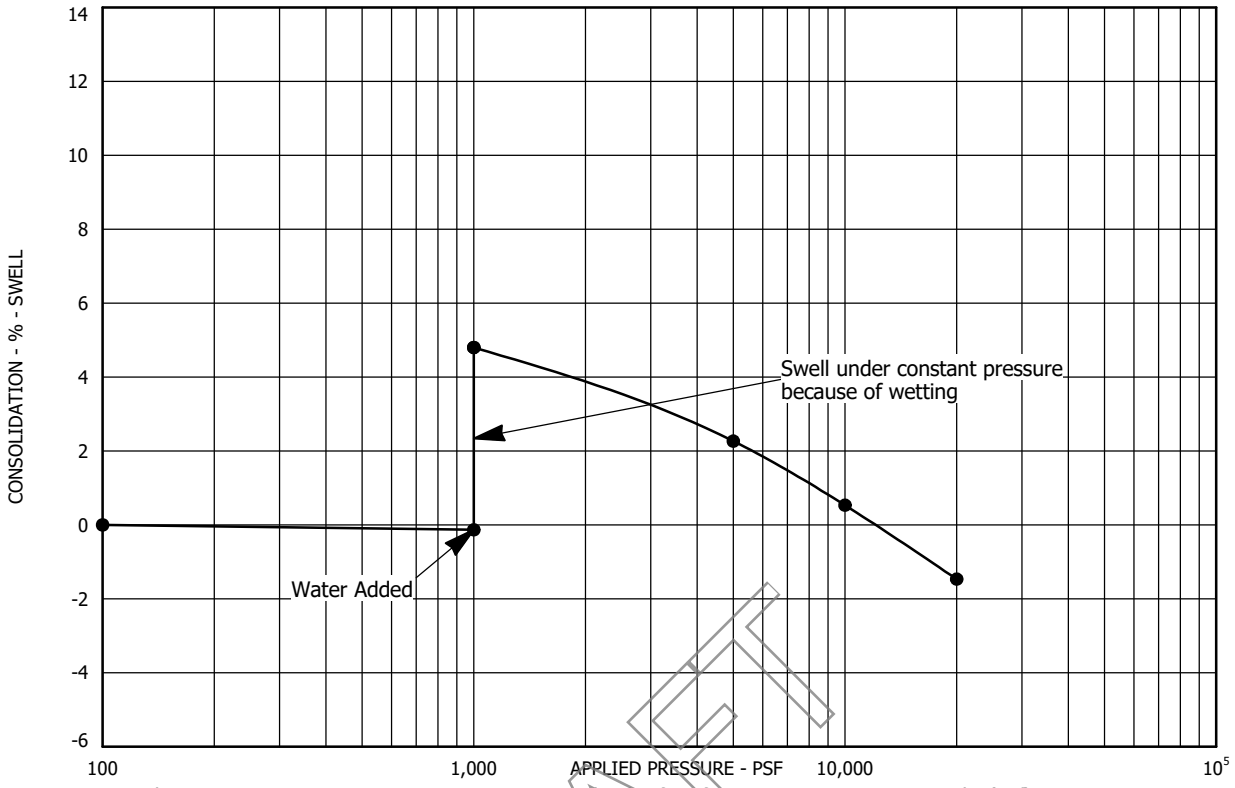
DRAFT



Sample Location: Test Boring No. 132 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 15

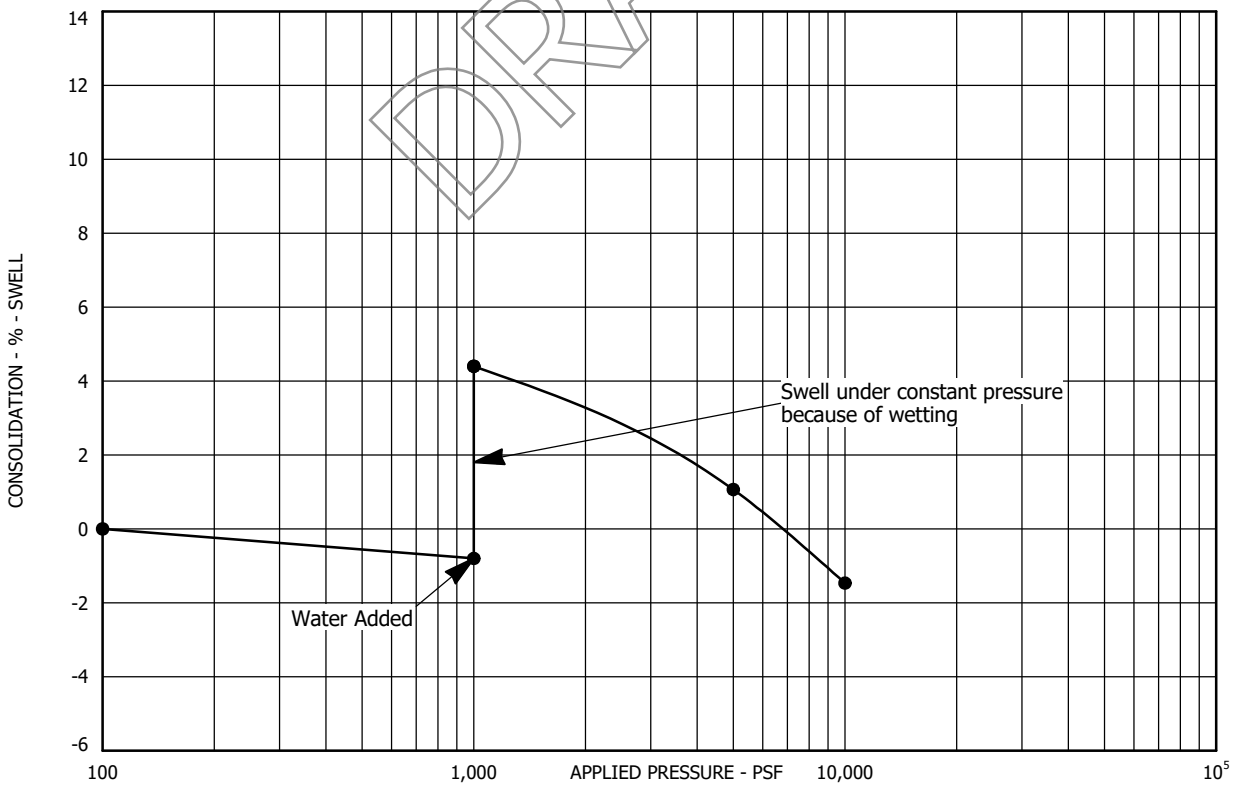
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-167
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 133 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 123
Moisture Content (%): 13

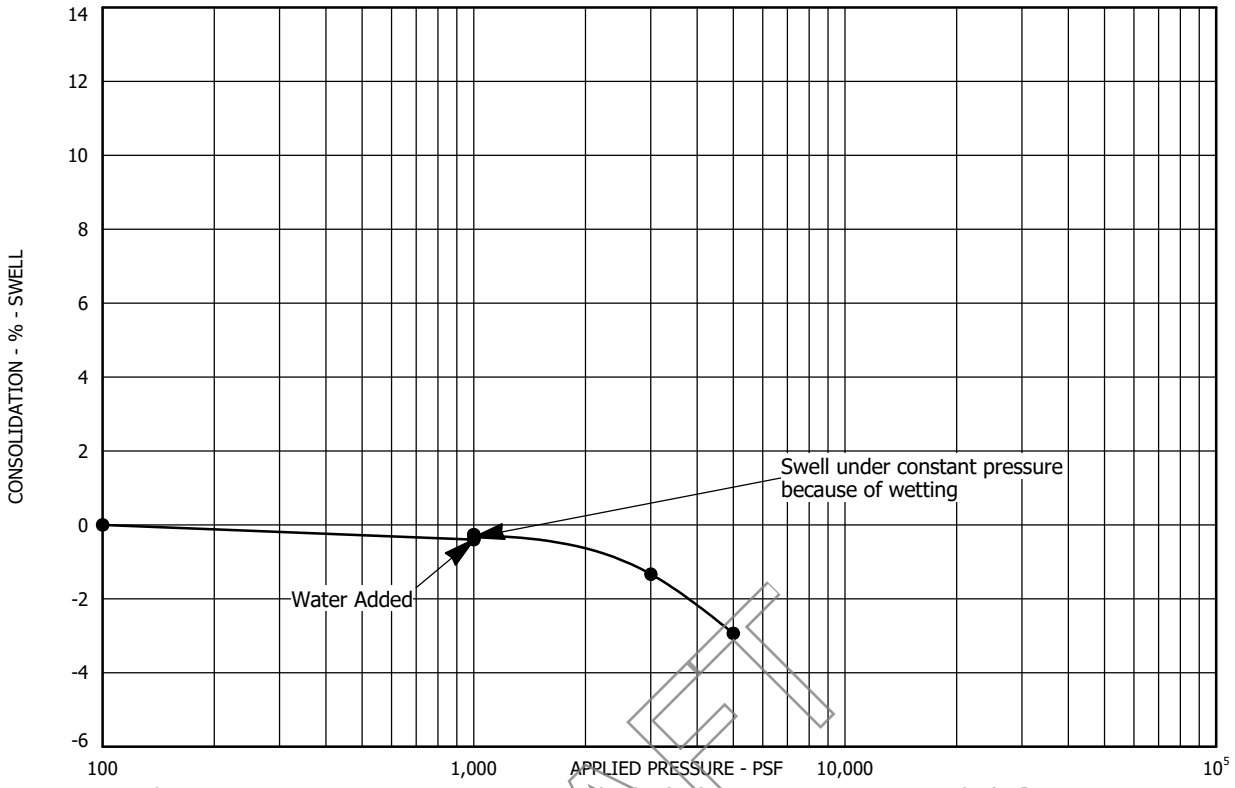
DRAFT



Sample Location: Test Boring No. 133 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 20

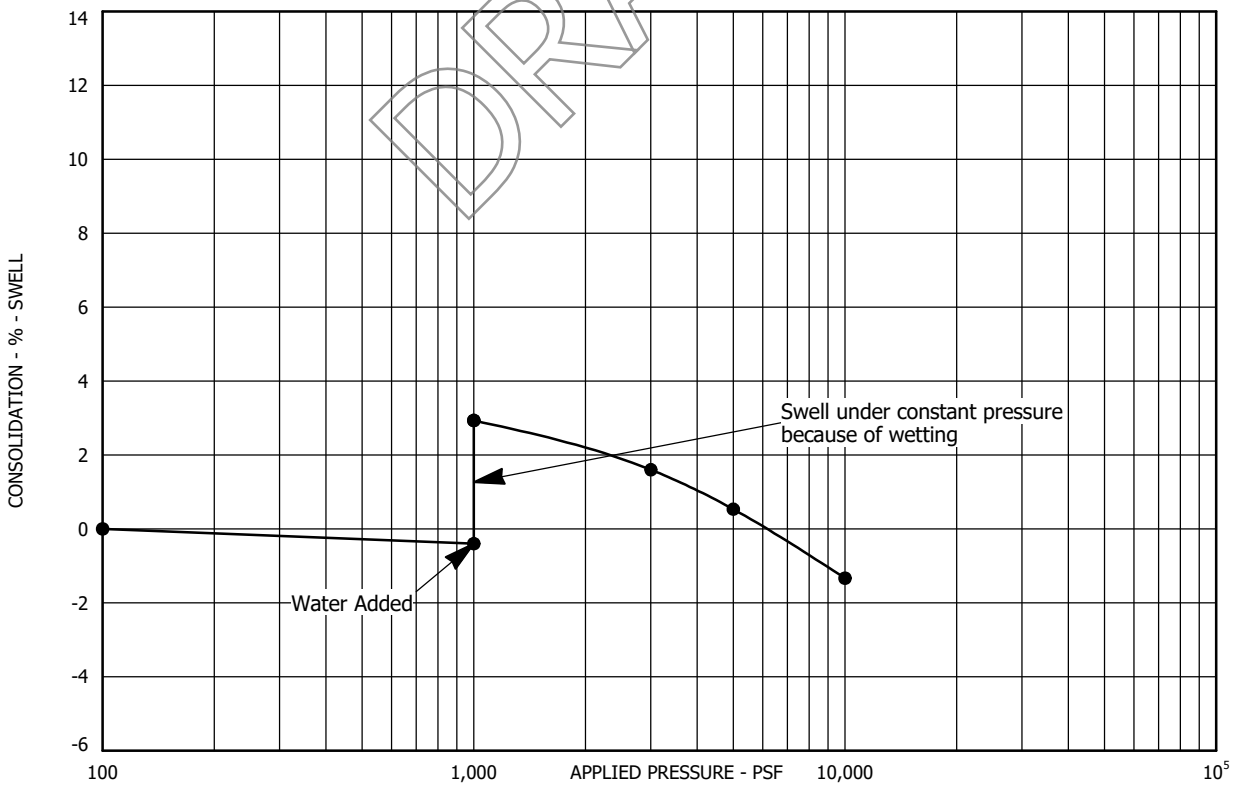
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-168
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 134 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 103
Moisture Content (%): 22

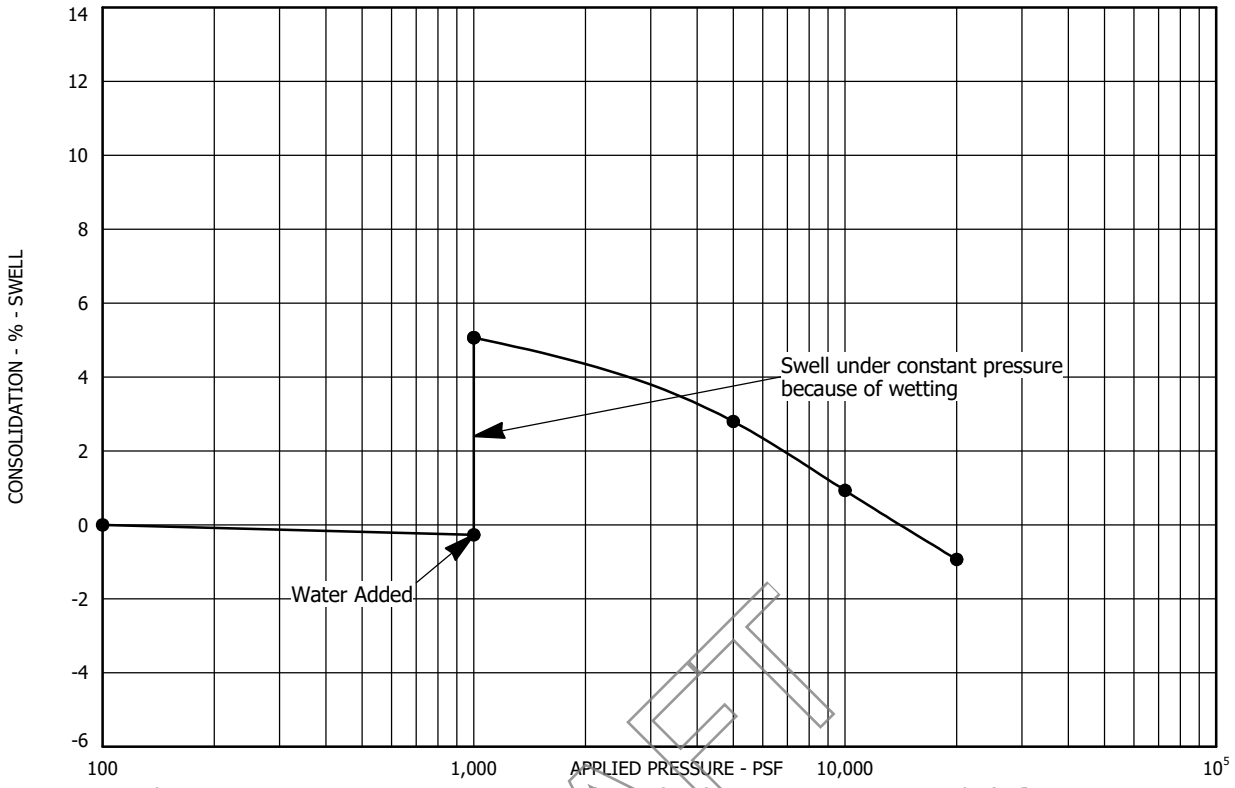
DRAFT



Sample Location: Test Boring No. 134 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 115
Moisture Content (%): 17

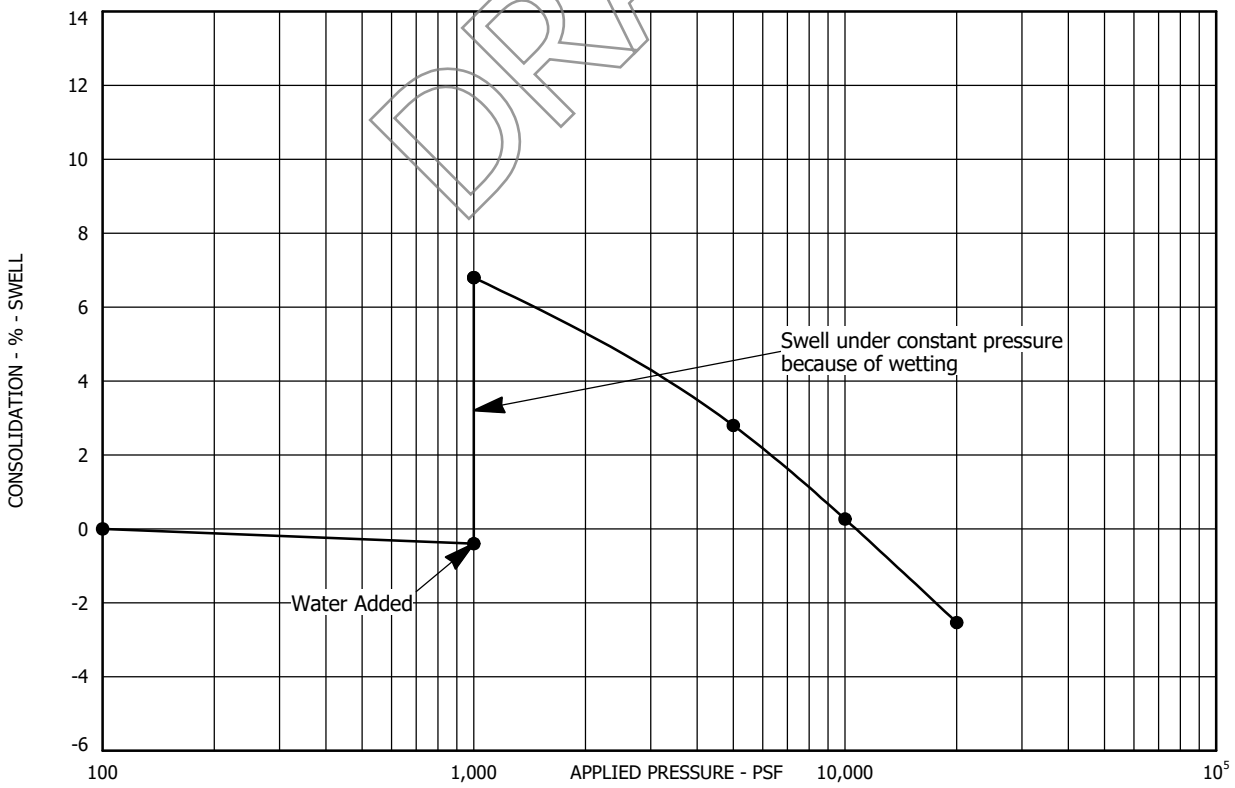
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-169
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 134 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 117
Moisture Content (%): 16

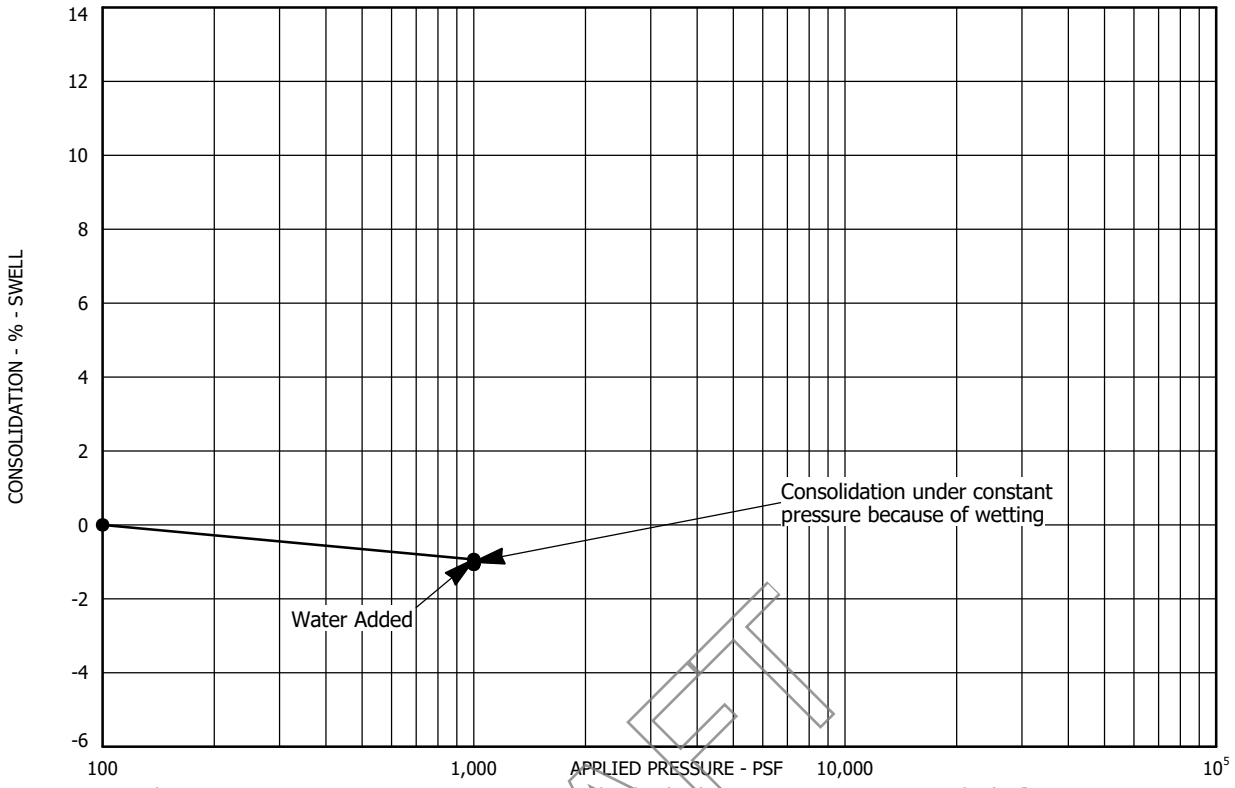
DRAFT



Sample Location: Test Boring No. 134 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 114
Moisture Content (%): 17

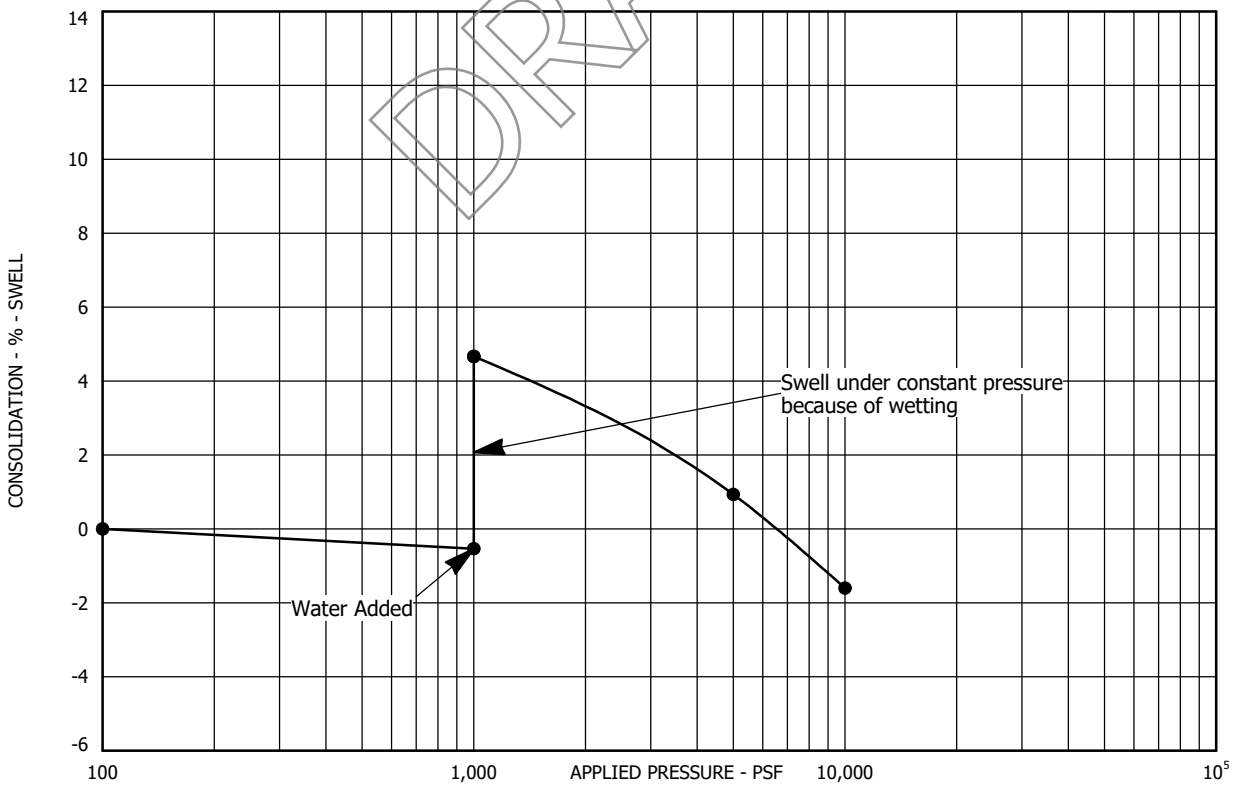
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-170
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 135 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 102
Moisture Content (%): 21

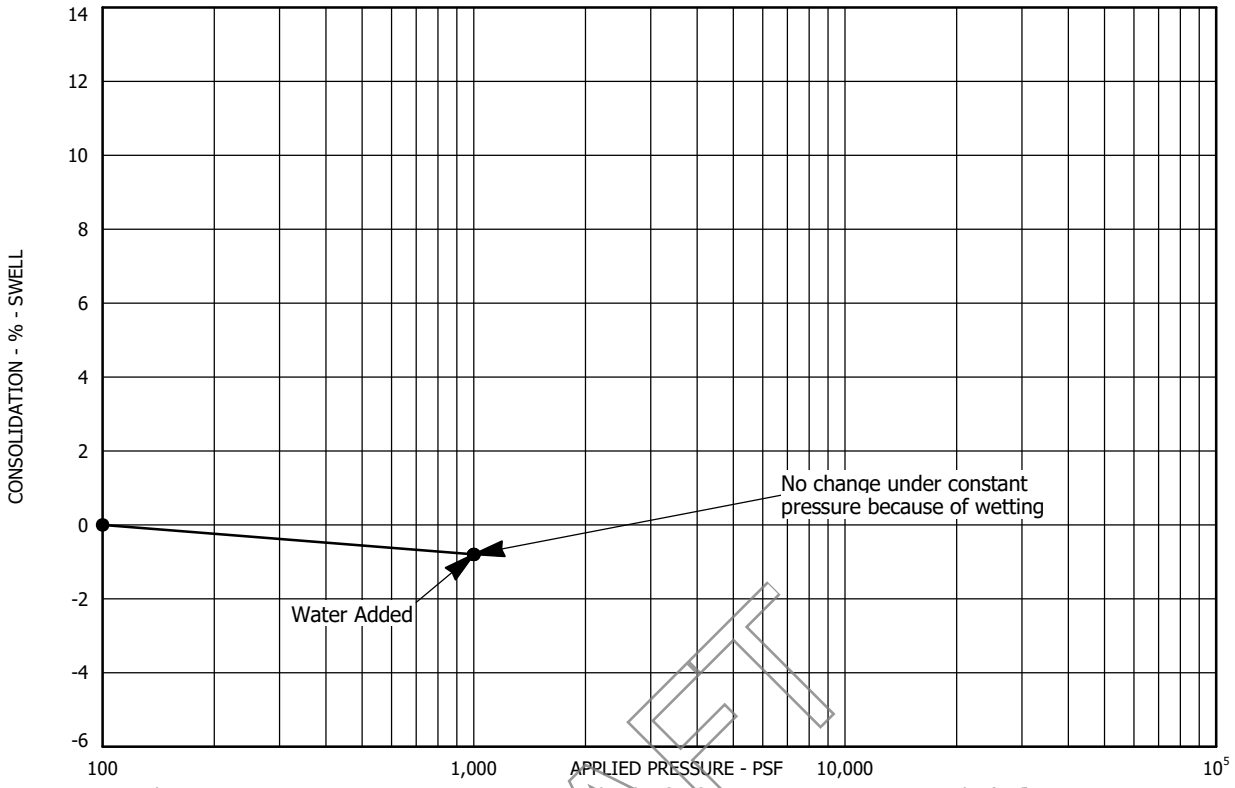
DRAFT



Sample Location: Test Boring No. 135 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 21

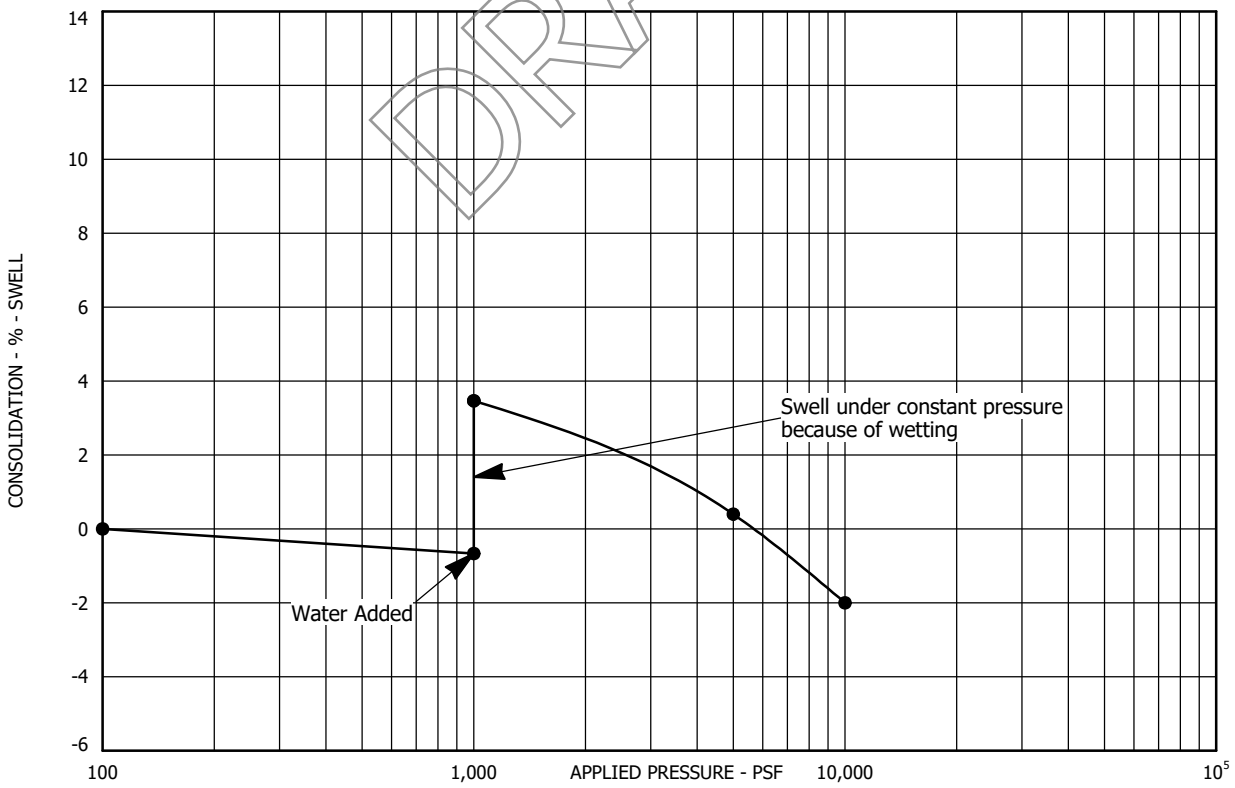
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-171
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 136 at a depth of 2 feet
Sample Description: Clay, sandy
Dry Unit Weight (pcf): 110
Moisture Content (%): 14

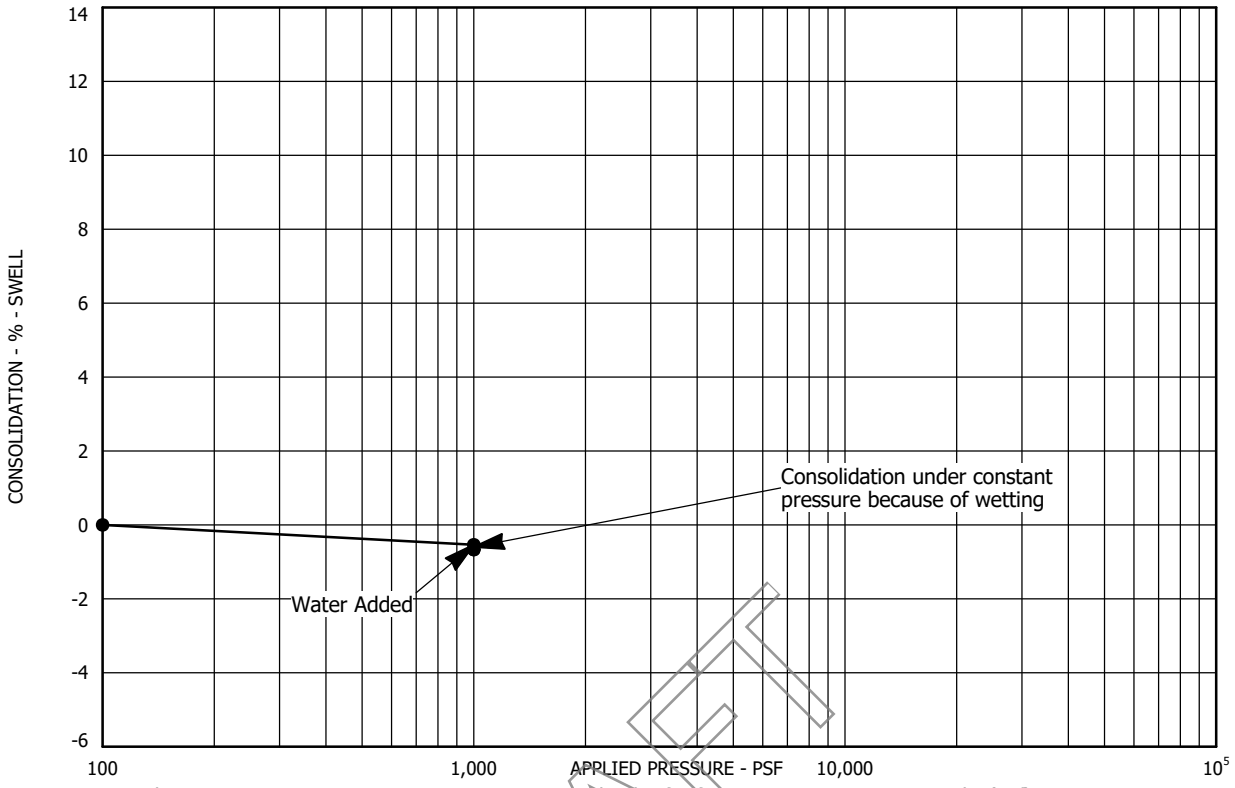
DRAFT



Sample Location: Test Boring No. 136 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 107
Moisture Content (%): 21

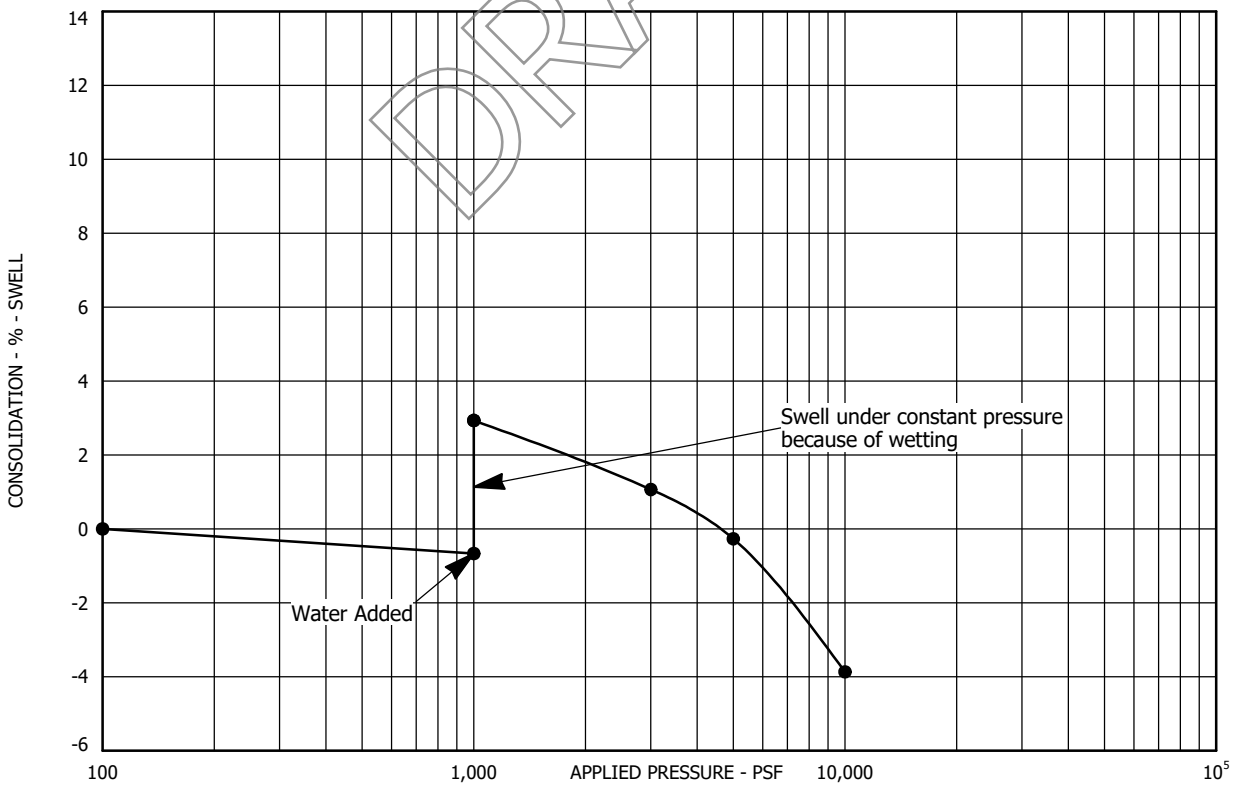
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-172
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 137 at a depth of 9 feet
Sample Description: Siltstone, clayey, sandy
Dry Unit Weight (pcf): 122
Moisture Content (%): 11

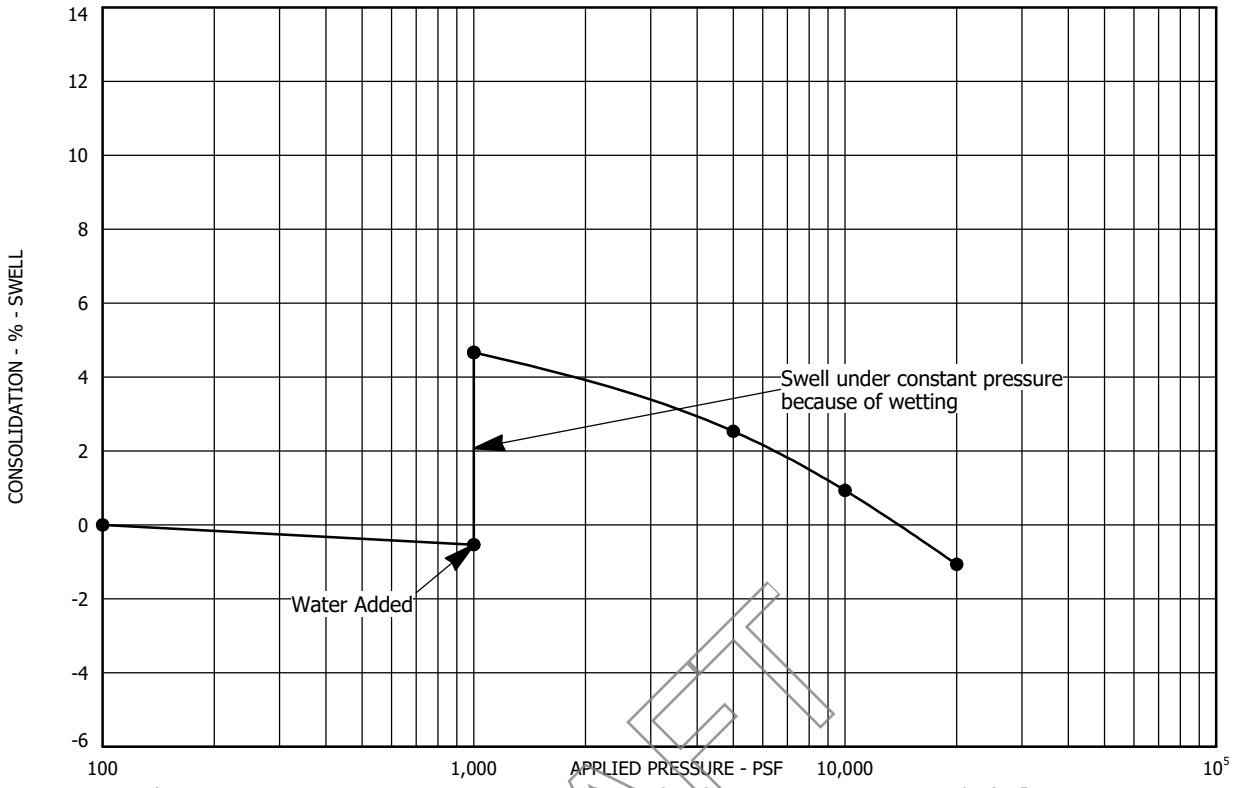
DRAFT



Sample Location: Test Boring No. 137 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 105
Moisture Content (%): 20

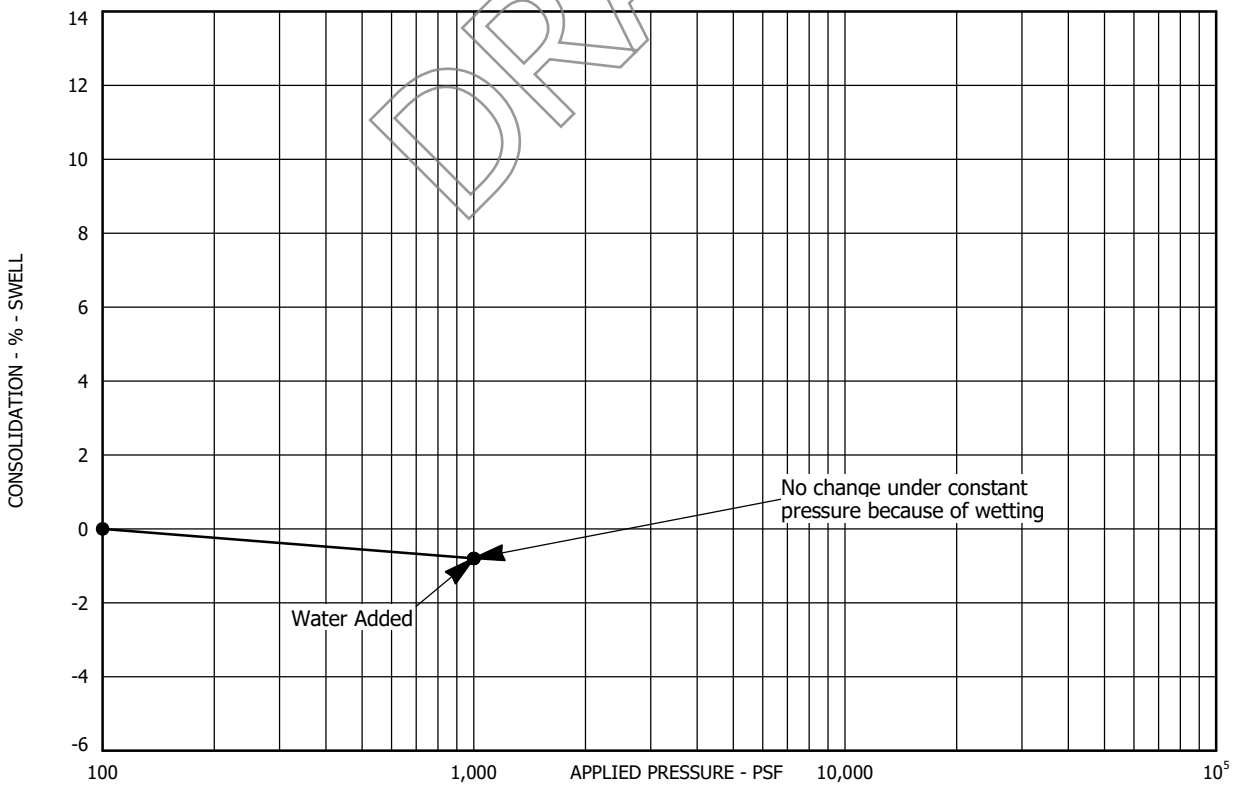
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-173
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 137 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Dry Unit Weight (pcf): 116
Moisture Content (%): 17

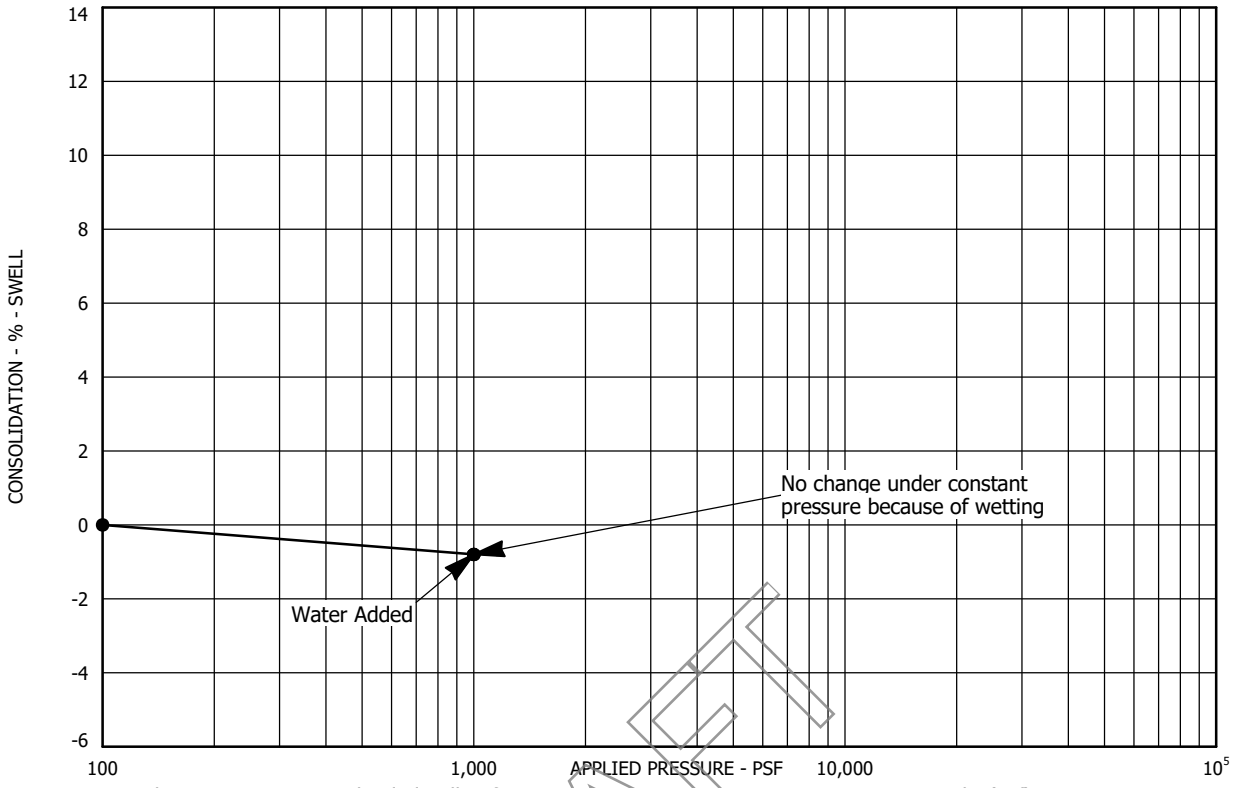
DRAFT



Sample Location: Blended Bulk 1 from Test Borings 1-50
Sample Description: Clay, slightly sandy
Dry Unit Weight (pcf): 102
Moisture Content (%): 18

SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-174
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.

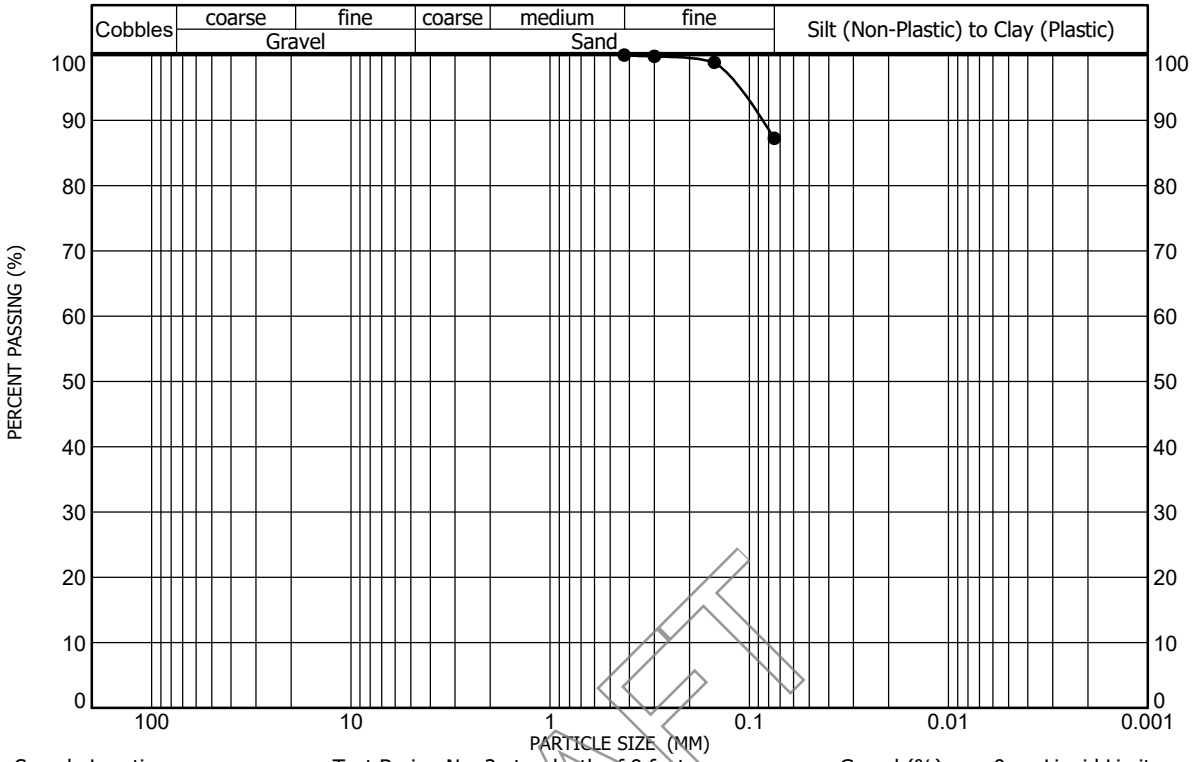


Sample Location: Blended Bulk 2 from Test Borings 51-137
Sample Description: Clay, slightly sandy, trace gravel
Dry Unit Weight (pcf): 98
Moisture Content (%): 20

DRAFT

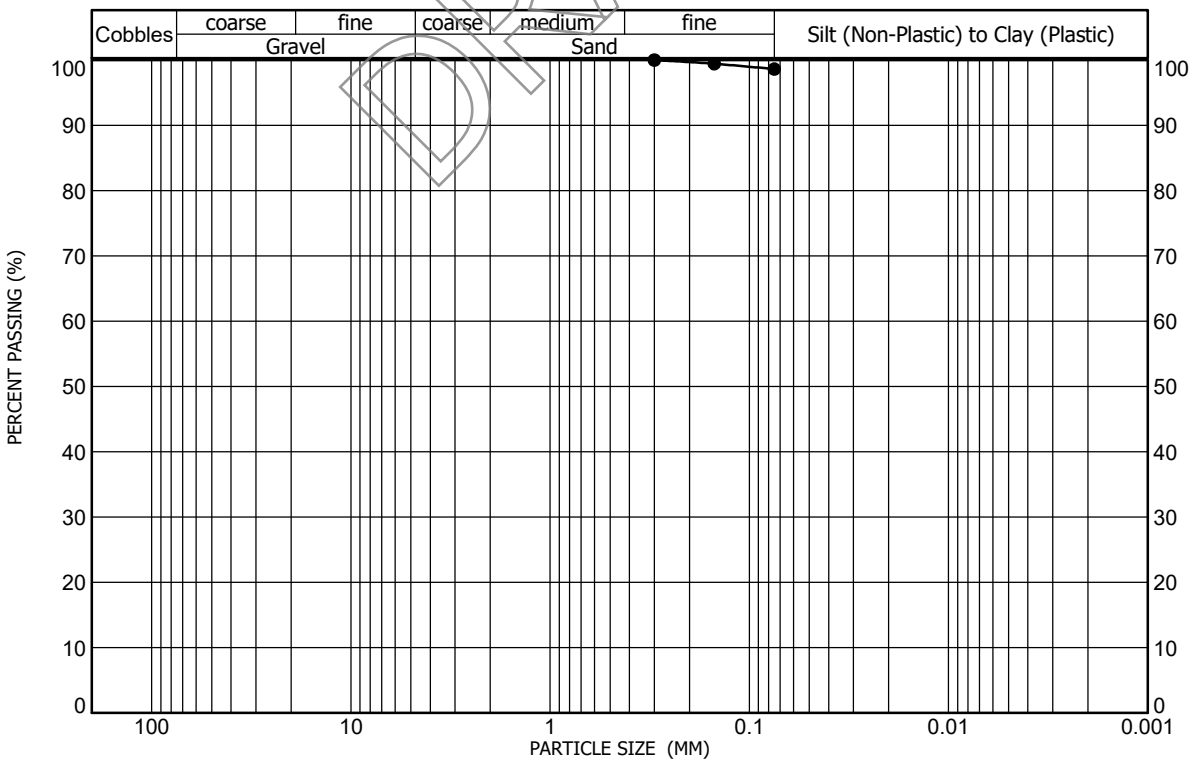
SWELL - CONSOLIDATION TEST RESULTS
FIGURE A-175
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 2 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Classification: A-4(5), SILTY CLAY(CL-ML)
Gravel (%): 0
Sand (%): 13
Clay/Silt (%): 87
Liquid Limit: 27
Plasticity Index: 7

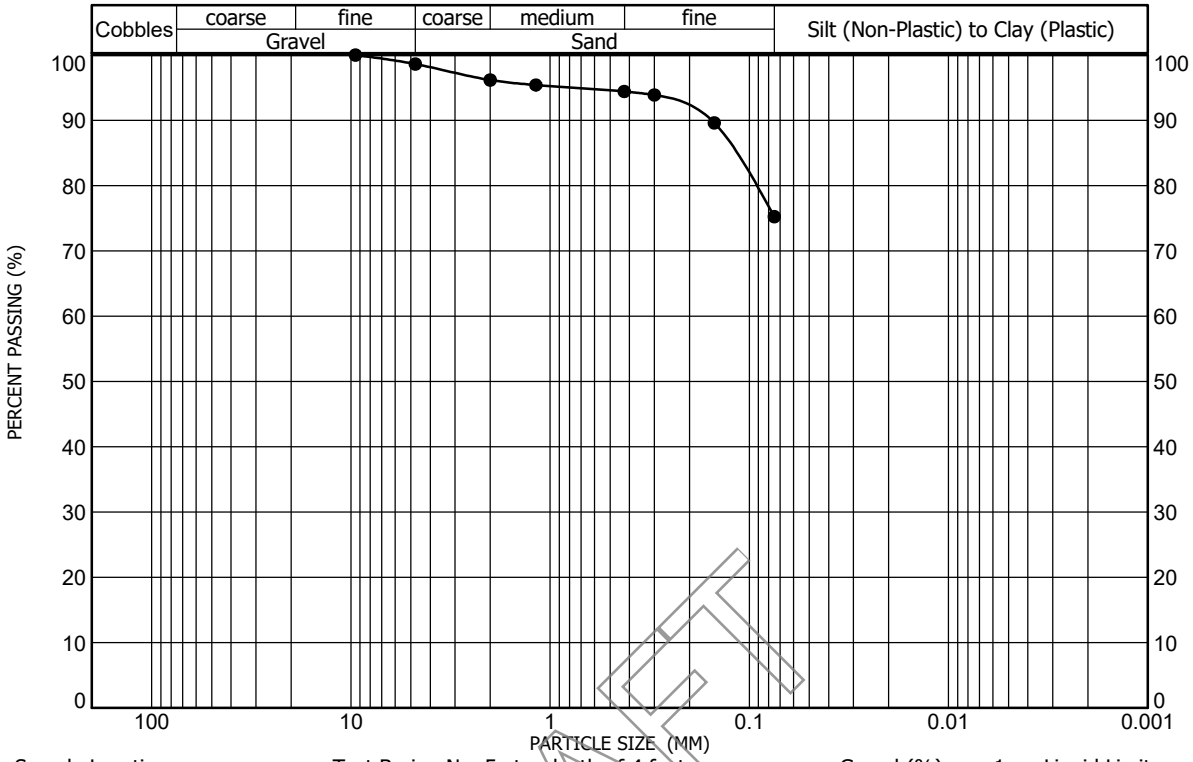
DRAFT



Sample Location: Test Boring No. 4 at a depth of 19 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(50), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 1
Clay/Silt (%): 99
Liquid Limit: 67
Plasticity Index: 44

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-176
PROJECT NO. 223122

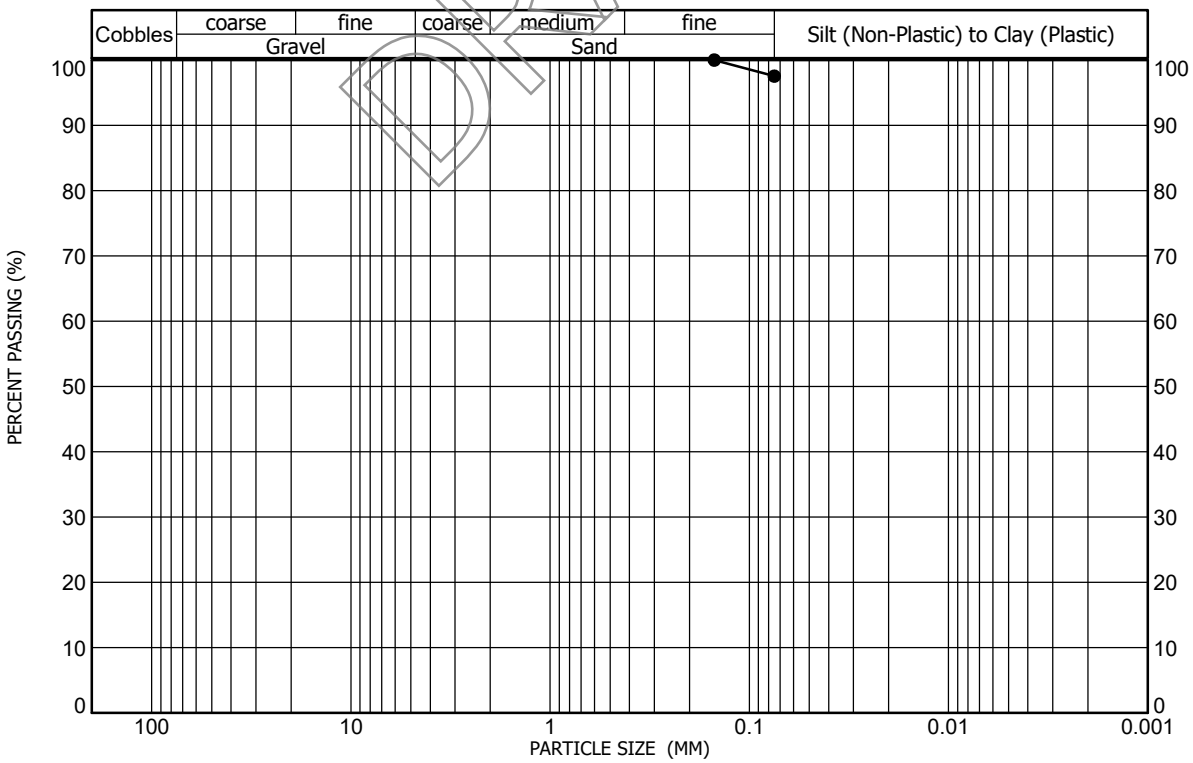
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 5 at a depth of 4 feet
Sample Description: Clay, sandy, trace gravel
Classification: A-6(16), LEAN CLAY with SAND(CL)

Gravel (%): 1 | Sand (%): 23 | Clay/Silt (%): 75
Liquid Limit: 38 | Plasticity Index: 24

DRAFT



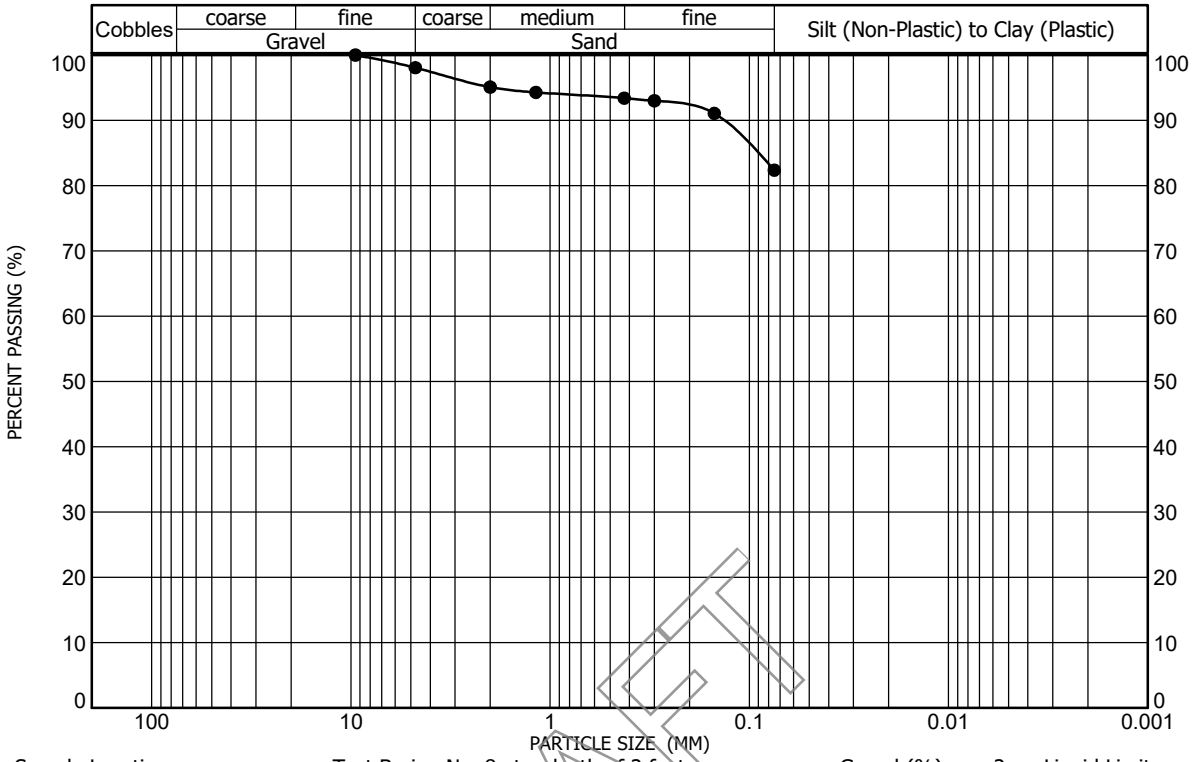
Sample Location: Test Boring No. 7 at a depth of 29 feet
Sample Description: Siltstone, clayey, trace sand
Classification: A-6(20), LEAN CLAY(CL)

Gravel (%): 0 | Sand (%): 2 | Clay/Silt (%): 98
Liquid Limit: 38 | Plasticity Index: 20

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-177

PROJECT NO. 223122

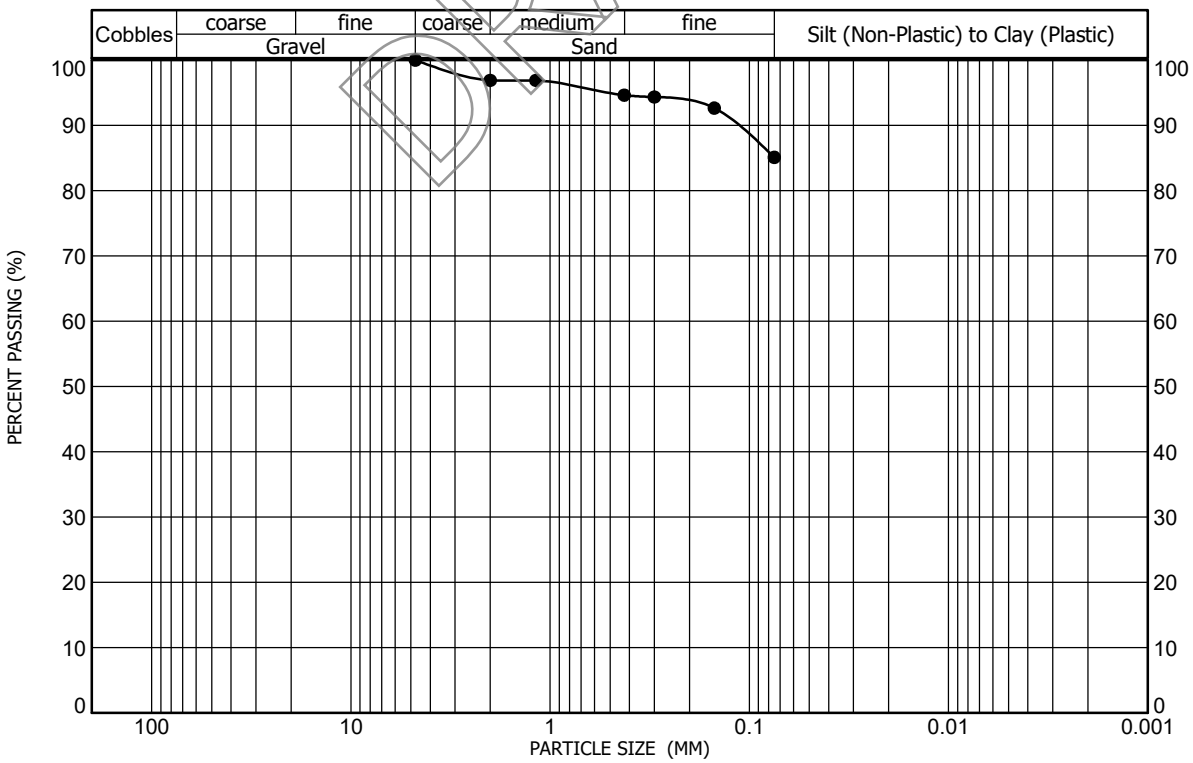
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 8 at a depth of 2 feet
Sample Description: Clay, sandy, trace gravel
Classification: A-7-6(20), LEAN CLAY with SAND(CL)

Gravel (%): 2 Liquid Limit: 42
Sand (%): 16 Plasticity Index: 25
Clay/Silt (%): 82

DRAFT



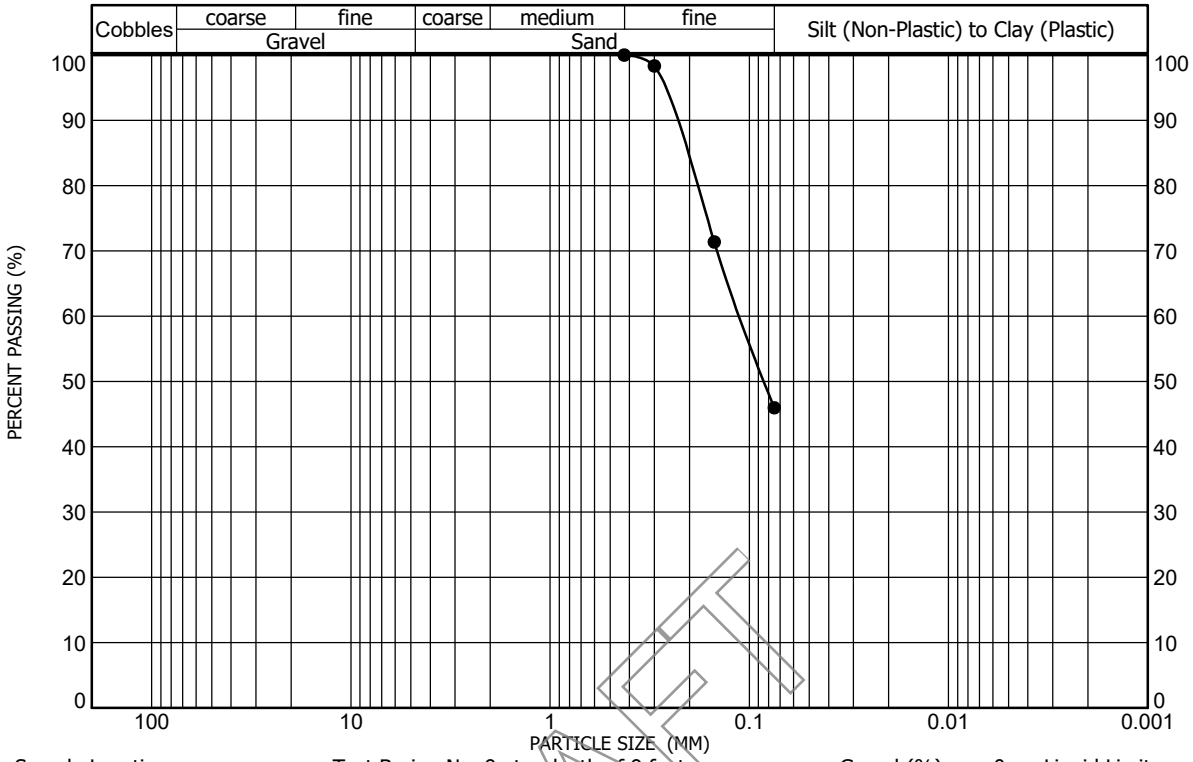
Sample Location: Test Boring No. 8 at a depth of 7 feet
Sample Description: Claystone, sandy
Classification: A-7-6(25), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 46
Sand (%): 15 Plasticity Index: 29
Clay/Silt (%): 85

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-178

PROJECT NO. 223122

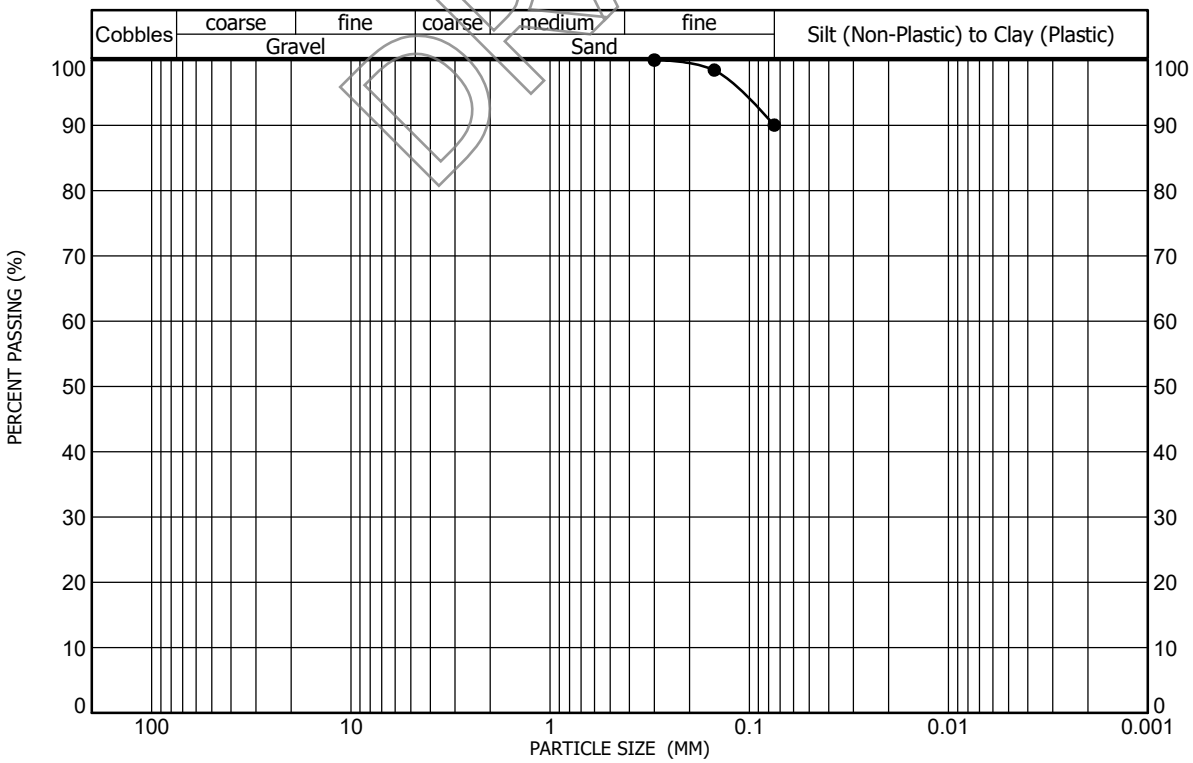
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 9 at a depth of 9 feet
Sample Description: Sandstone, very silty
Classification: A-4(0), SILTY SAND(SM)

Gravel (%): 0
Sand (%): 54
Clay/Silt (%): 46
Liquid Limit: NV
Plasticity Index: NP

DRAFT



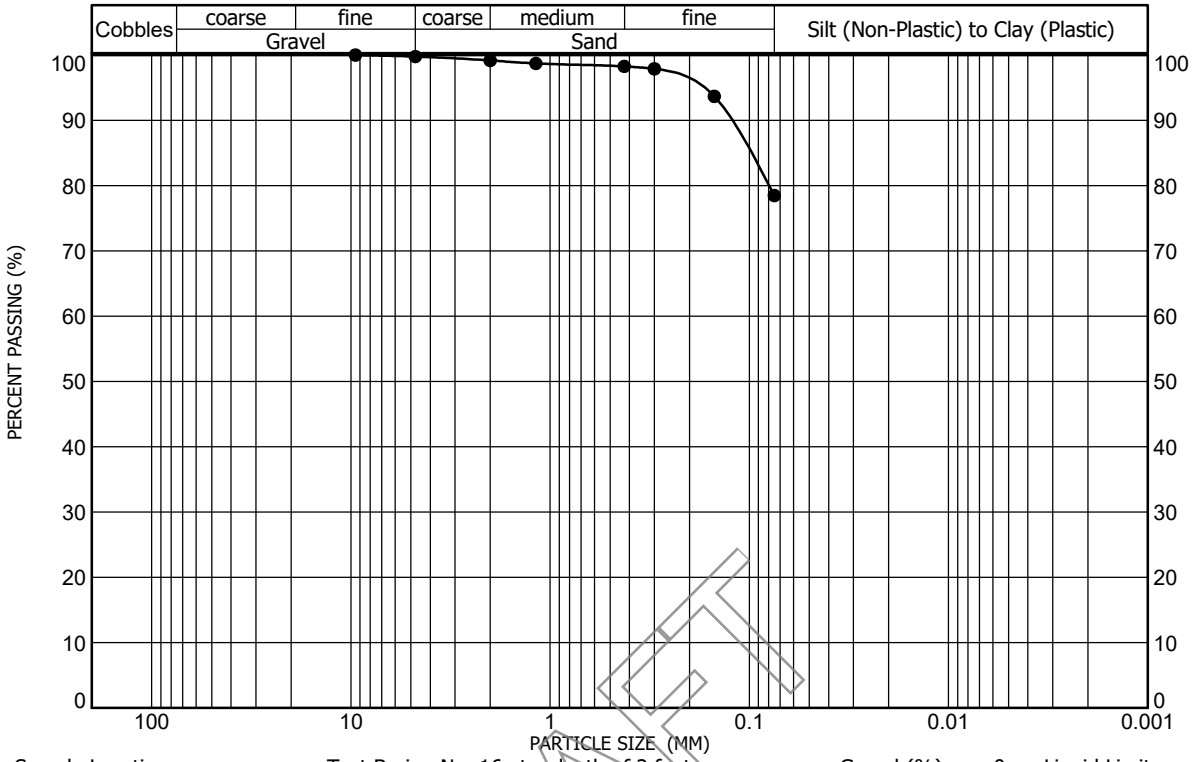
Sample Location: Test Boring No. 13 at a depth of 2 feet
Sample Description: Clay, sandy
Classification: -

Gravel (%): 0
Sand (%): 10
Clay/Silt (%): 90
Liquid Limit: -
Plasticity Index: -

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-179

PROJECT NO. 223122

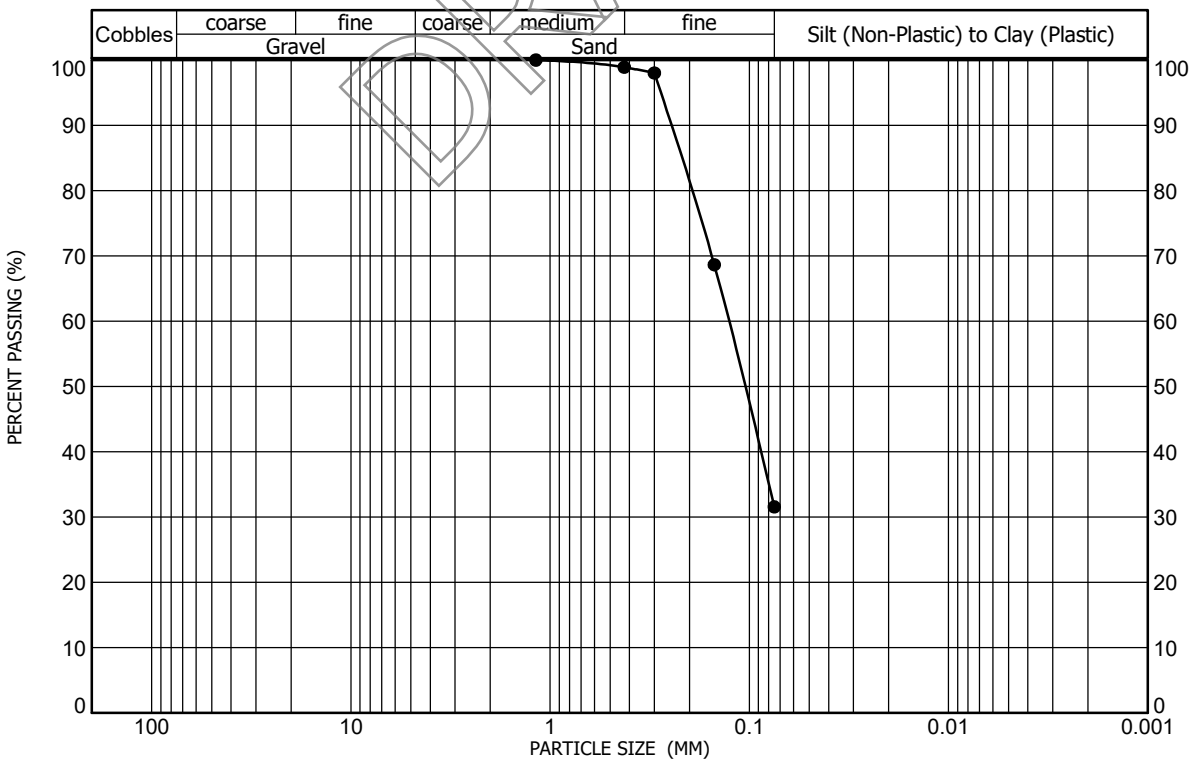
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 16 at a depth of 2 feet
Sample Description: Clay, sandy
Classification: A-6(10), LEAN CLAY with SAND(CL)

Gravel (%): 0 | Liquid Limit: 32
Sand (%): 21 | Plasticity Index: 15
Clay/Silt (%): 78

DRAFT



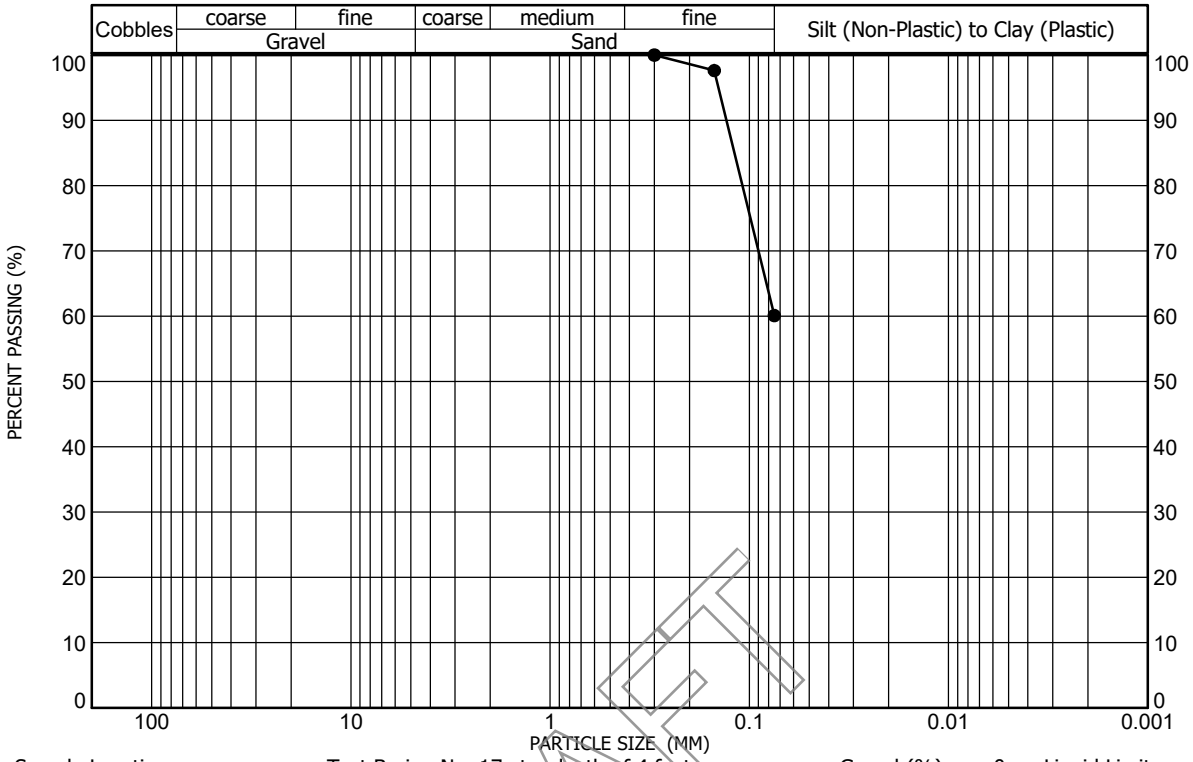
Sample Location: Test Boring No. 16 at a depth of 7 feet
Sample Description: Sand, very silty
Classification: A-2-4(0), SILTY SAND(SM)

Gravel (%): 0 | Liquid Limit: NV
Sand (%): 68 | Plasticity Index: NP
Clay/Silt (%): 32

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-180

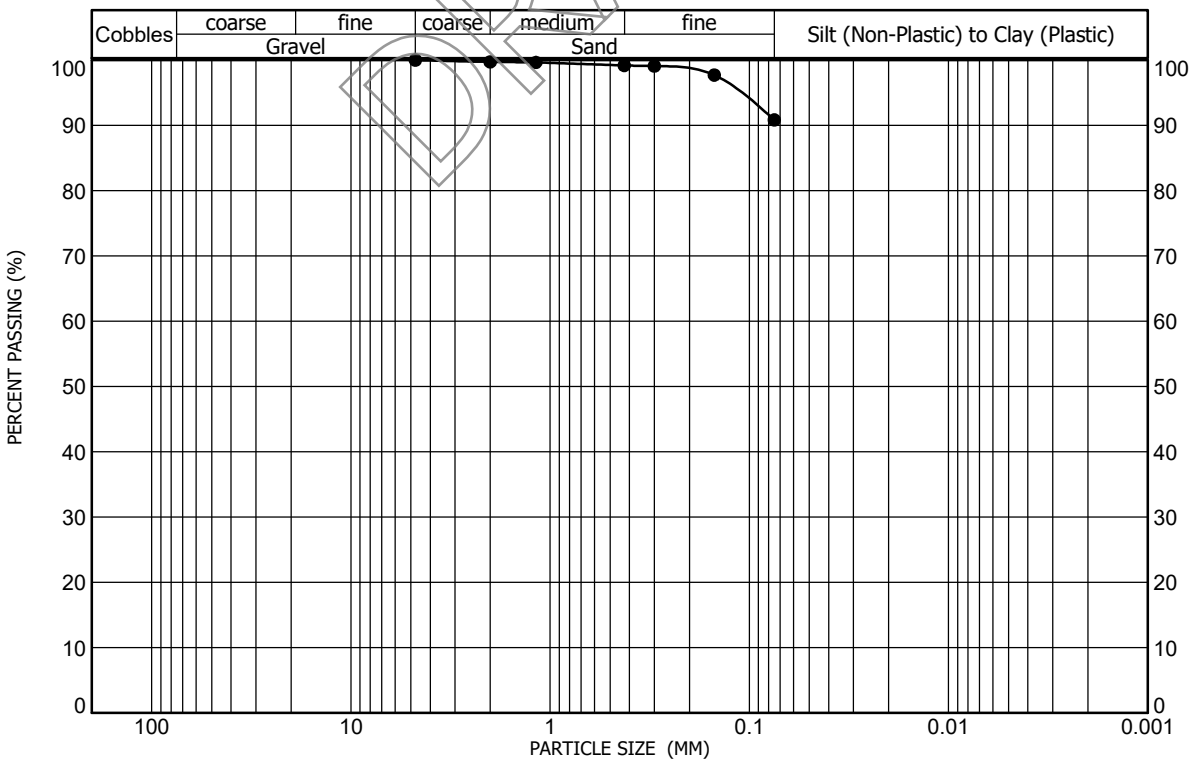
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 17 at a depth of 4 feet
Sample Description: Silt, very sandy (lens)
Classification: A-4(0), SANDY SILT(ML)
Gravel (%): 0 Sand (%): 40 Clay/Silt (%): 60
Liquid Limit: NV Plasticity Index: NP

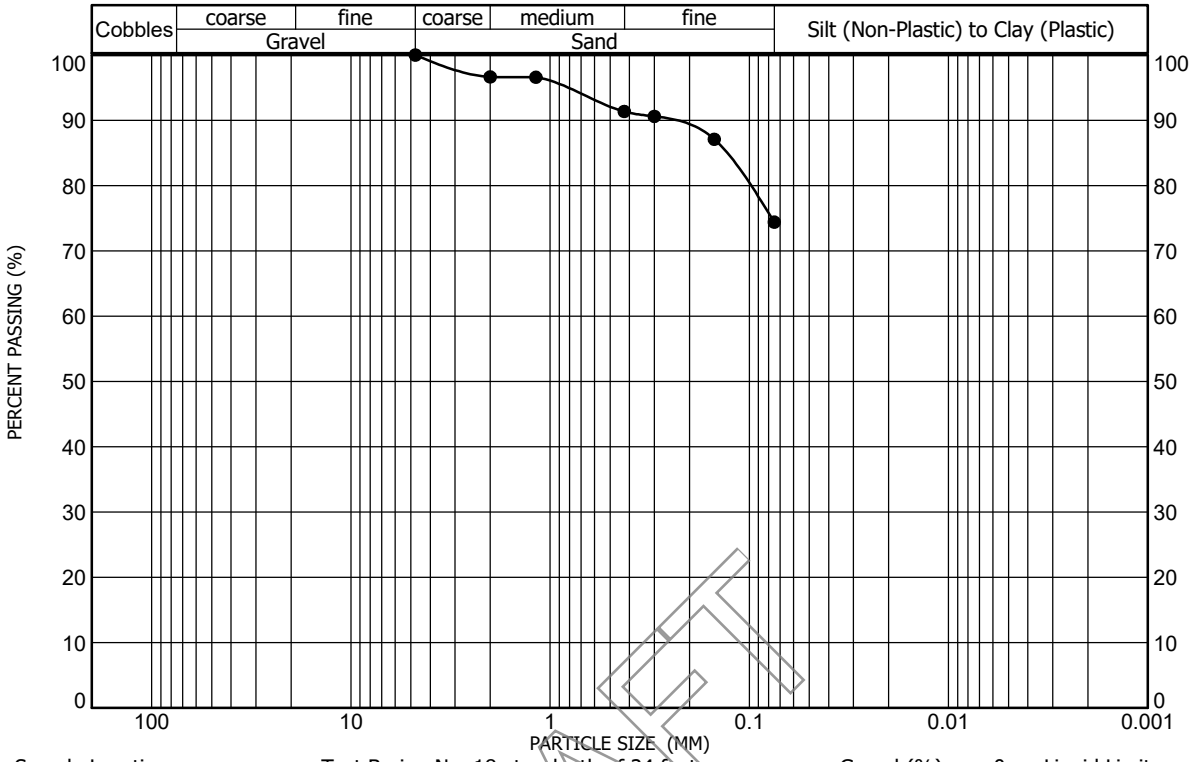
DRAFT



Sample Location: Test Boring No. 18 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(24), LEAN CLAY(CL)
Gravel (%): 0 Sand (%): 9 Clay/Silt (%): 91
Liquid Limit: 43 Plasticity Index: 26

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-181
PROJECT NO. 223122

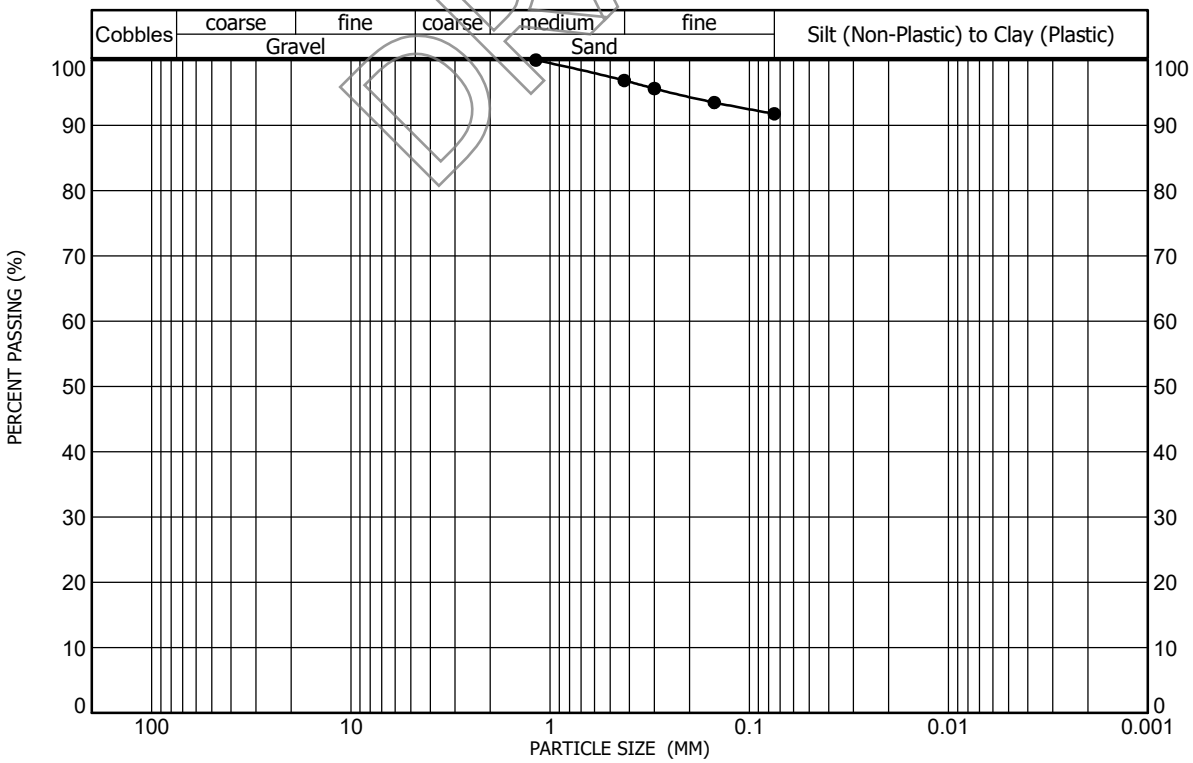
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 18 at a depth of 24 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-6(11), LEAN CLAY with SAND(CL)

Gravel (%): 0 | Sand (%): 26 | Clay/Silt (%): 74
Liquid Limit: 34 | Plasticity Index: 17

DRAFT



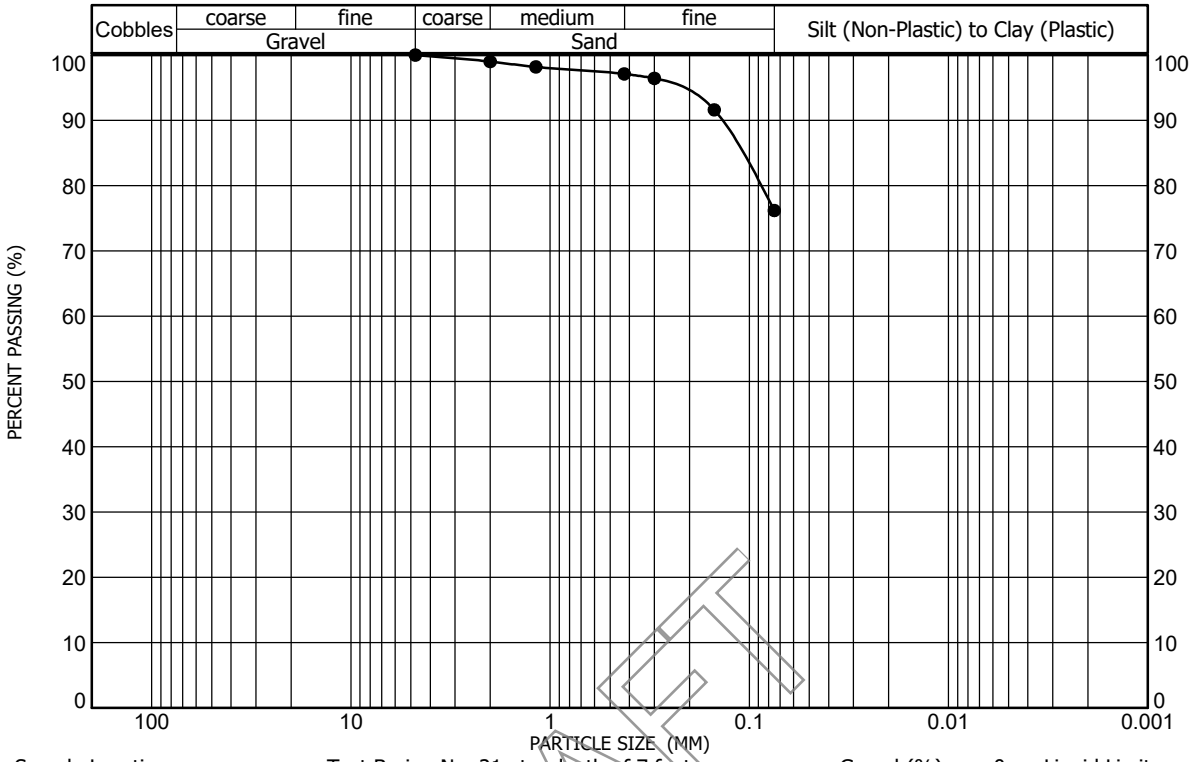
Sample Location: Test Boring No. 20 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(39), FAT CLAY(CH)

Gravel (%): 0 | Sand (%): 8 | Clay/Silt (%): 92
Liquid Limit: 61 | Plasticity Index: 38

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-182

PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.

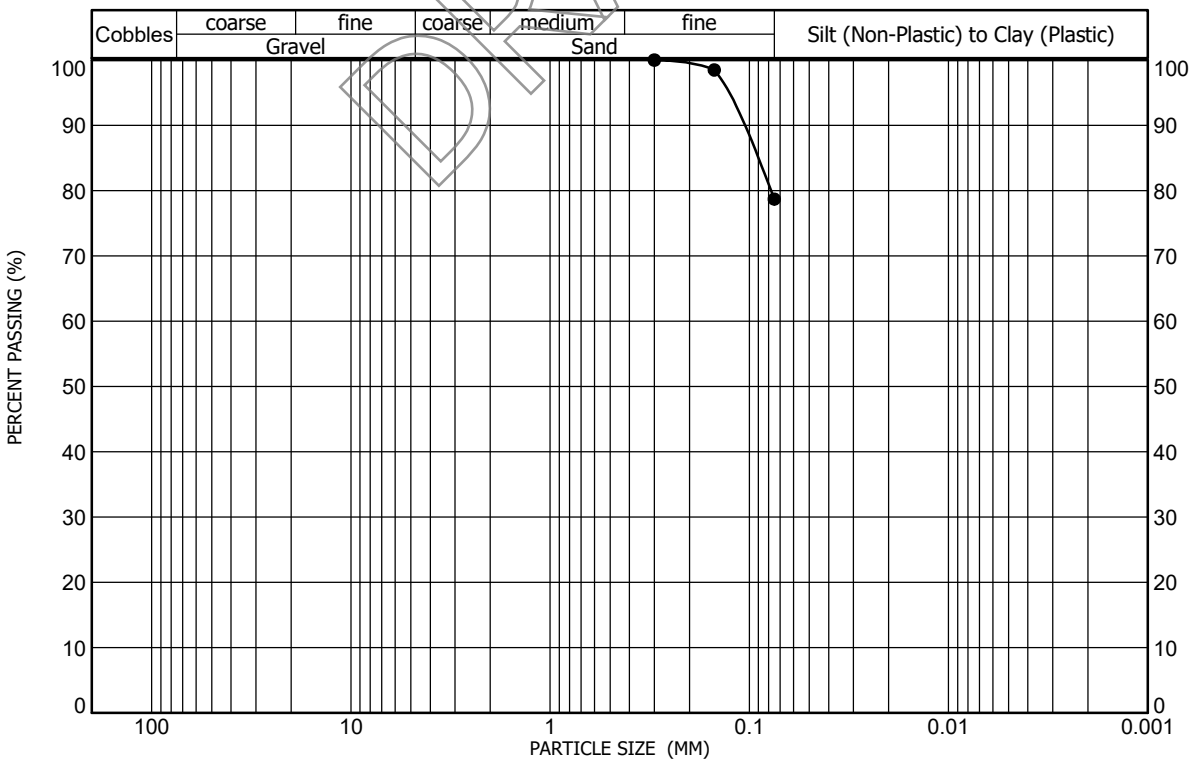


Sample Location: Test Boring No. 21 at a depth of 7 feet
Sample Description: Clay, sandy
Classification: A-7-6(15), LEAN CLAY with SAND(CL)

Gravel (%): 0
Sand (%): 24
Clay/Silt (%): 76

Liquid Limit: 41
Plasticity Index: 20

DRAFT



Sample Location: Test Boring No. 22 at a depth of 29 feet
Sample Description: Claystone, sandy
Classification: A-6(11), LEAN CLAY with SAND(CL)

Gravel (%): 0
Sand (%): 21
Clay/Silt (%): 79

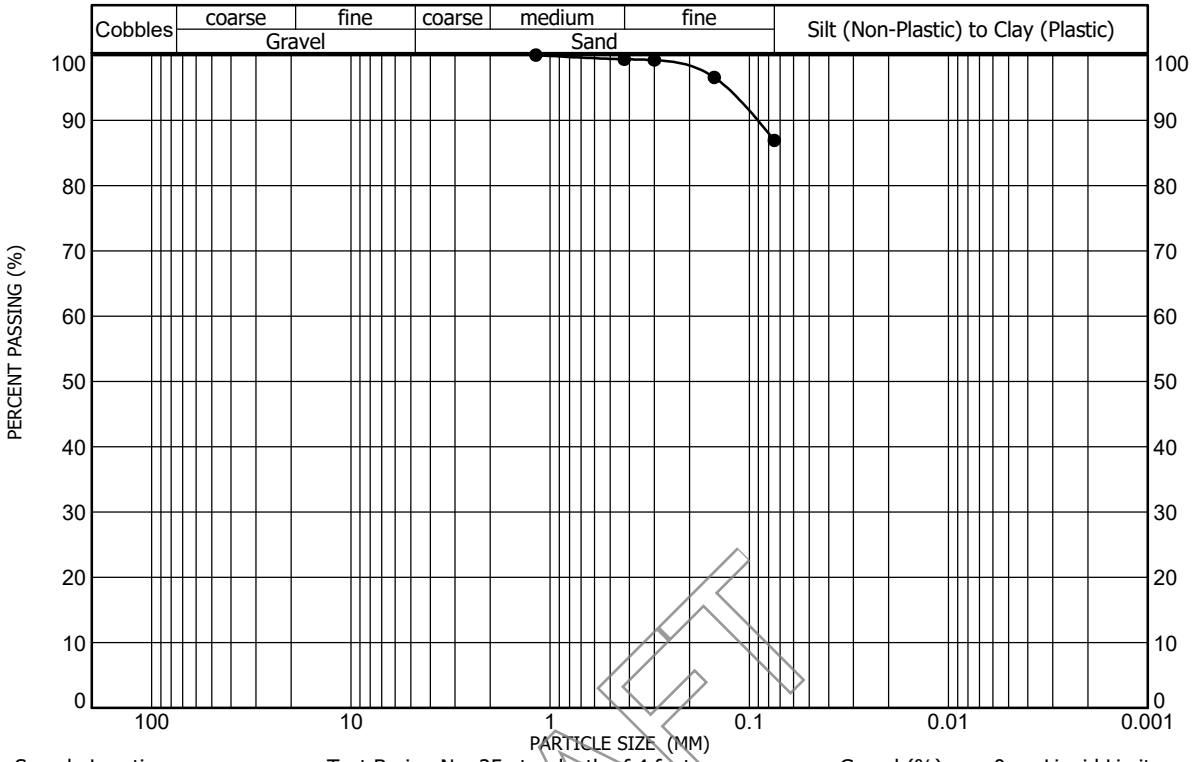
Liquid Limit: 34
Plasticity Index: 15

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-183

PROJECT NO. 223122

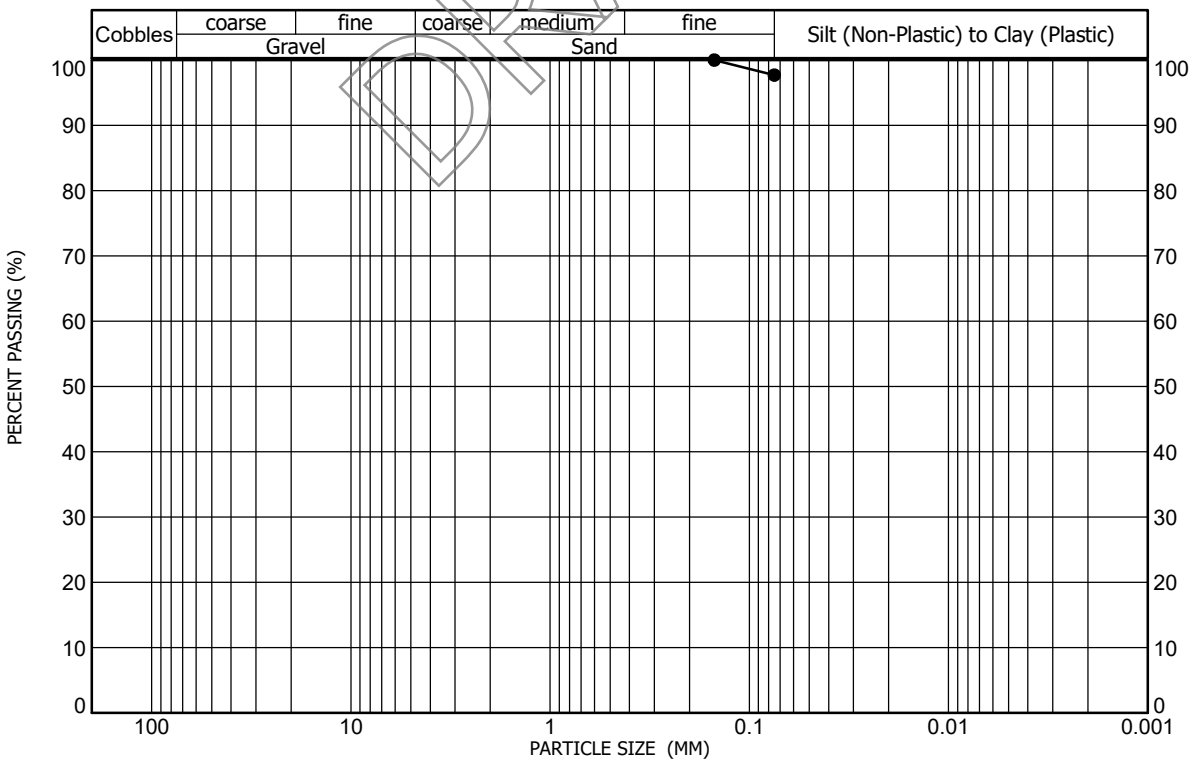
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 25 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(26), LEAN CLAY(CL)

Gravel (%): 0 | Sand (%): 13 | Clay/Silt (%): 87
Liquid Limit: 46 | Plasticity Index: 29

DRAFT



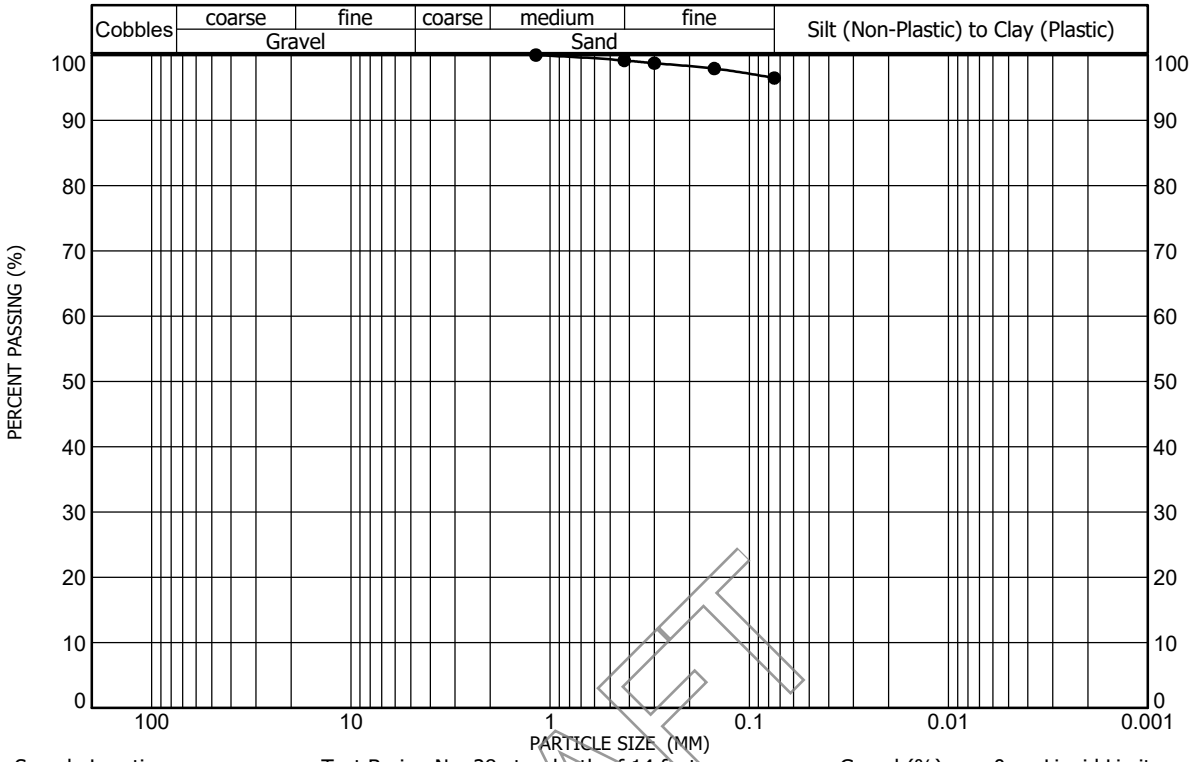
Sample Location: Test Boring No. 26 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(35), FAT CLAY(CH)

Gravel (%): 0 | Sand (%): 2 | Clay/Silt (%): 98
Liquid Limit: 53 | Plasticity Index: 32

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-184

PROJECT NO. 223122

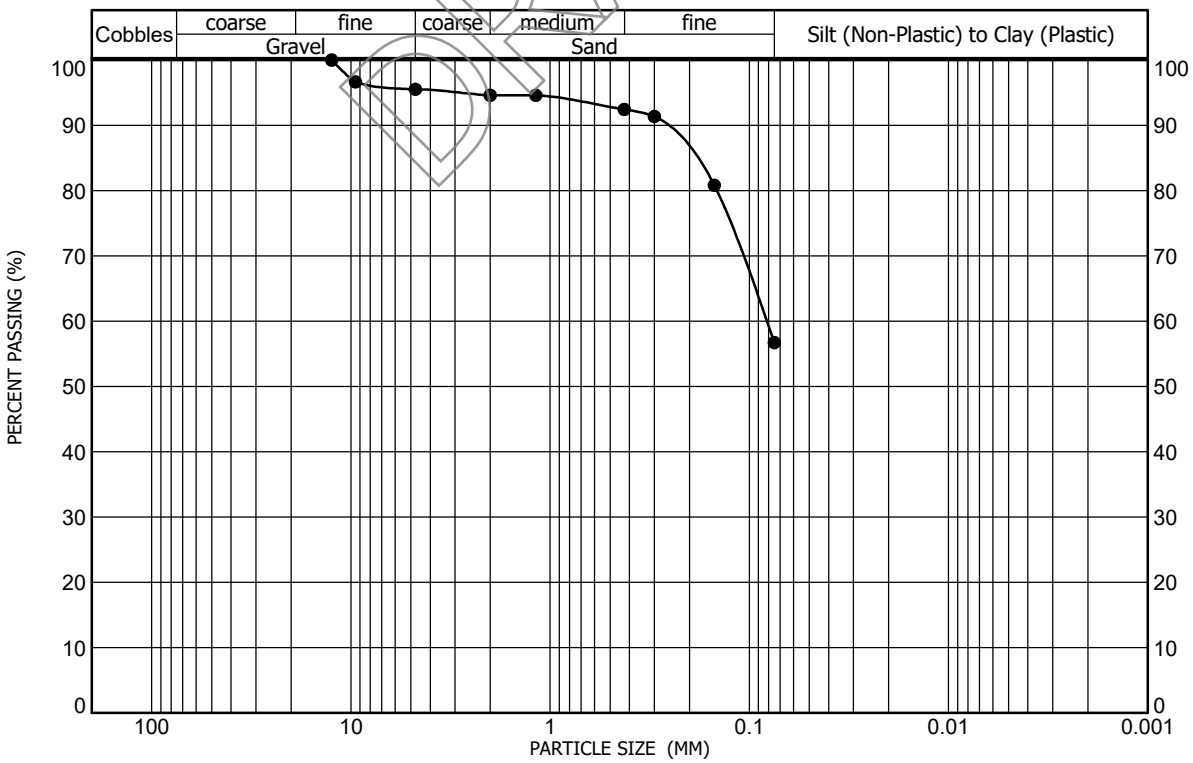
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 28 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(37), FAT CLAY(CH)

Gravel (%): 0 | Sand (%): 4 | Clay/Silt (%): 96
Liquid Limit: 56 | Plasticity Index: 34

DRAFT



Sample Location: Test Boring No. 29 at a depth of 29 feet
Sample Description: Siltstone, very sandy, clayey
Classification: A-6(6), SANDY LEAN CLAY(CL)

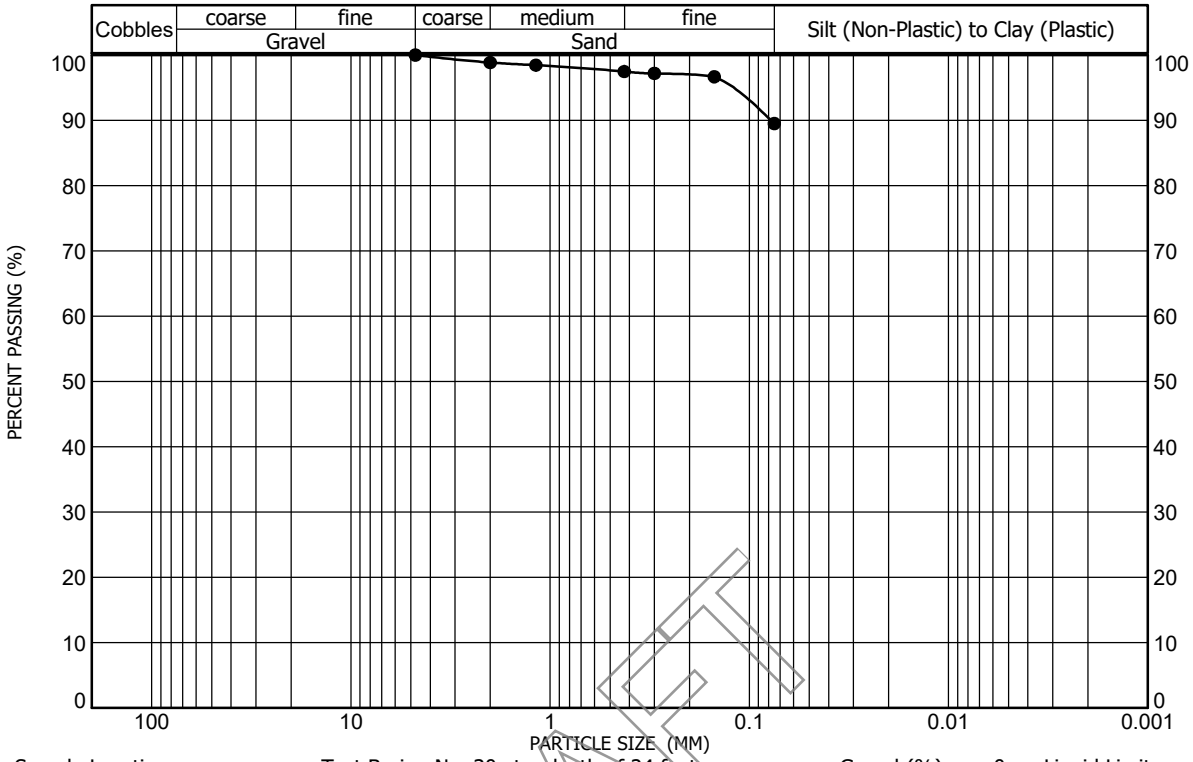
Gravel (%): 4 | Sand (%): 39 | Clay/Silt (%): 57
Liquid Limit: 32 | Plasticity Index: 15

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-185

PROJECT NO. 223122

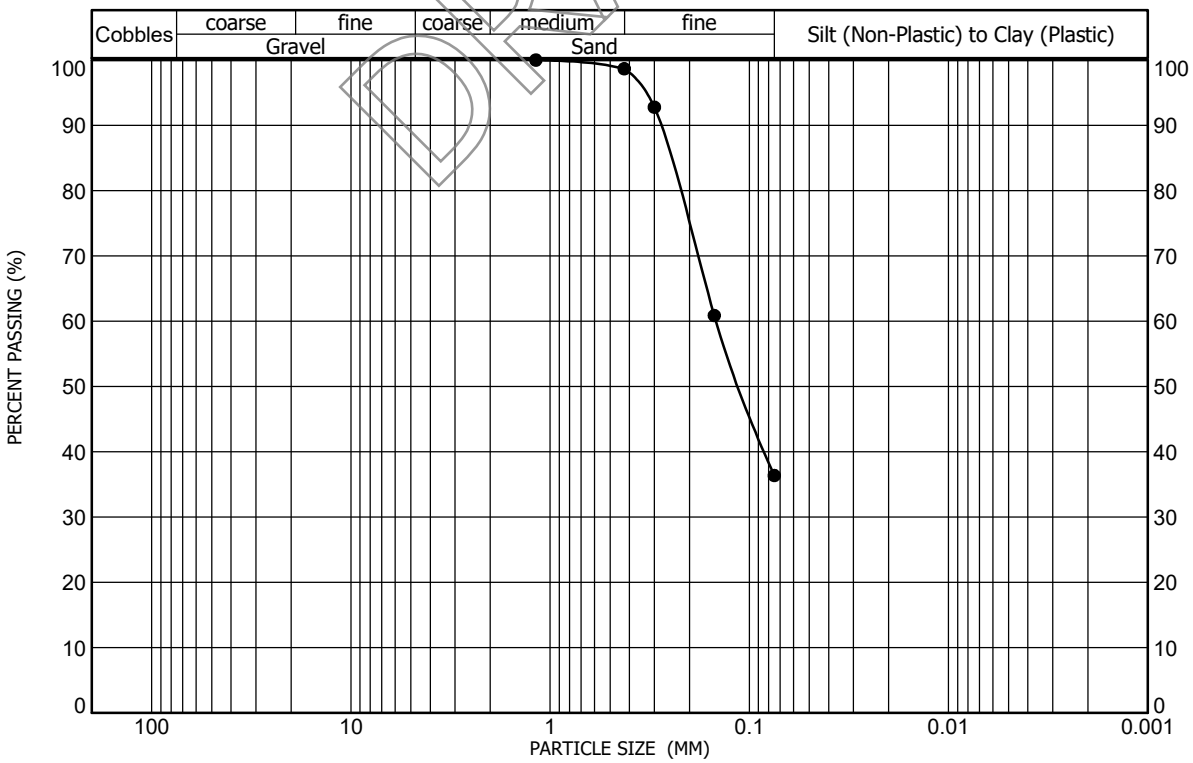
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 30 at a depth of 24 feet
Sample Description: Claystone, slightly sandy
Classification: A-6(13), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 33
Sand (%): 10 Plasticity Index: 15
Clay/Silt (%): 90

DRAFT



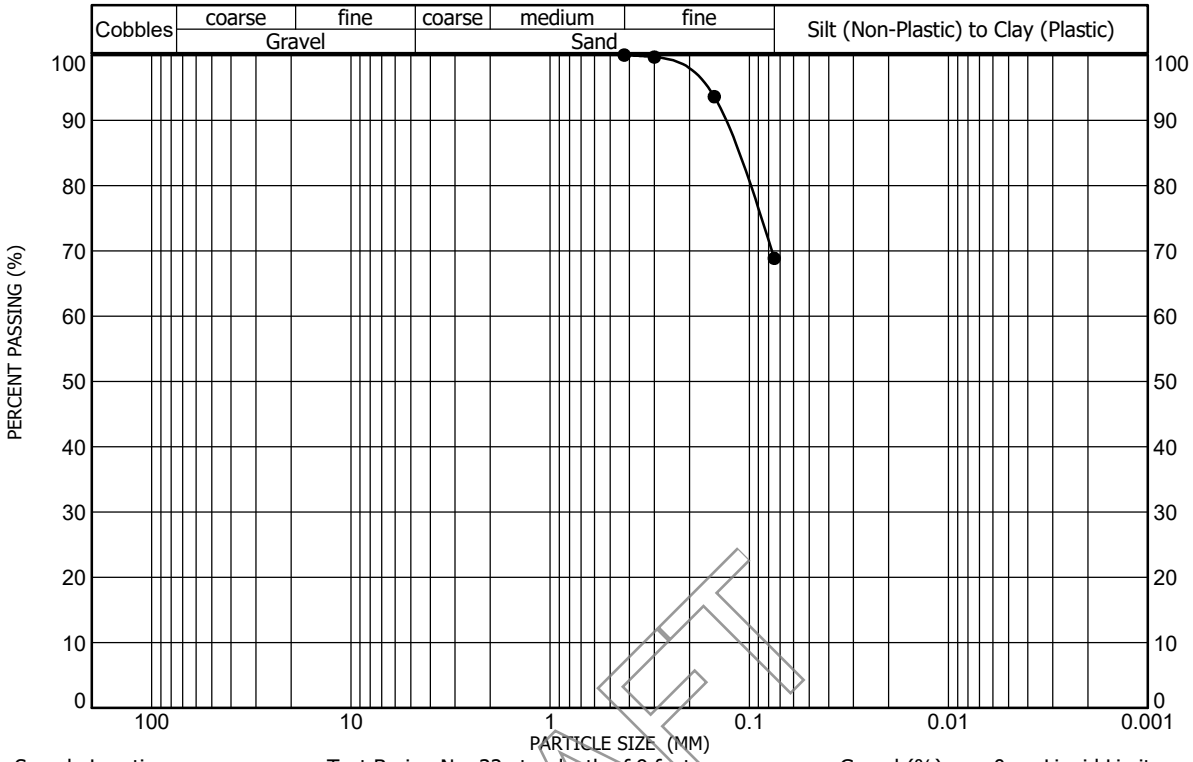
Sample Location: Test Boring No. 31 at a depth of 7 feet
Sample Description: Sand, very silty
Classification: A-4(0), SILTY SAND(SM)

Gravel (%): 0 Liquid Limit: NV
Sand (%): 64 Plasticity Index: NP
Clay/Silt (%): 36

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-186

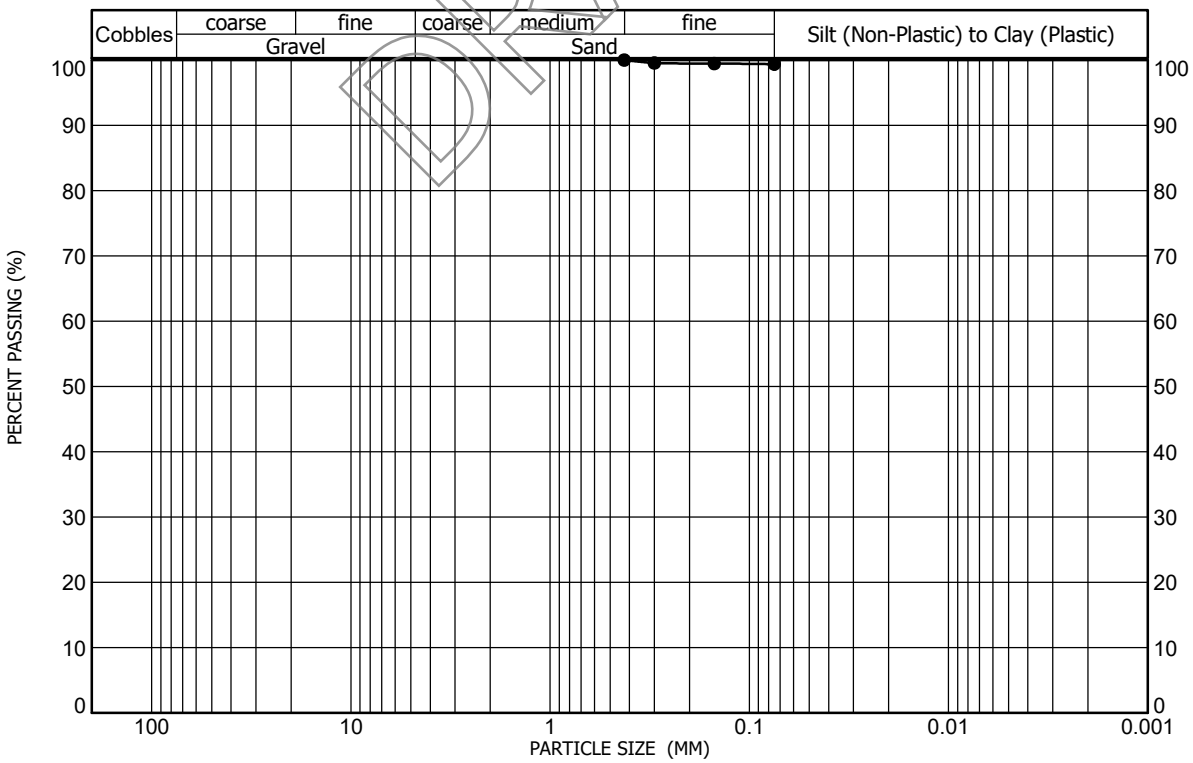
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location Test Boring No. 32 at a depth of 9 feet — Gravel (%) 0 — Liquid Limit 30
Sample Description Claystone, very sandy (lens) — Sand (%) 31 — Plasticity Index 11
Classification A-6(6), SANDY LEAN CLAY(CL) — Clay/Silt (%) 69

DRAFT

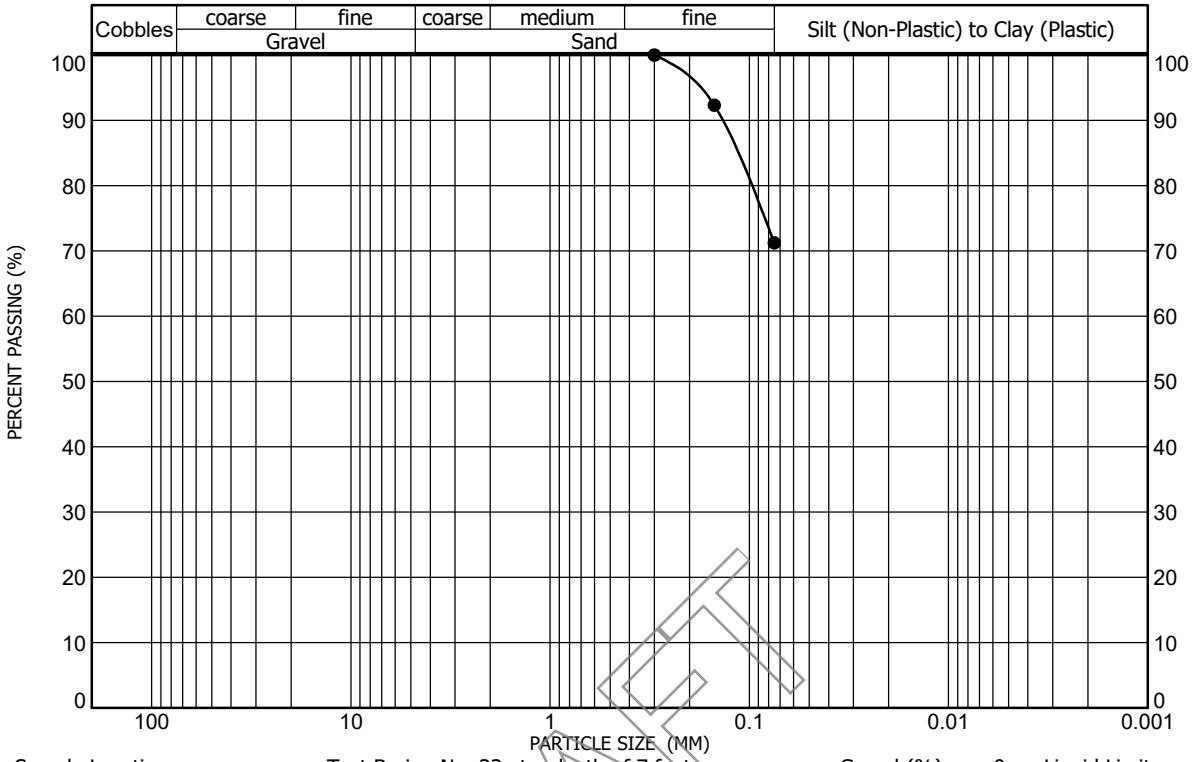


Sample Location Test Boring No. 32 at a depth of 19 feet — Gravel (%) 0 — Liquid Limit 59
Sample Description Claystone, trace sand — Sand (%) 1 — Plasticity Index 38
Classification A-7-6(42), FAT CLAY(CH) — Clay/Silt (%) 99

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-187

PROJECT NO. 223122

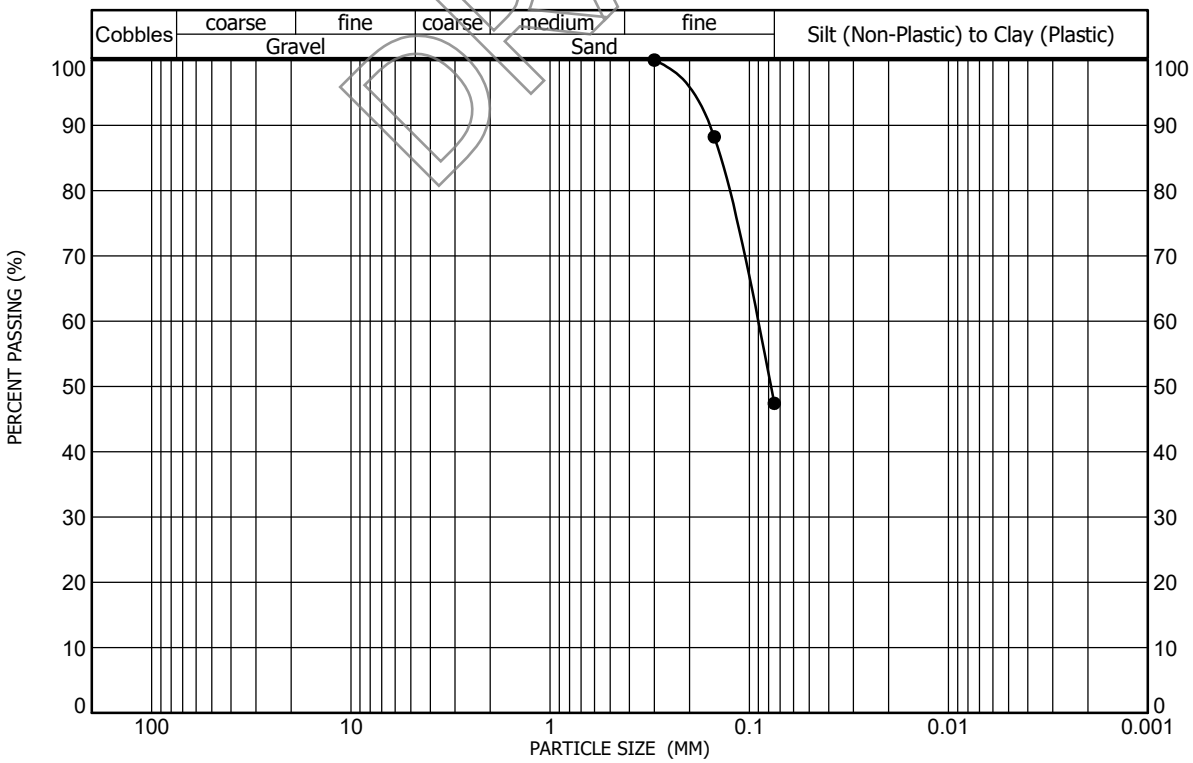
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 33 at a depth of 7 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-6(10), LEAN CLAY with SAND(CL)

Gravel (%): 0 Sand (%): 29 Clay/Silt (%): 71
Liquid Limit: 33 Plasticity Index: 17

DRAFT



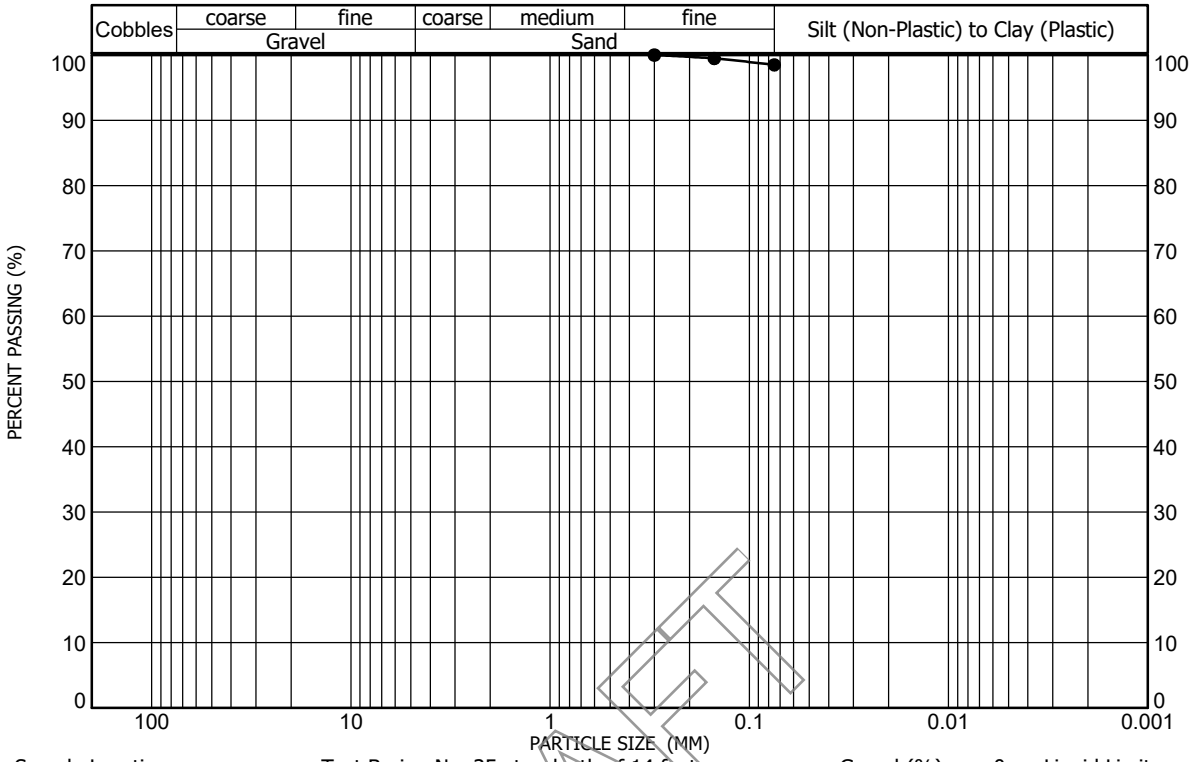
Sample Location: Test Boring No. 33 at a depth of 24 feet
Sample Description: Sandstone, very clayey
Classification: A-6(2), CLAYEY SAND(SC)

Gravel (%): 0 Sand (%): 53 Clay/Silt (%): 47
Liquid Limit: 27 Plasticity Index: 11

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-188

PROJECT NO. 223122

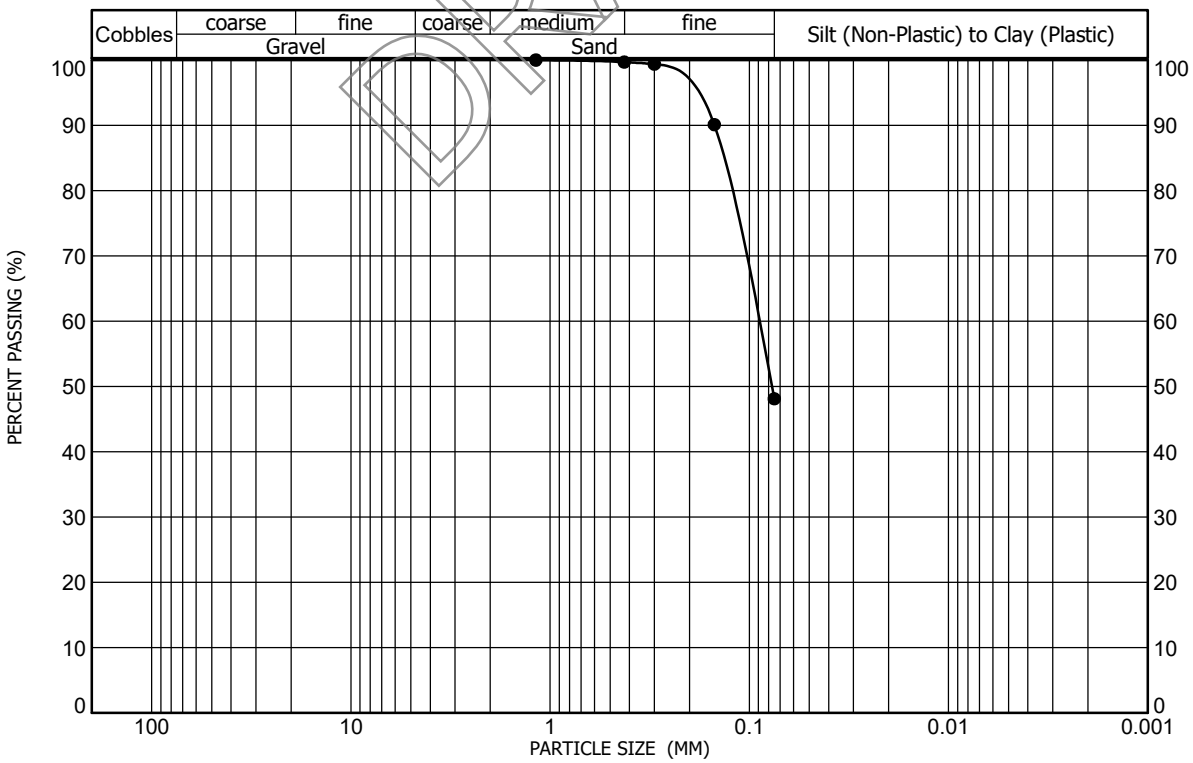
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 35 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(57), FAT CLAY(CH)

Gravel (%): 0 Sand (%): 2 Clay/Silt (%): 98
Liquid Limit: 74 Plasticity Index: 50

DRAFT



Sample Location: Test Boring No. 36 at a depth of 34 feet
Sample Description: Sandstone, very clayey
Classification: A-6(2), CLAYEY SAND(SC)

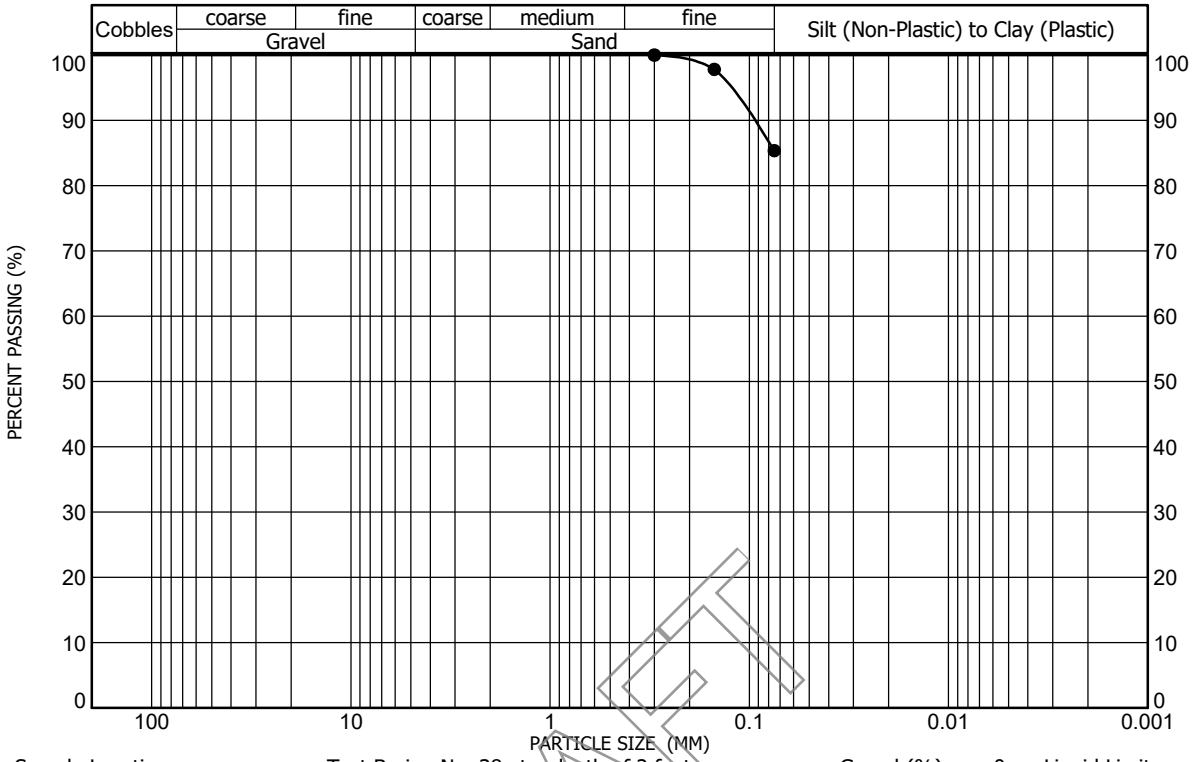
Gravel (%): 0 Sand (%): 52 Clay/Silt (%): 48
Liquid Limit: 29 Plasticity Index: 11

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-189

PROJECT NO. 223122

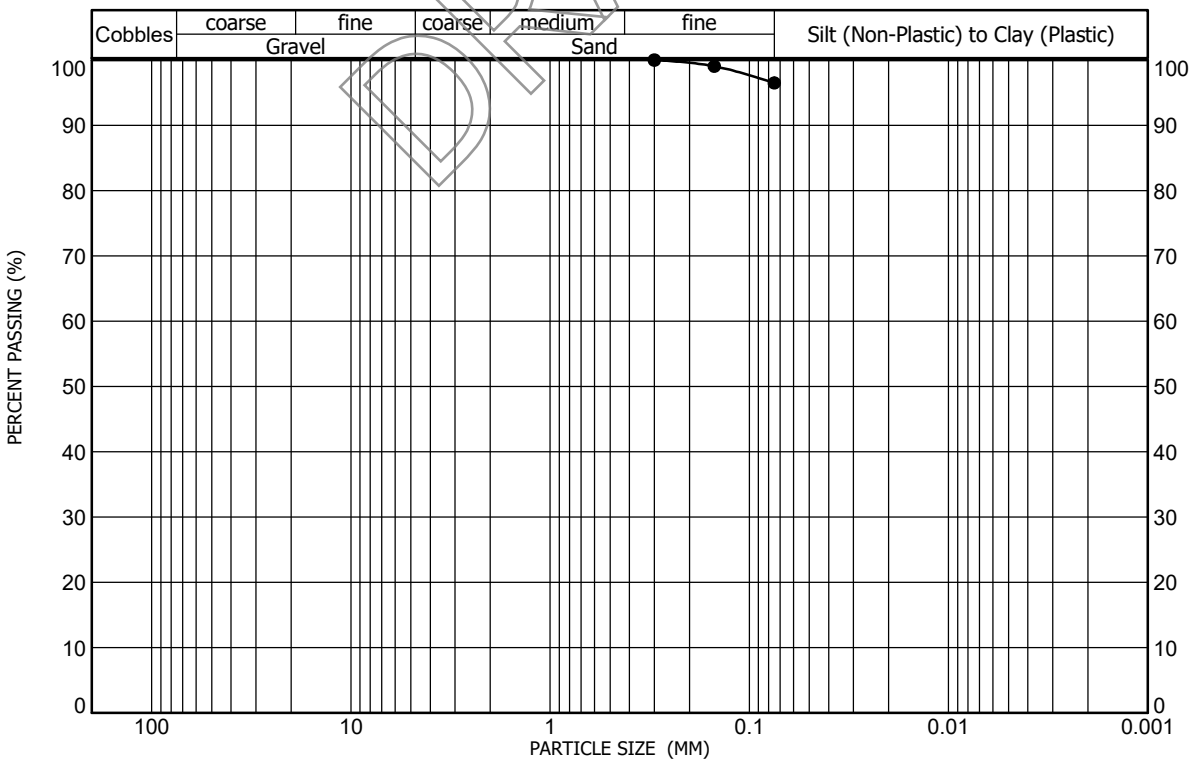
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 38 at a depth of 2 feet
Sample Description: Clay, sandy
Classification: A-6(15), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 37
Sand (%): 15 Plasticity Index: 18
Clay/Silt (%): 85

DRAFT



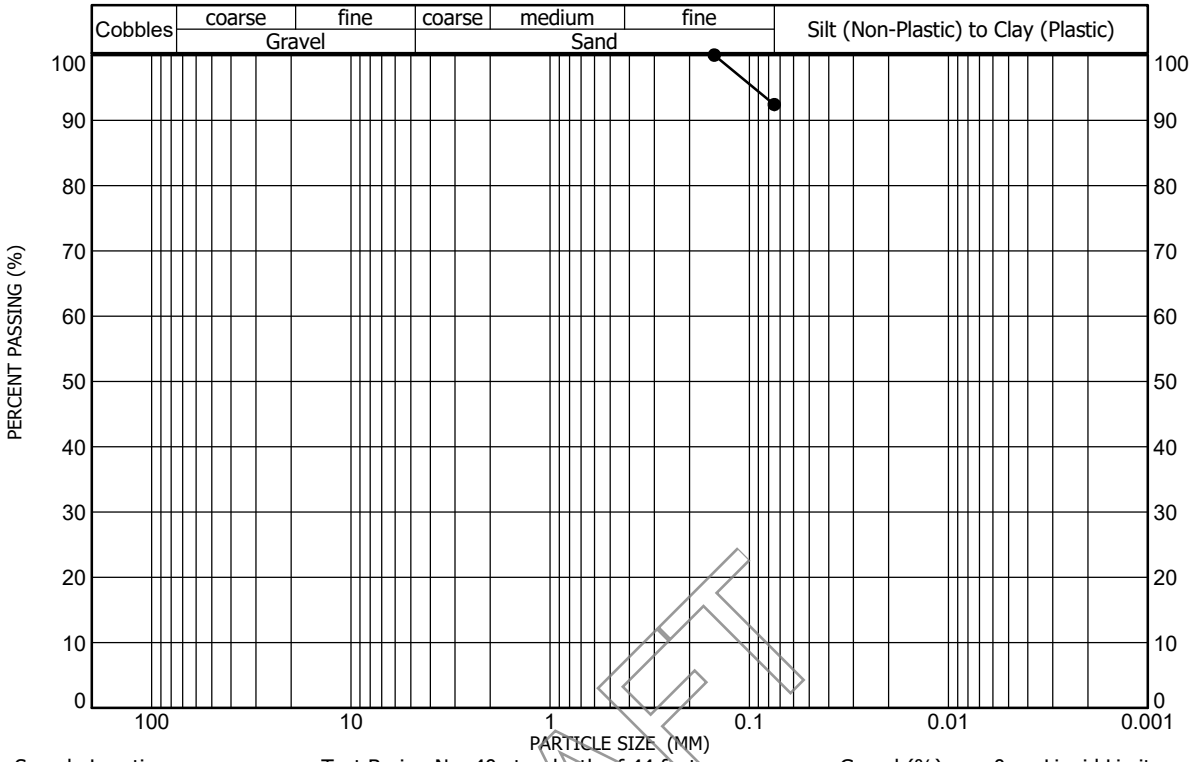
Sample Location: Test Boring No. 40 at a depth of 7 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(25), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 44
Sand (%): 4 Plasticity Index: 24
Clay/Silt (%): 96

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-190

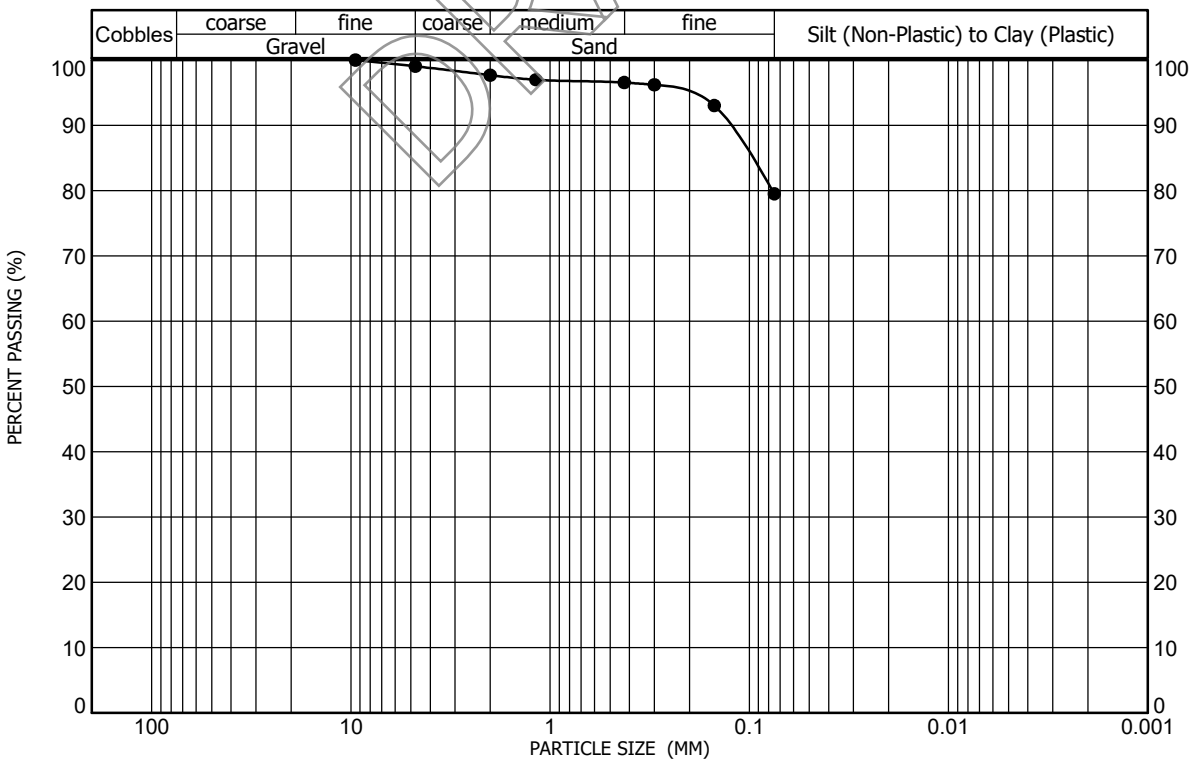
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 40 at a depth of 44 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(32), LEAN CLAY(CL)
Gravel (%): 0 Sand (%): 8 Clay/Silt (%): 92
Liquid Limit: 49 Plasticity Index: 33

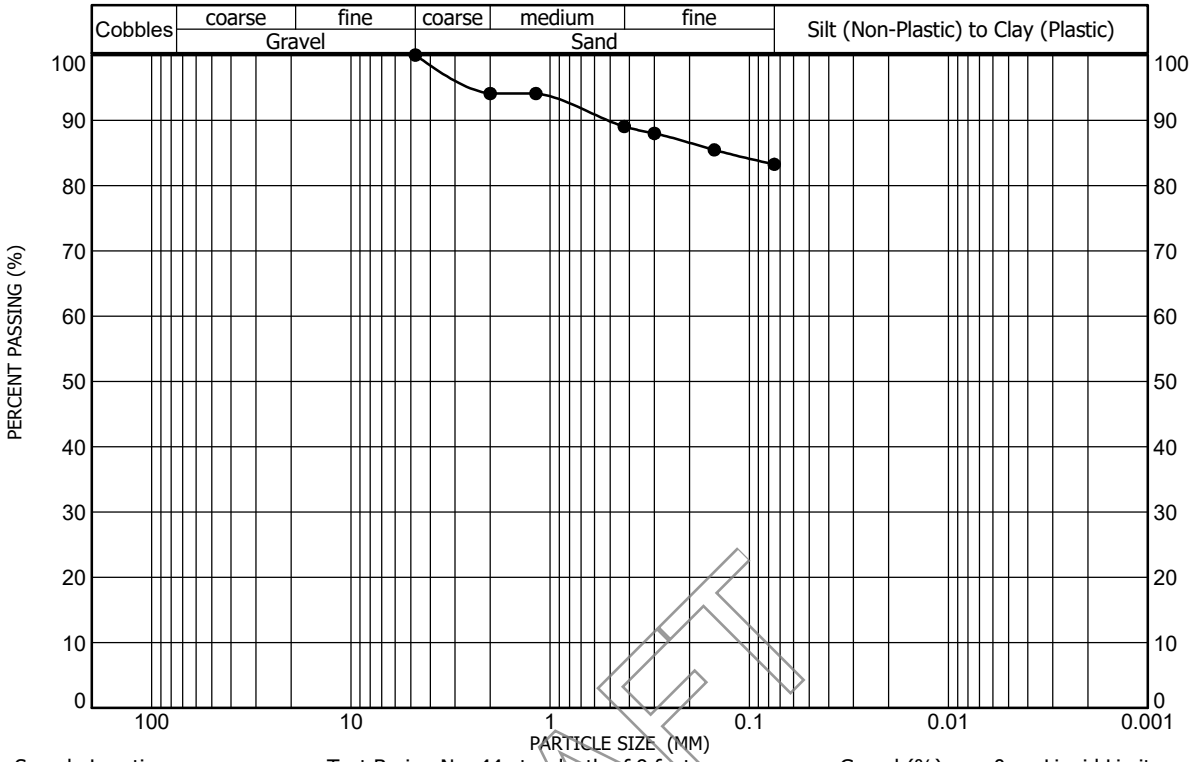
DRAFT



Sample Location: Test Boring No. 43 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Classification: A-7-6(23), LEAN CLAY with SAND(CL)
Gravel (%): 1 Sand (%): 20 Clay/Silt (%): 80
Liquid Limit: 45 Plasticity Index: 30

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-191
PROJECT NO. 223122

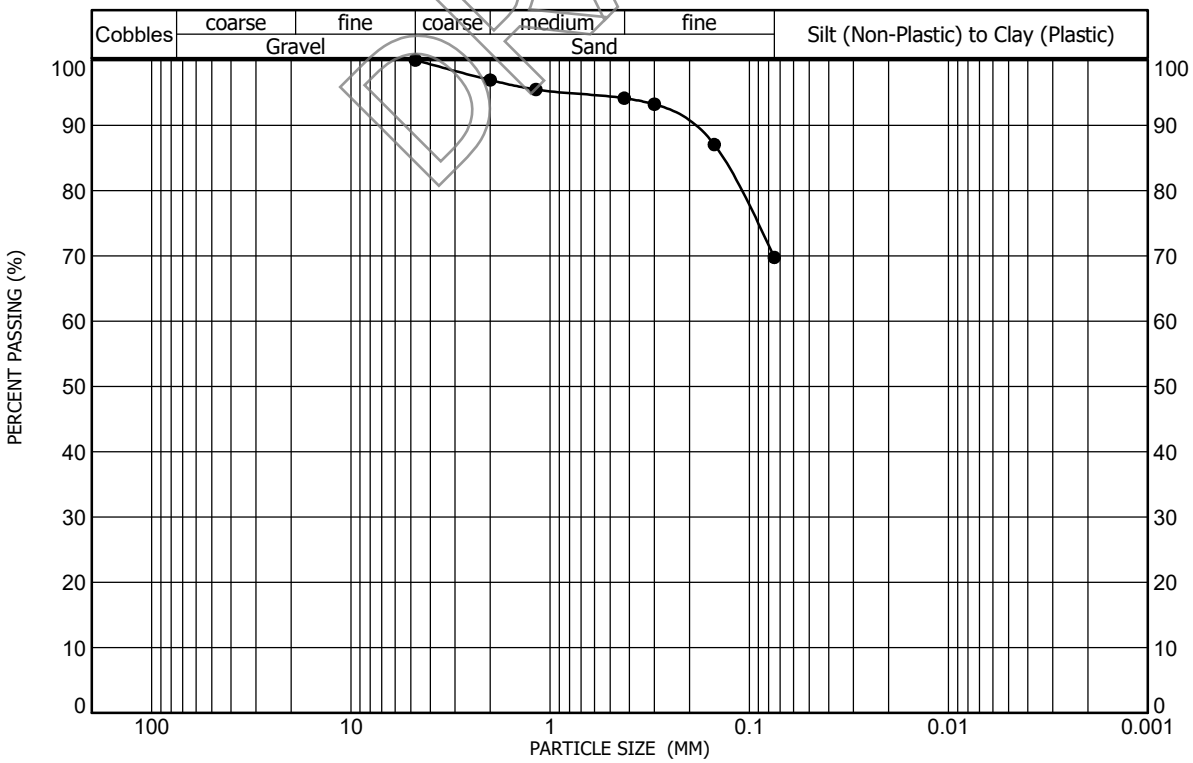
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 44 at a depth of 9 feet
Sample Description: Claystone, sandy
Classification: A-7-6(21), LEAN CLAY with SAND(CL)

Gravel (%): 0
Sand (%): 17
Clay/Silt (%): 83
Liquid Limit: 46
Plasticity Index: 24

DRAFT



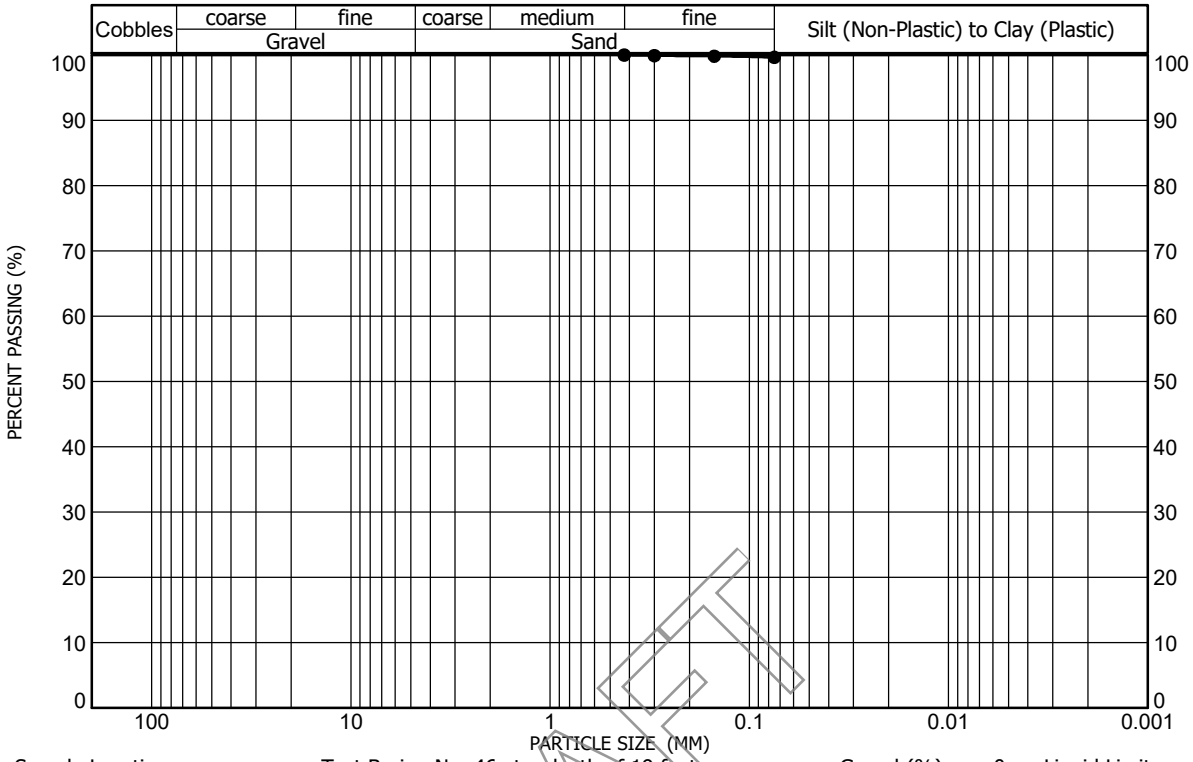
Sample Location: Test Boring No. 45 at a depth of 14 feet
Sample Description: Claystone, sandy
Classification: A-6(13), SANDY LEAN CLAY(CL)

Gravel (%): 0
Sand (%): 30
Clay/Silt (%): 70
Liquid Limit: 36
Plasticity Index: 22

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-192

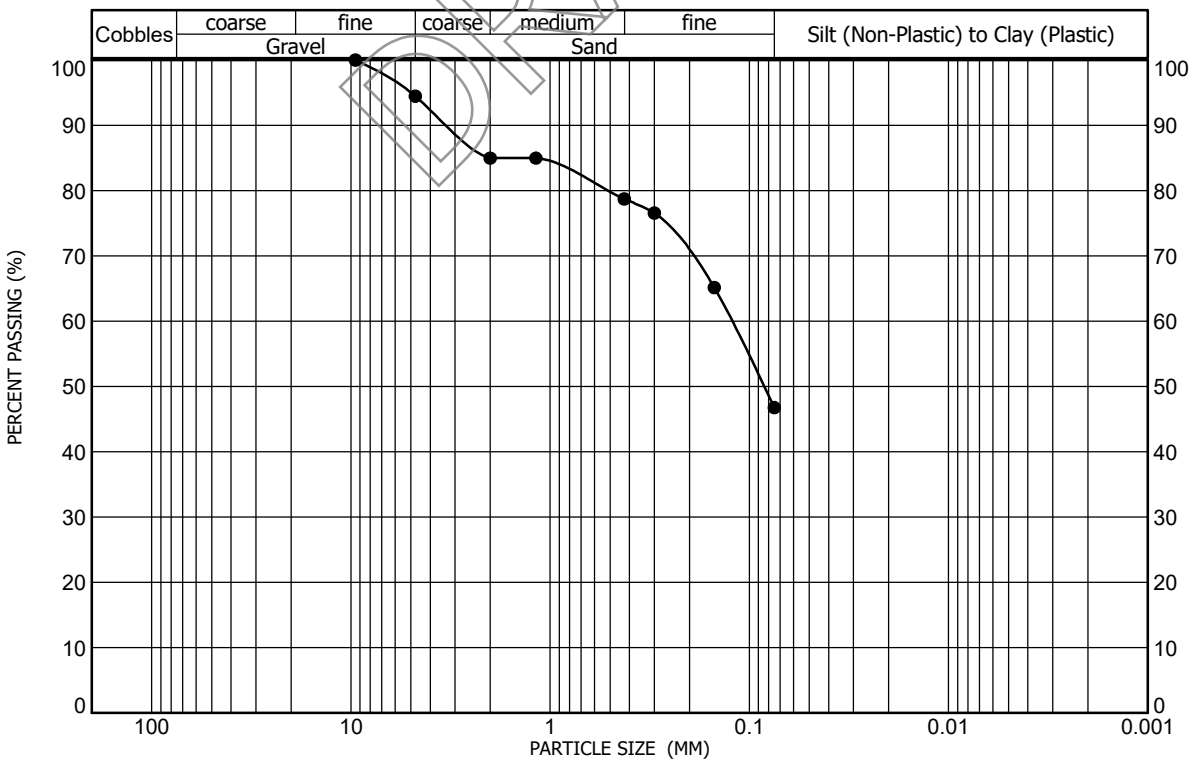
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 46 at a depth of 19 feet
Sample Description: Claystone, silty
Classification: A-7-6(37), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 0
Clay/Silt (%): 100
Liquid Limit: 54
Plasticity Index: 33

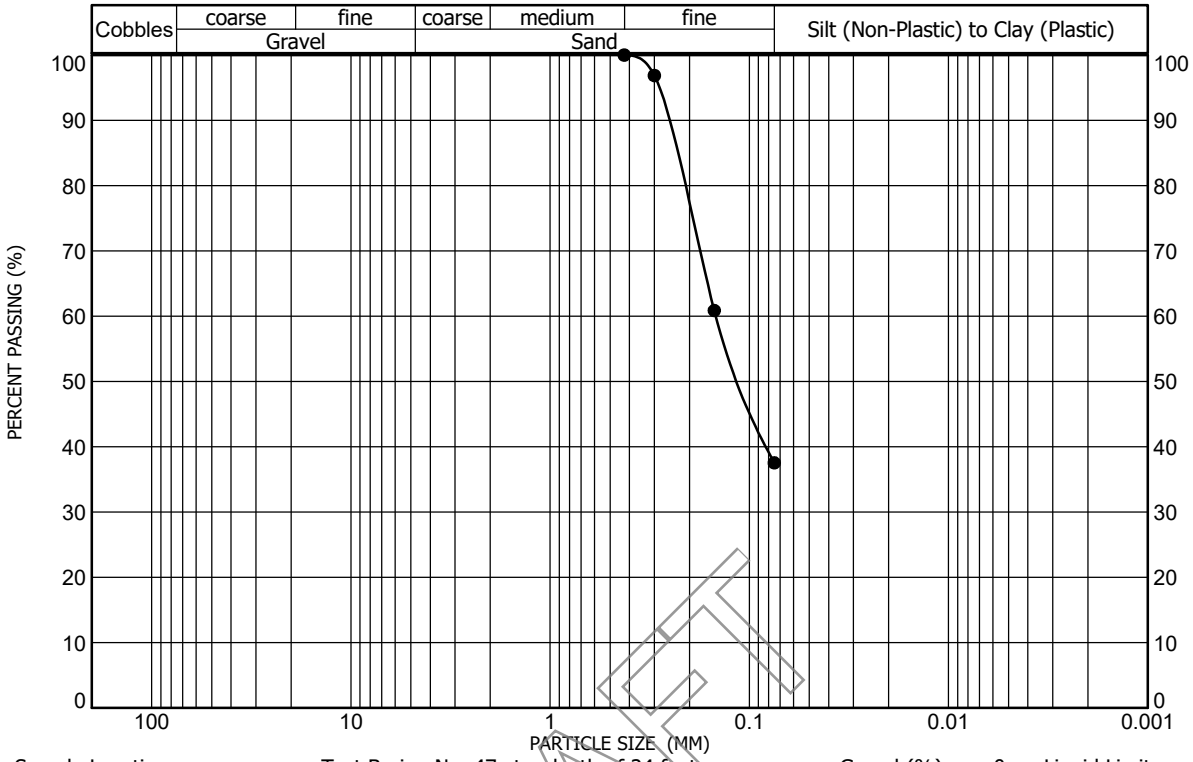
DRAFT



Sample Location: Test Boring No. 47 at a depth of 9 feet
Sample Description: Sand, very clayey, slightly gravelly
Classification: A-6(3), CLAYEY SAND(SC)
Gravel (%): 6
Sand (%): 48
Clay/Silt (%): 47
Liquid Limit: 33
Plasticity Index: 14

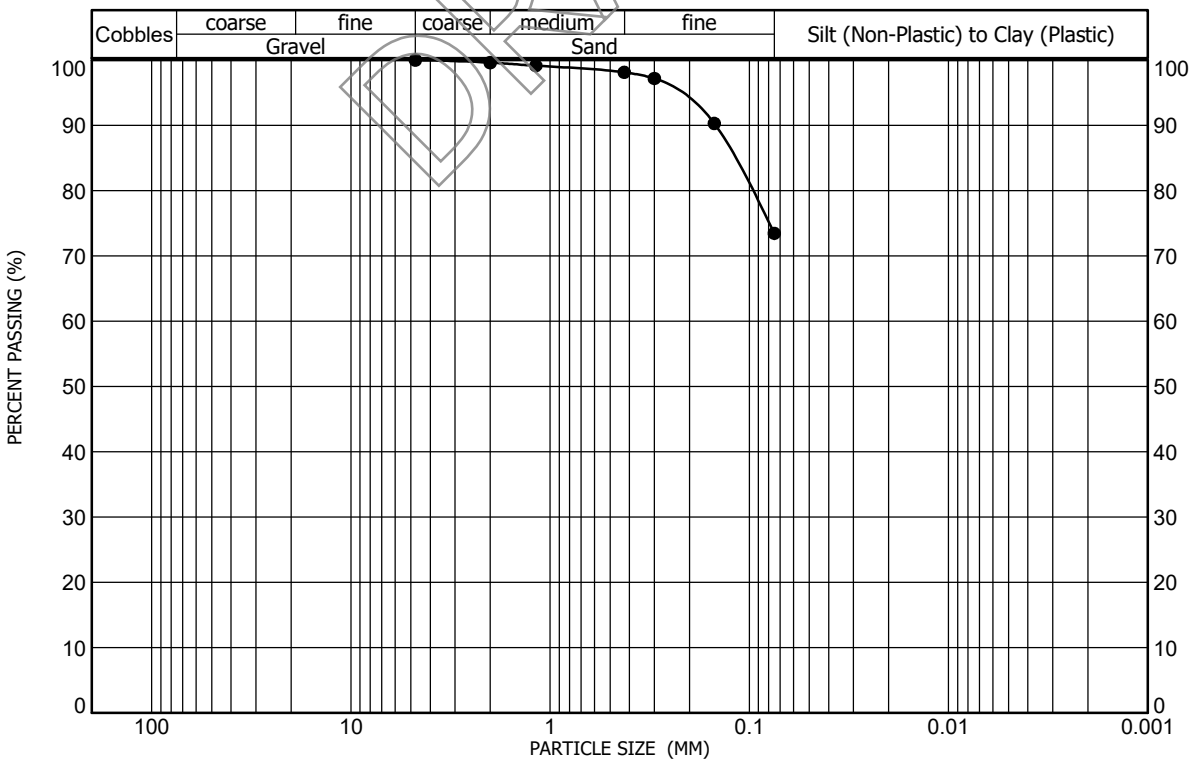
GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-193
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 47 at a depth of 24 feet
Sample Description: Sandstone, very silty
Classification: A-4(0), SILTY SAND(SM)
Gravel (%): 0
Sand (%): 62
Clay/Silt (%): 38
Liquid Limit: NV
Plasticity Index: NP

DRAFT

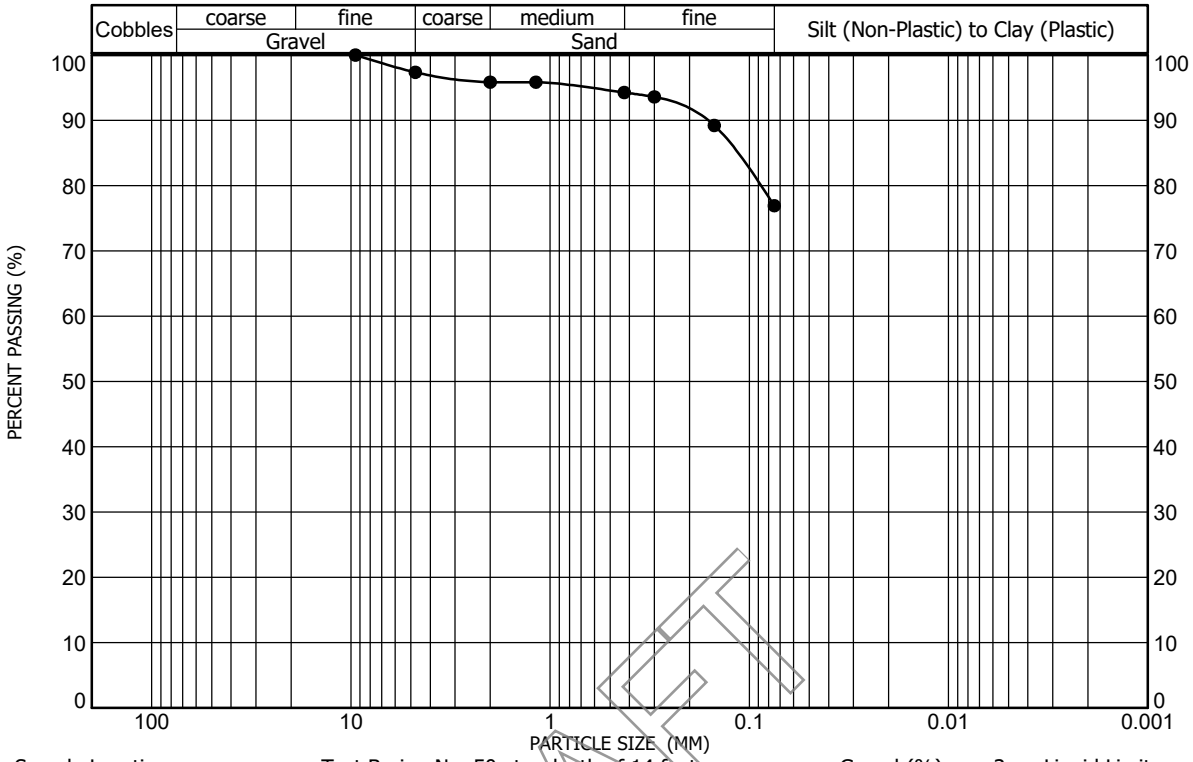


Sample Location: Test Boring No. 49 at a depth of 9 feet
Sample Description: Clay, sandy
Classification: A-7-6(15), LEAN CLAY with SAND(CL)
Gravel (%): 0
Sand (%): 27
Clay/Silt (%): 73
Liquid Limit: 42
Plasticity Index: 22

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-194

PROJECT NO. 223122

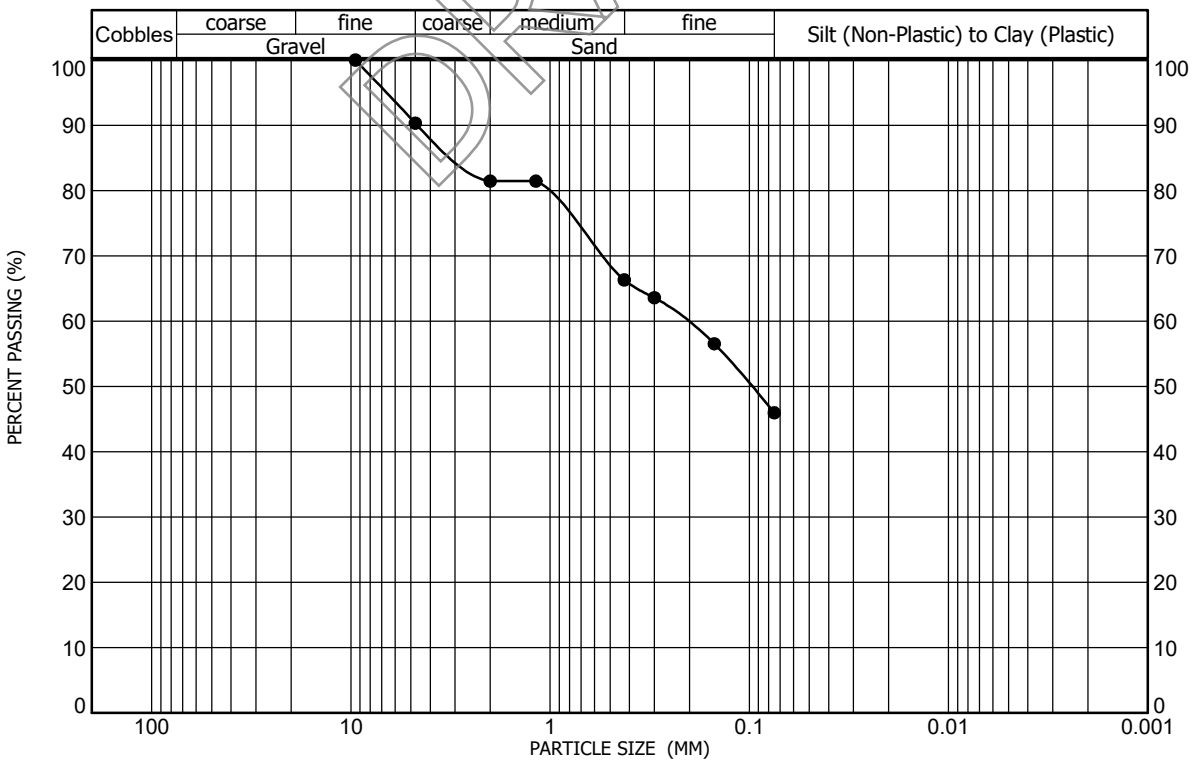
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 50 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Classification: A-7-6(20), LEAN CLAY with SAND(CL)

Gravel (%): 3 Liquid Limit: 46
Sand (%): 20 Plasticity Index: 27
Clay/Silt (%): 77

DRAFT



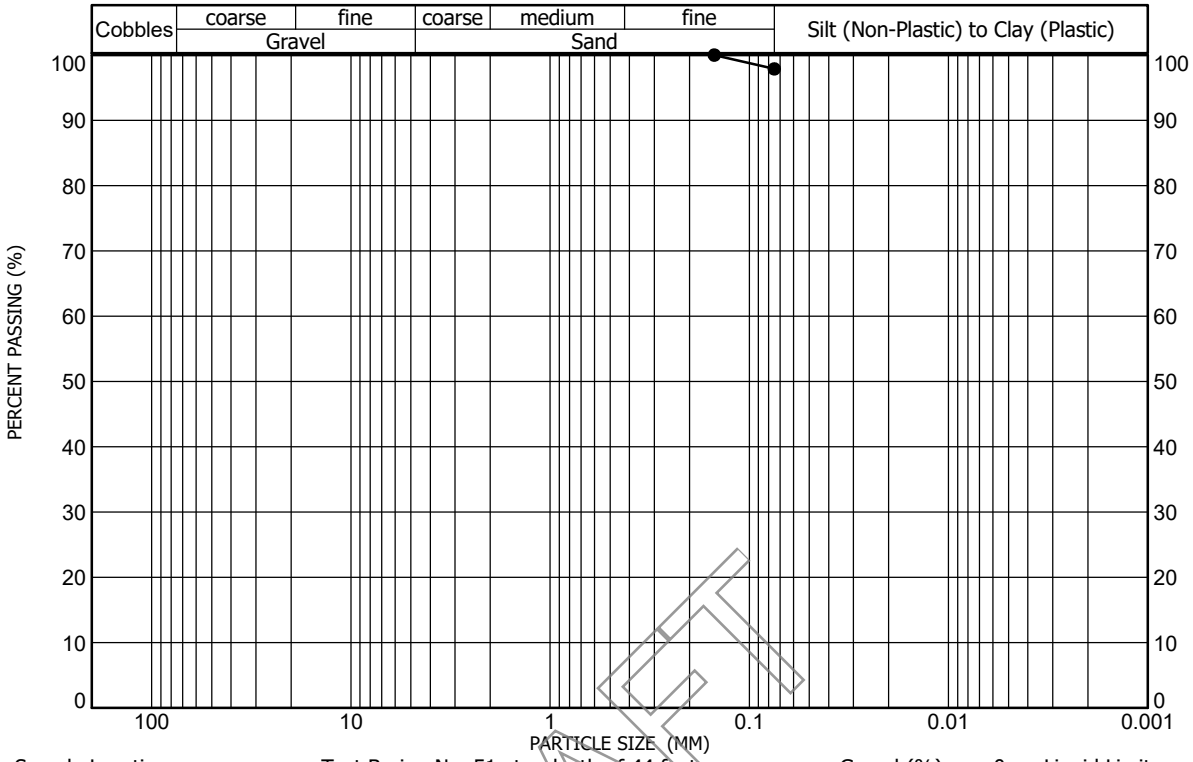
Sample Location: Test Boring No. 51 at a depth of 2 feet
Sample Description: Clay, very sandy, slightly gravelly
Classification: A-6(5), CLAYEY SAND(SC)

Gravel (%): 10 Liquid Limit: 39
Sand (%): 44 Plasticity Index: 18
Clay/Silt (%): 46

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-195

PROJECT NO. 223122

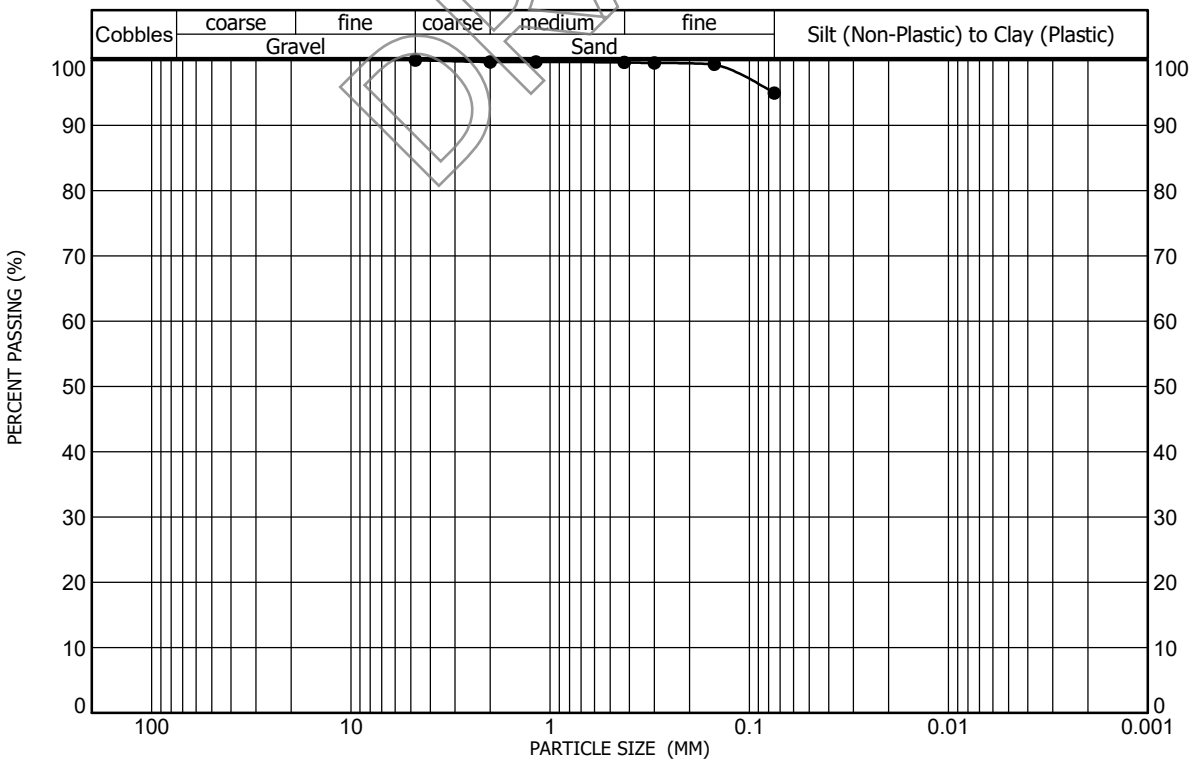
AGW
A.G. WASSENAAR, INC.



Sample Location Test Boring No. 51 at a depth of 44 feet
Sample Description Claystone, trace sand
Classification A-7-6(35), FAT CLAY(CH)

Gravel (%) 0 Liquid Limit 54
Sand (%) 2 Plasticity Index 32
Clay/Silt (%) 98

DRAFT



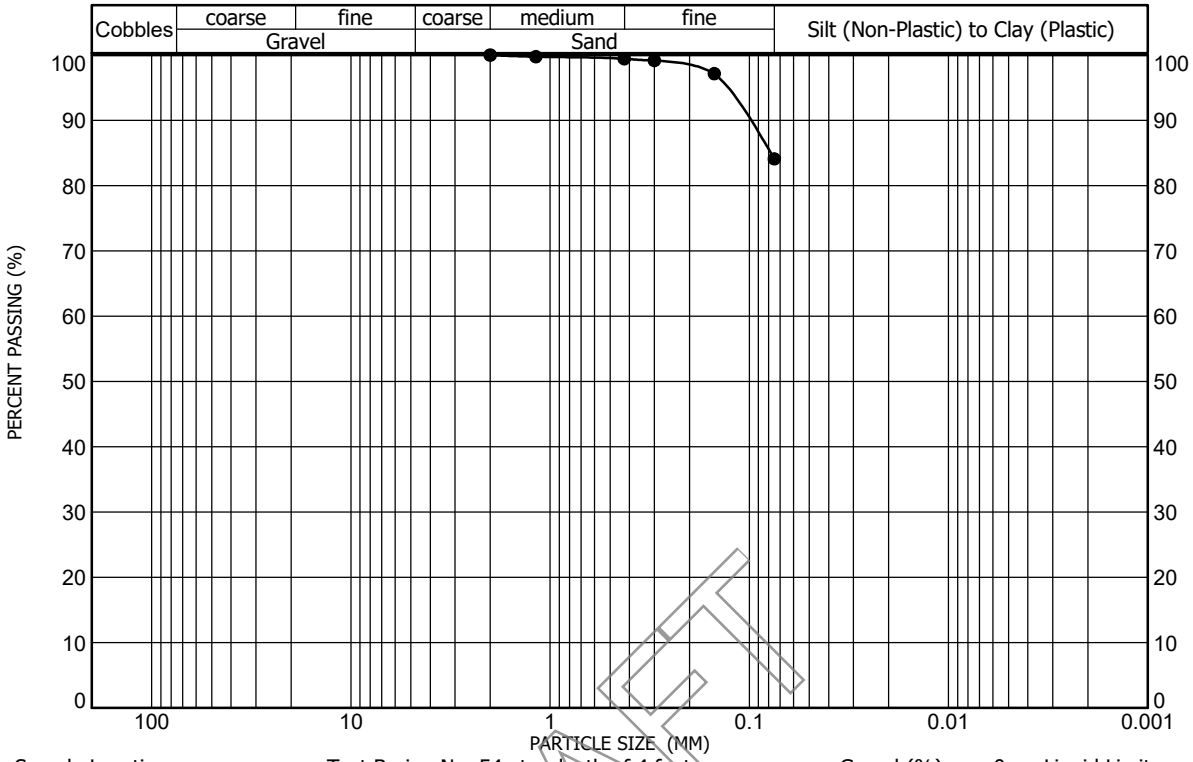
Sample Location Test Boring No. 52 at a depth of 19 feet
Sample Description Claystone, slightly sandy
Classification A-7-6(34), FAT CLAY(CH)

Gravel (%) 0 Liquid Limit 54
Sand (%) 5 Plasticity Index 32
Clay/Silt (%) 95

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-196

PROJECT NO. 223122

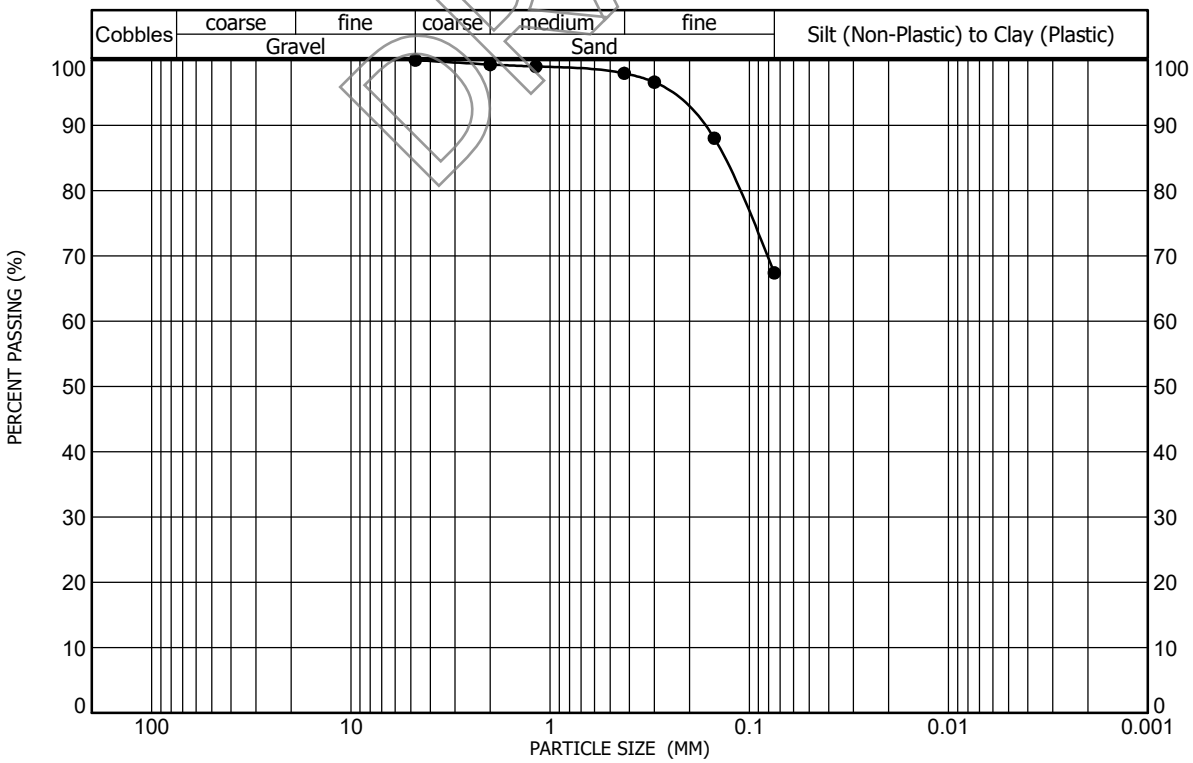
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 54 at a depth of 4 feet
Sample Description: Clay, sandy
Classification: A-6(11), LEAN CLAY with SAND(CL)

Gravel (%): 0
Sand (%): 16
Clay/Silt (%): 84
Liquid Limit: 33
Plasticity Index: 14

DRAFT



Sample Location: Test Boring No. 56 at a depth of 7 feet
Sample Description: Clay, very sandy
Classification: A-7-6(13), SANDY LEAN CLAY(CL)

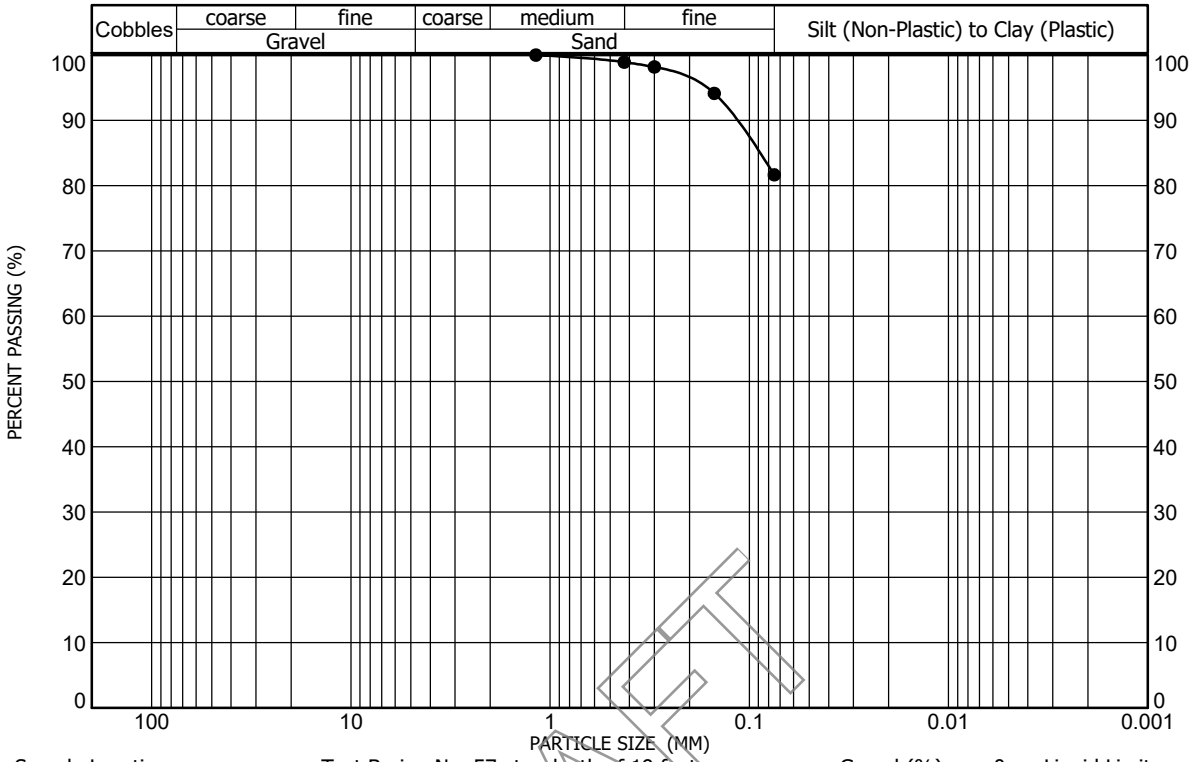
Gravel (%): 0
Sand (%): 33
Clay/Silt (%): 67
Liquid Limit: 44
Plasticity Index: 21

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-197

PROJECT NO. 223122

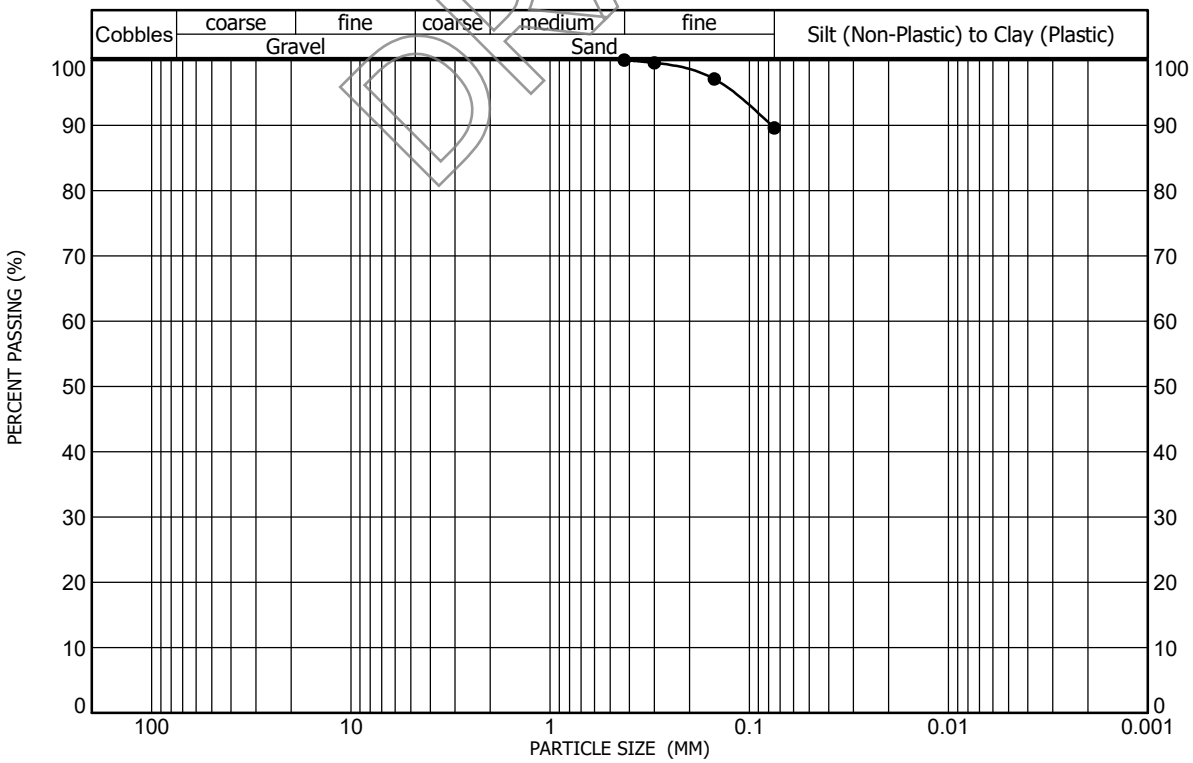
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 57 at a depth of 19 feet
Sample Description: Clay, sandy
Classification: A-6(10), LEAN CLAY with SAND(CL)

Gravel (%): 0 Liquid Limit: 36
Sand (%): 18 Plasticity Index: 12
Clay/Silt (%): 82

DRAFT



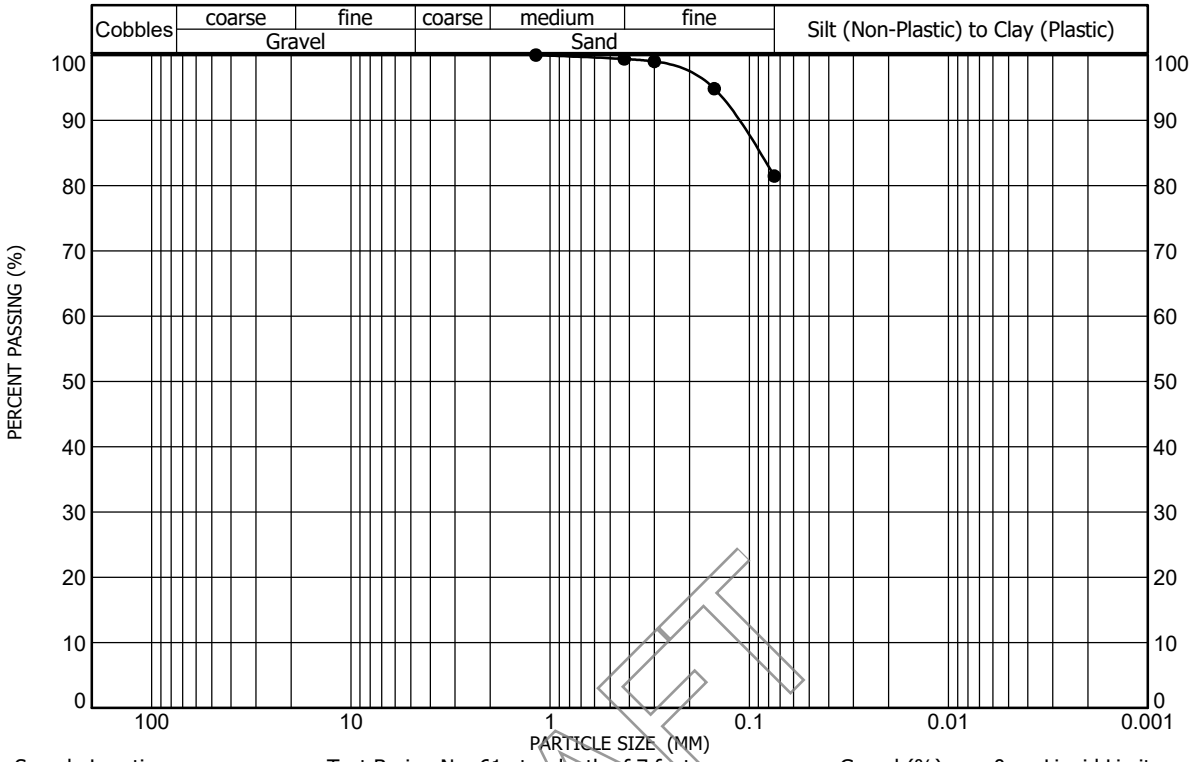
Sample Location: Test Boring No. 59 at a depth of 9 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(26), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 44
Sand (%): 10 Plasticity Index: 28
Clay/Silt (%): 90

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-198

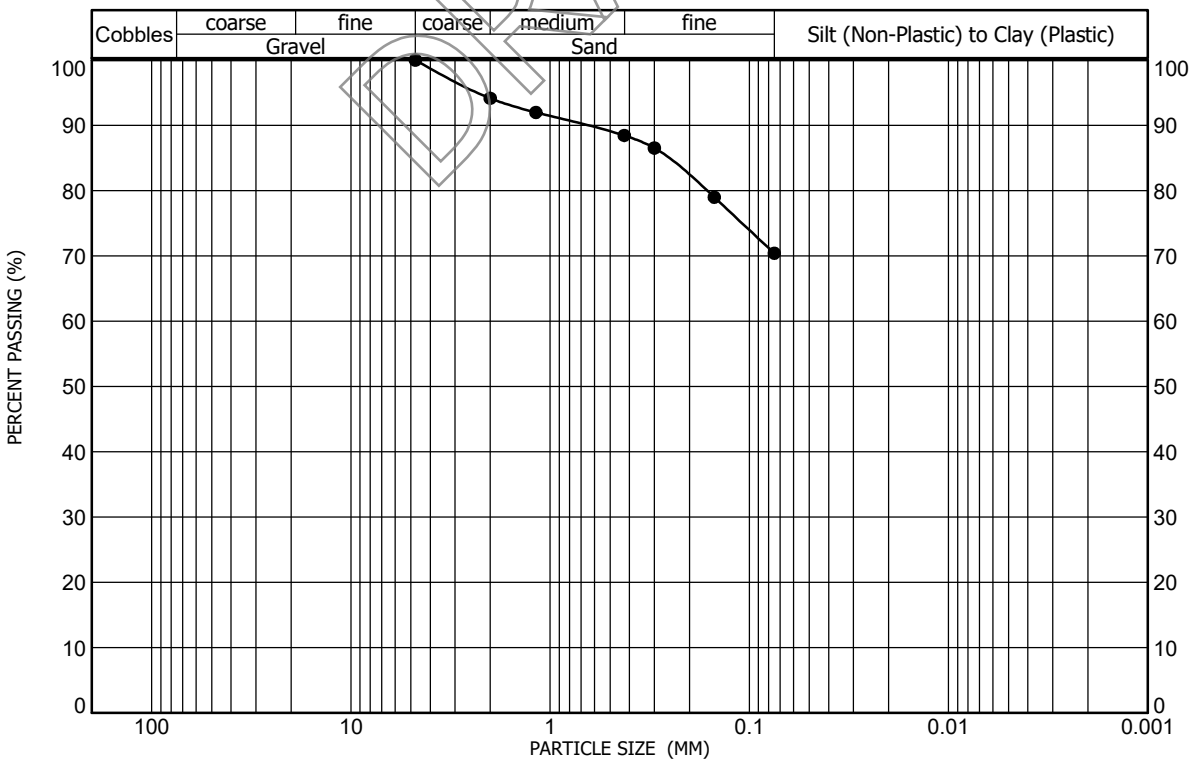
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 61 at a depth of 7 feet
Sample Description: Clay, sandy
Classification: A-6(16), LEAN CLAY with SAND(CL)
Gravel (%): 0
Sand (%): 19
Clay/Silt (%): 81
Liquid Limit: 38
Plasticity Index: 21

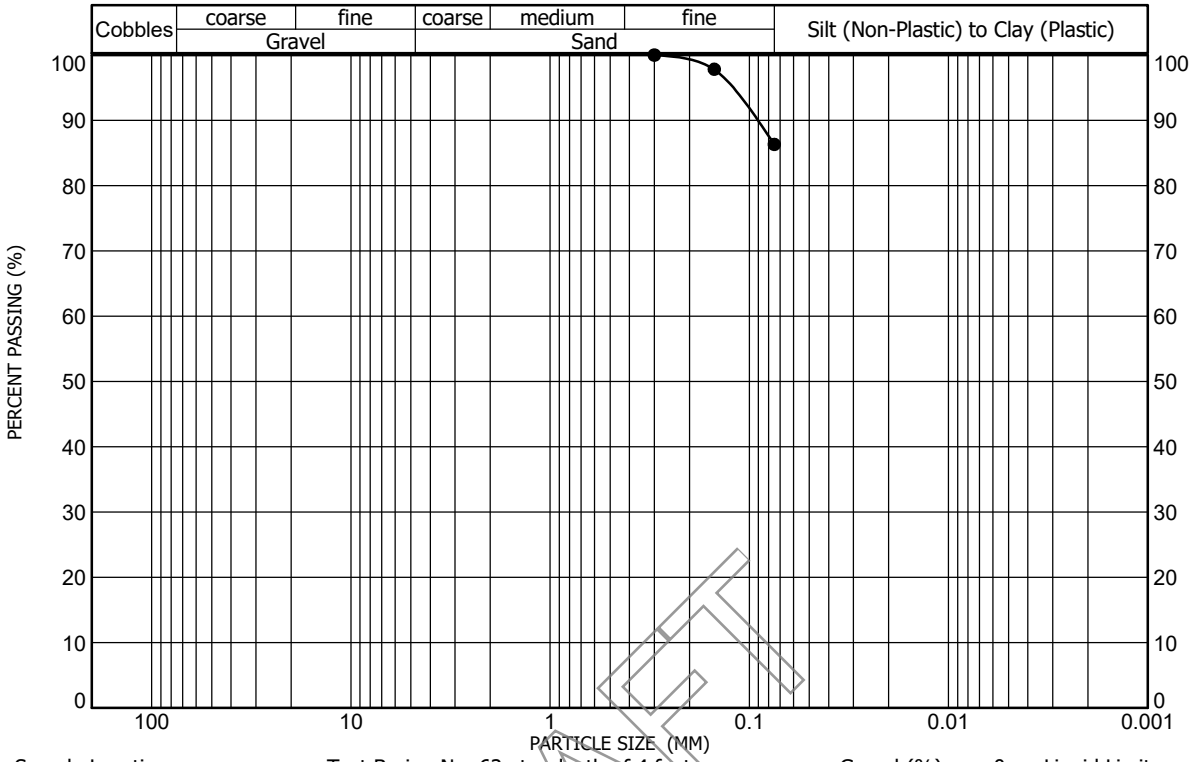
DRAFT



Sample Location: Test Boring No. 61 at a depth of 24 feet
Sample Description: Claystone, sandy
Classification: A-7-6(25), LEAN CLAY with SAND(CL)
Gravel (%): 0
Sand (%): 30
Clay/Silt (%): 70
Liquid Limit: 44
Plasticity Index: 41

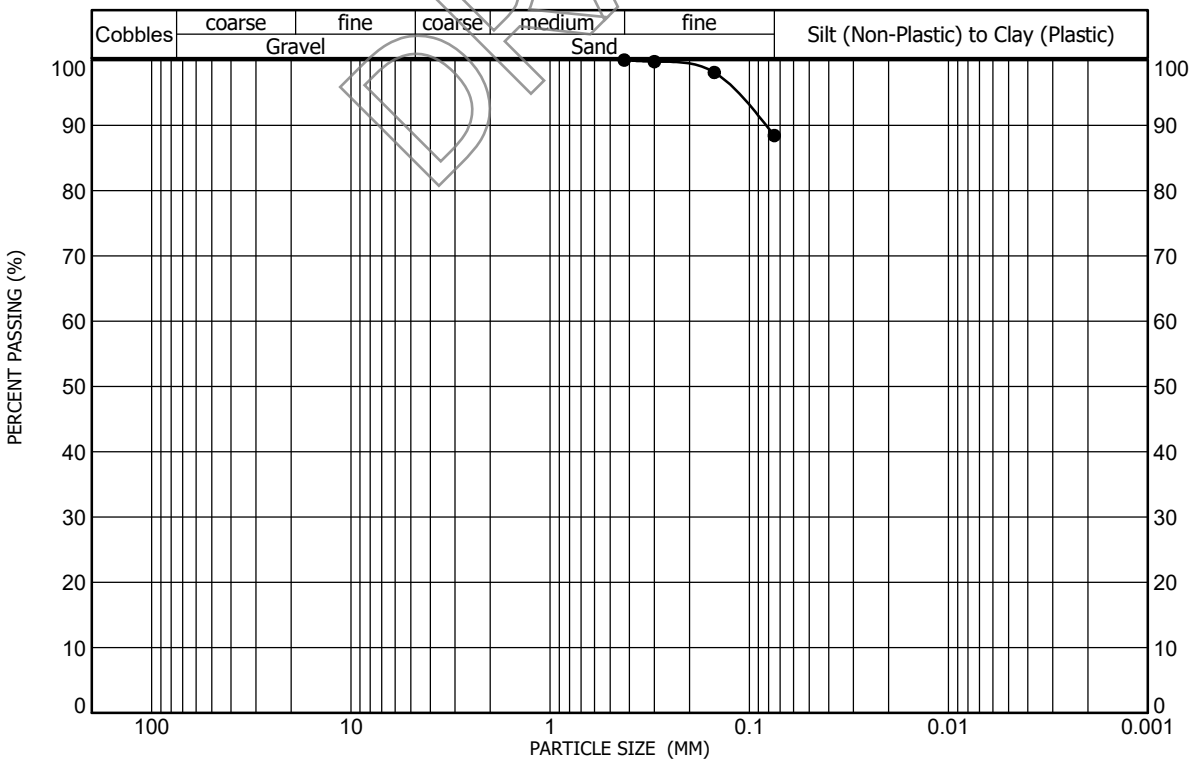
GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-199
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 62 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Classification: -
Gravel (%): 0
Sand (%): 14
Clay/Silt (%): 86
Liquid Limit: -
Plasticity Index: -

DRAFT

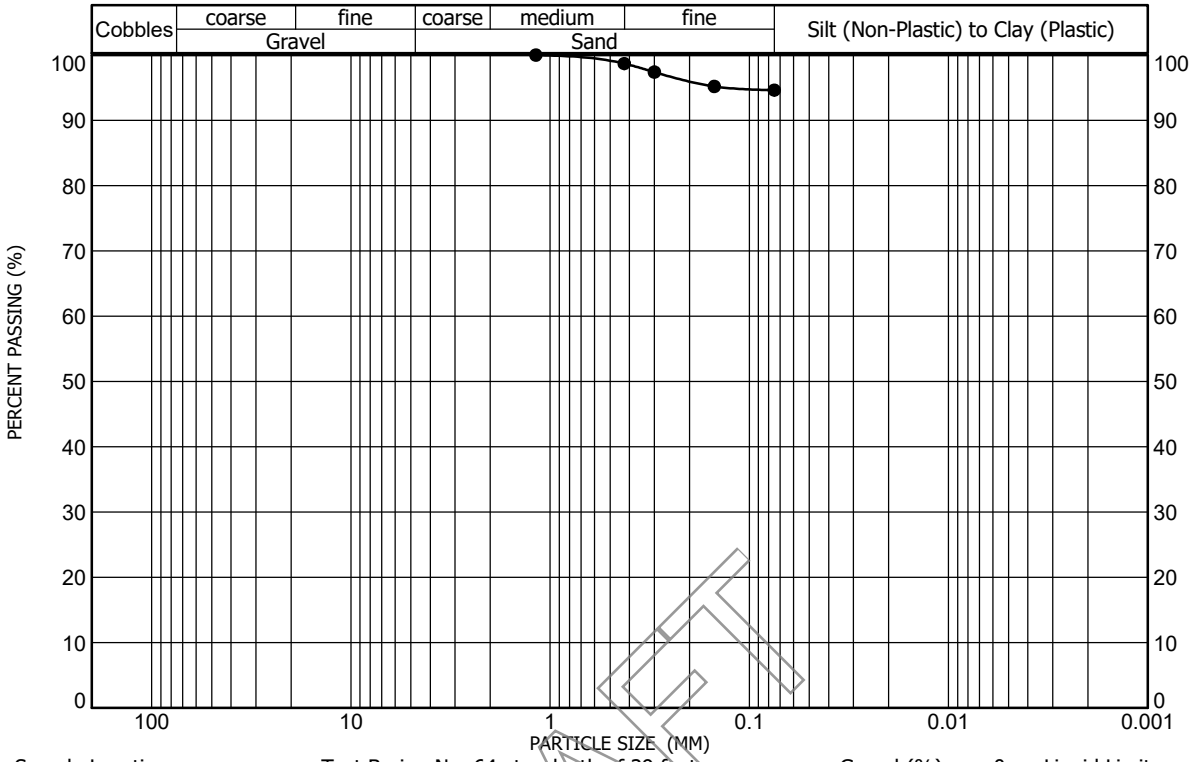


Sample Location: Test Boring No. 63 at a depth of 7 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(21), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 12
Clay/Silt (%): 88
Liquid Limit: 41
Plasticity Index: 24

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-200

PROJECT NO. 223122

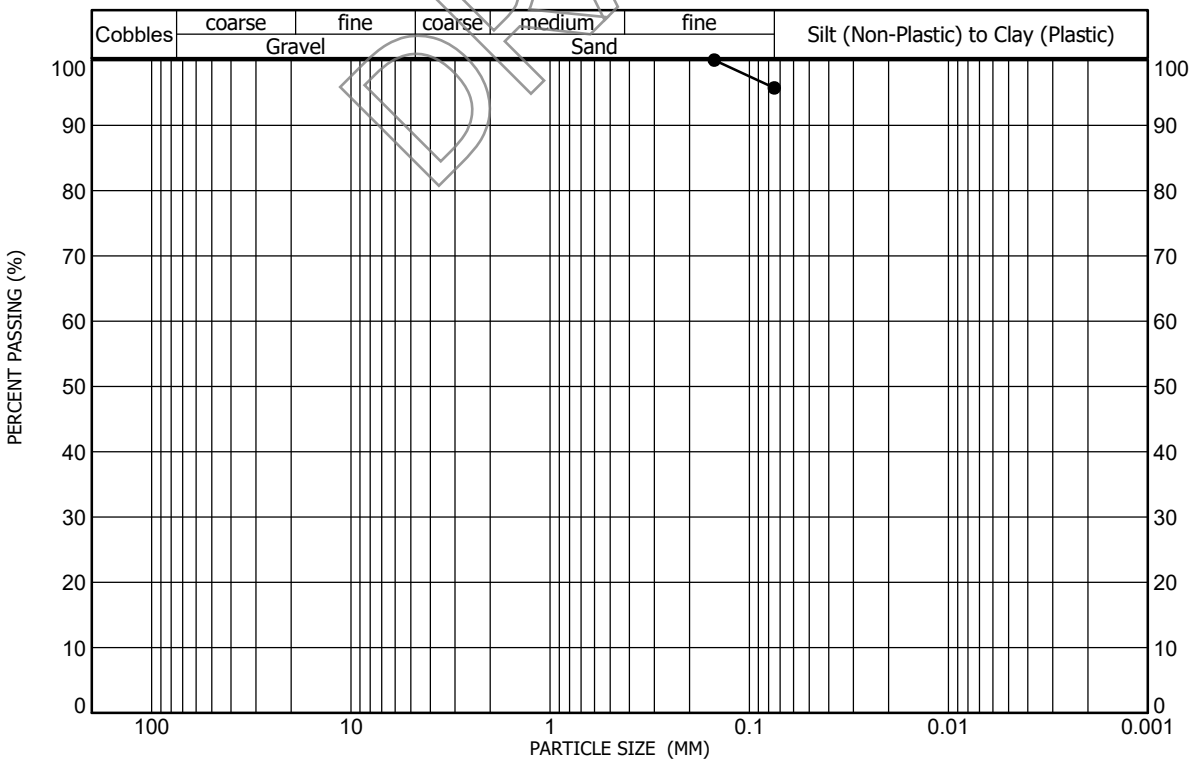
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 64 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(53), FAT CLAY(CH)

Gravel (%): 0 Liquid Limit: 74
Sand (%): 5 Plasticity Index: 48
Clay/Silt (%): 95

DRAFT



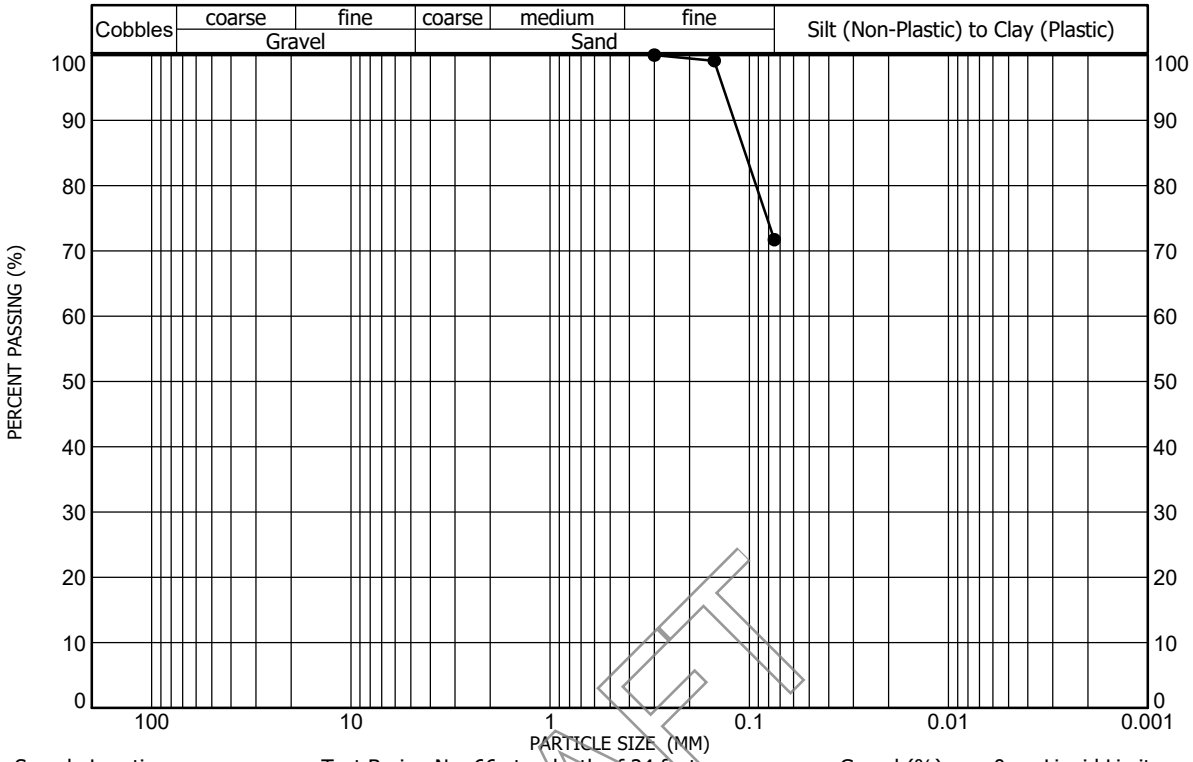
Sample Location: Test Boring No. 66 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-6(16), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 38
Sand (%): 4 Plasticity Index: 16
Clay/Silt (%): 96

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-201

PROJECT NO. 223122

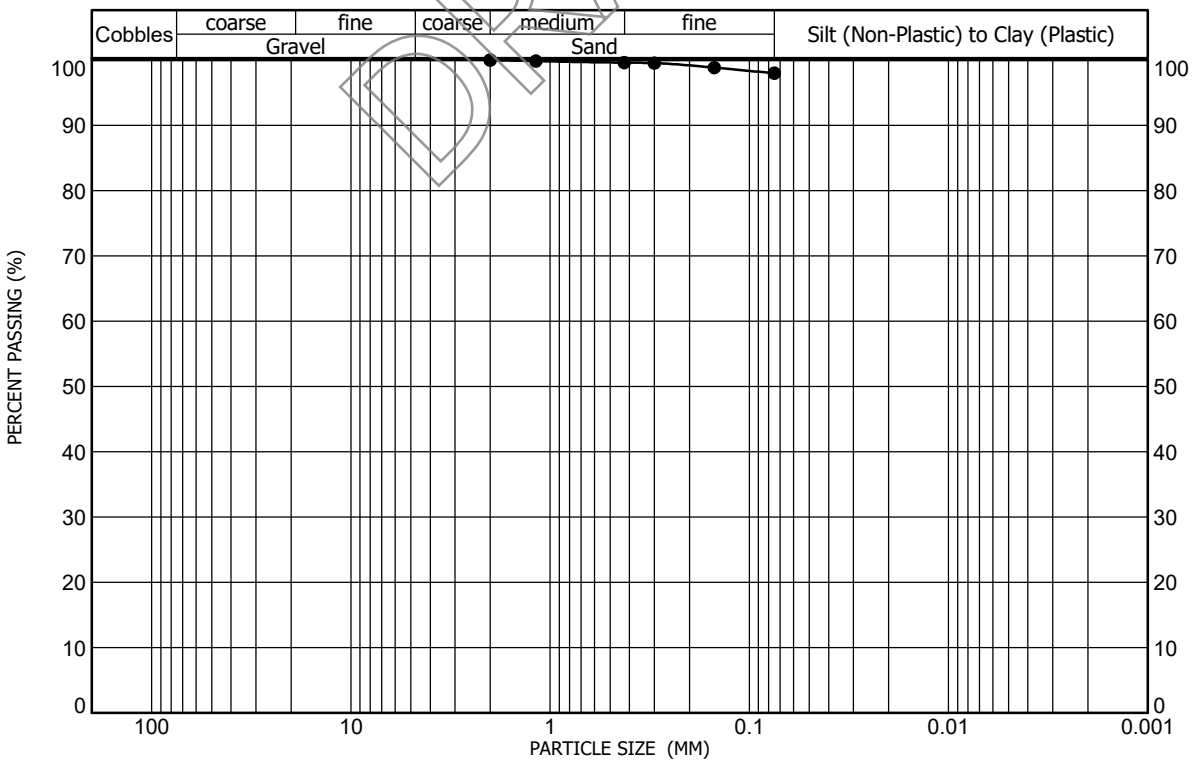
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 66 at a depth of 24 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-4(3), SILTY CLAY with SAND(CL-ML)

Gravel (%): 0 Liquid Limit: 25
Sand (%): 28 Plasticity Index: 7
Clay/Silt (%): 72

DRAFT



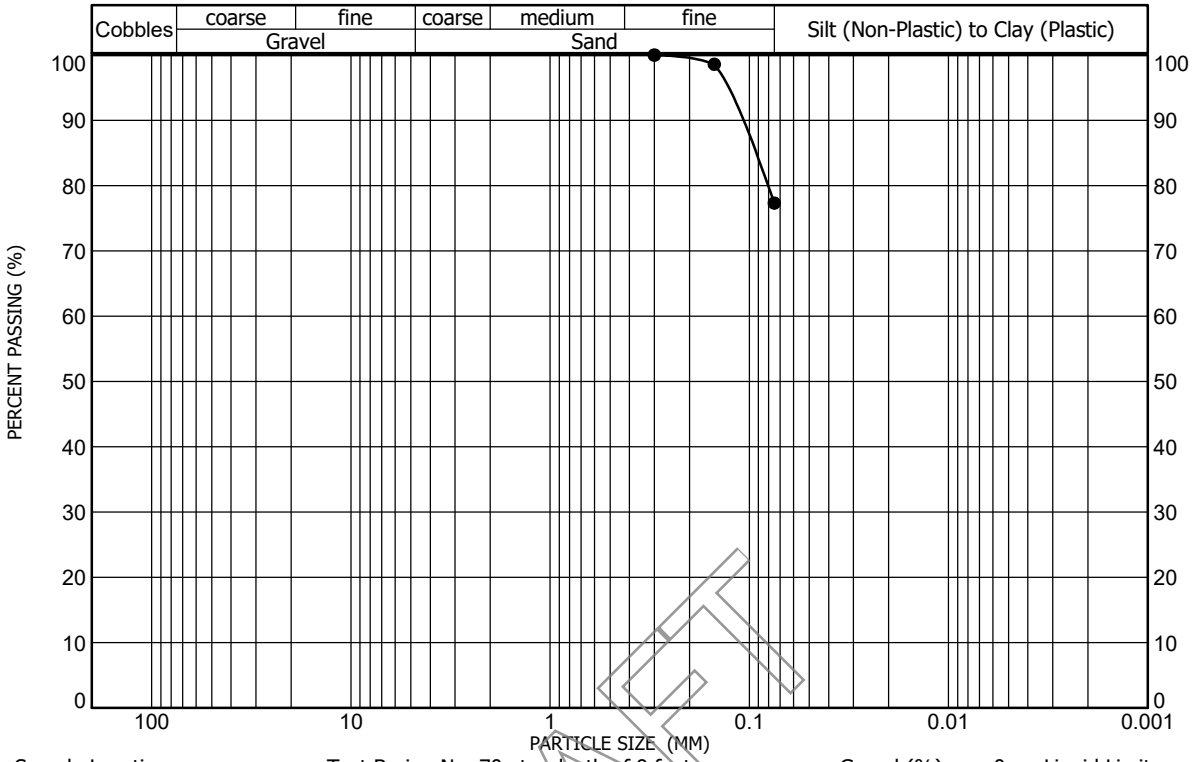
Sample Location: Test Boring No. 69 at a depth of 9 feet
Sample Description: Clay, trace sand
Classification: A-7-6(37), FAT CLAY(CH)

Gravel (%): 0 Liquid Limit: 56
Sand (%): 2 Plasticity Index: 33
Clay/Silt (%): 98

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-202

PROJECT NO. 223122

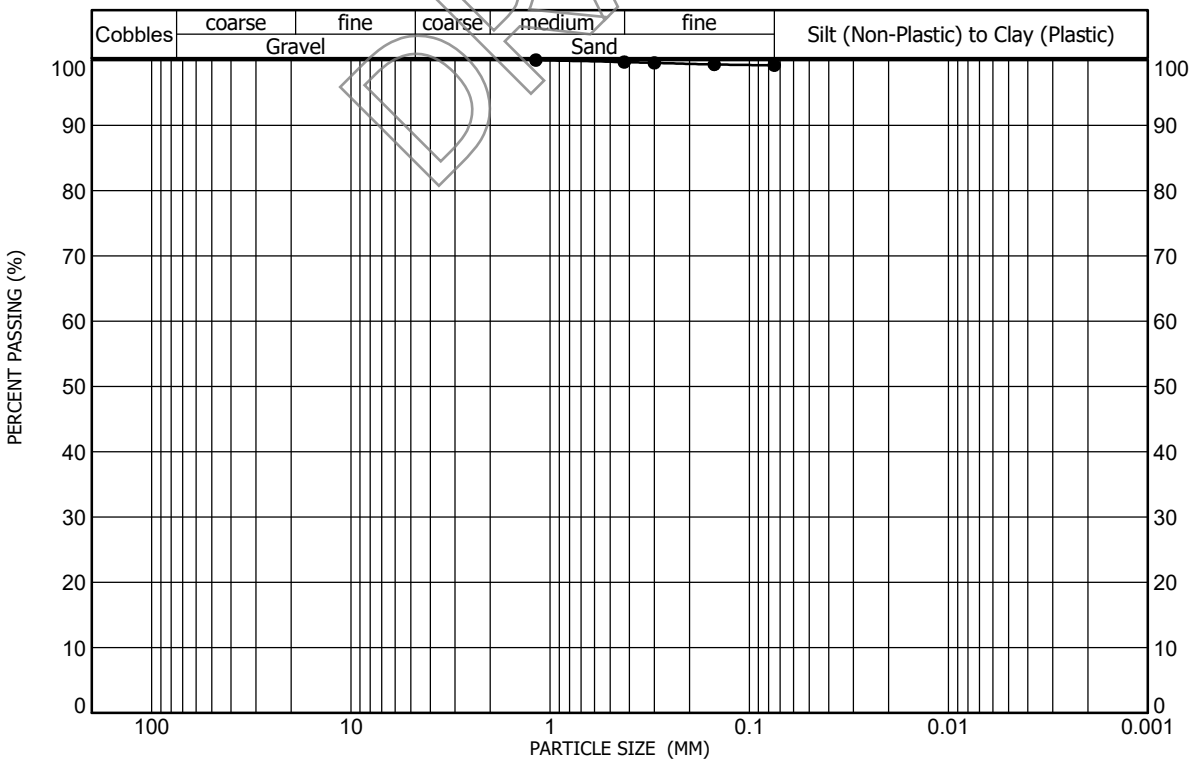
AGW
A.G. WASSENAAR, INC.



Sample Location Test Boring No. 70 at a depth of 9 feet
Sample Description Claystone, sandy
Classification A-6(11), LEAN CLAY with SAND(CL)

Gravel (%) 0 Liquid Limit 34
Sand (%) 23 Plasticity Index 17
Clay/Silt (%) 77

DRAFT



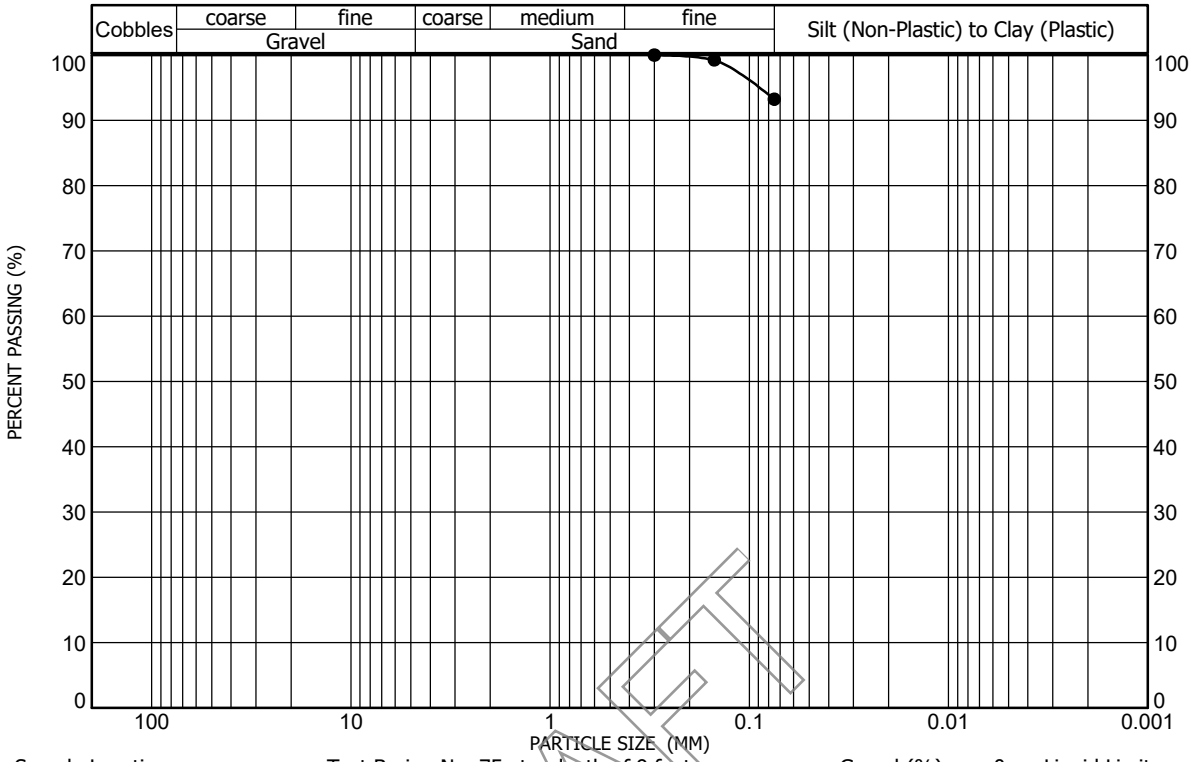
Sample Location Test Boring No. 72 at a depth of 19 feet
Sample Description Claystone, trace sand
Classification A-7-6(45), FAT CLAY(CH)

Gravel (%) 0 Liquid Limit 64
Sand (%) 1 Plasticity Index 39
Clay/Silt (%) 99

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-203

PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.

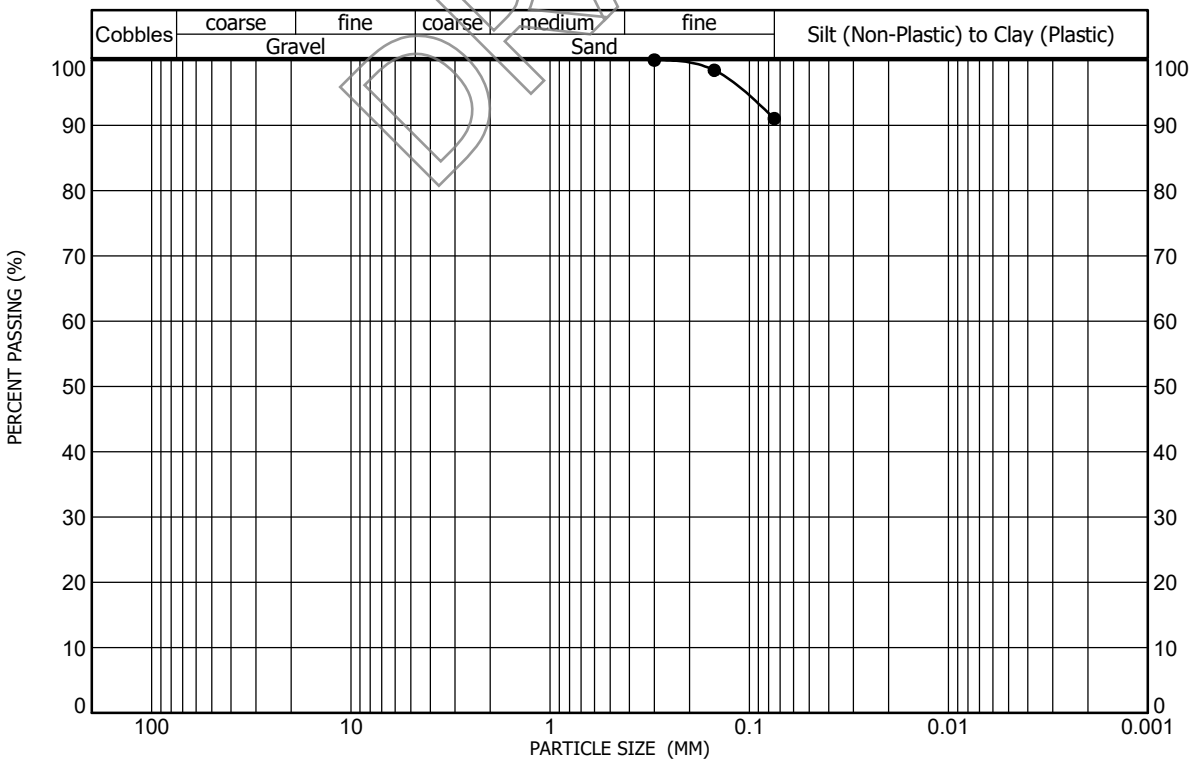


Sample Location: Test Boring No. 75 at a depth of 9 feet
Sample Description: Claystone, slightly sandy (lens)
Classification: A-6(14), LEAN CLAY(CL)

Gravel (%): 0
Sand (%): 7
Clay/Silt (%): 93

Liquid Limit: 32
Plasticity Index: 16

DRAFT



Sample Location: Test Boring No. 76 at a depth of 34 feet
Sample Description: Claystone, slightly sandy
Classification: A-4(7), LEAN CLAY(CL)

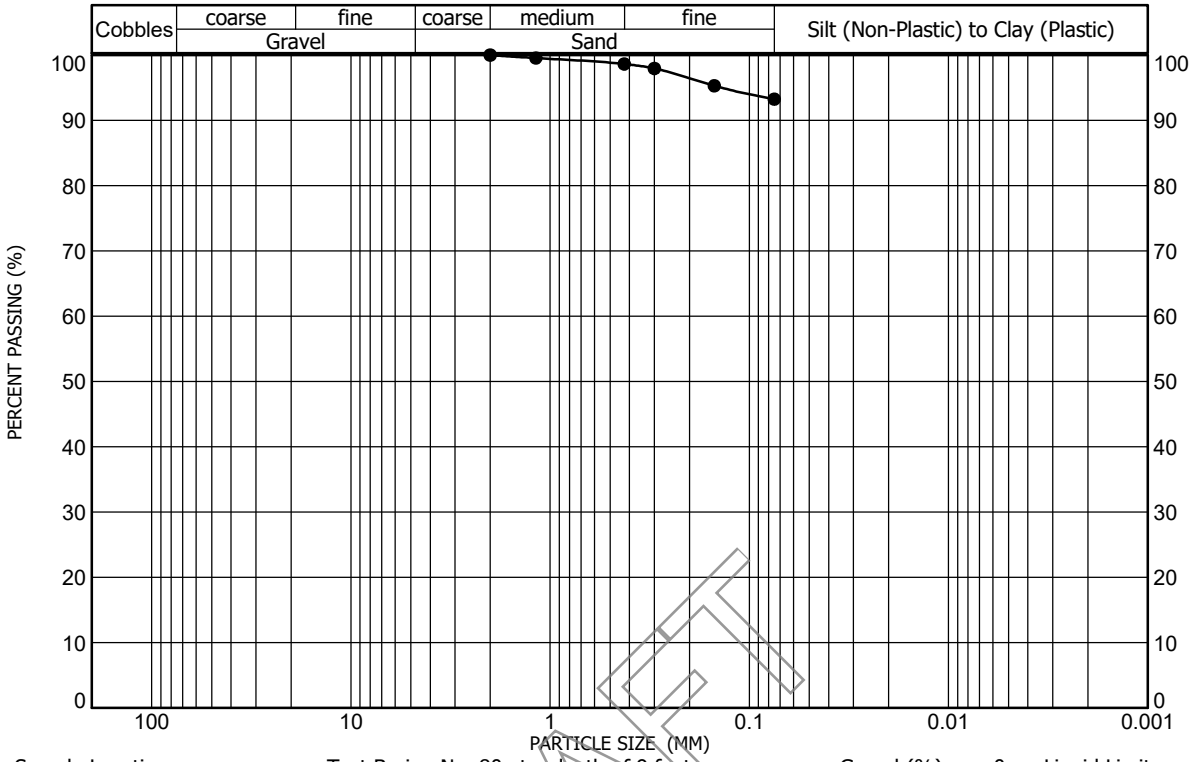
Gravel (%): 0
Sand (%): 9
Clay/Silt (%): 91

Liquid Limit: 27
Plasticity Index: 9

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-204

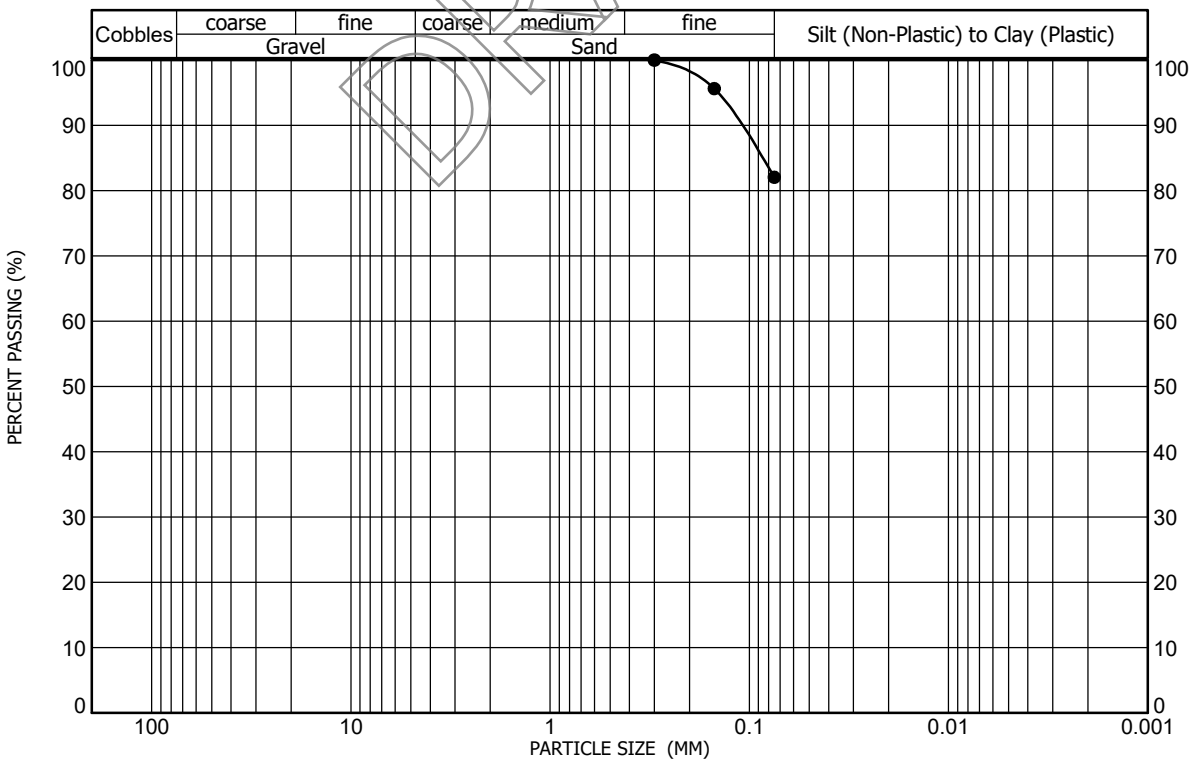
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 80 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(35), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 7
Clay/Silt (%): 93
Liquid Limit: 55
Plasticity Index: 34

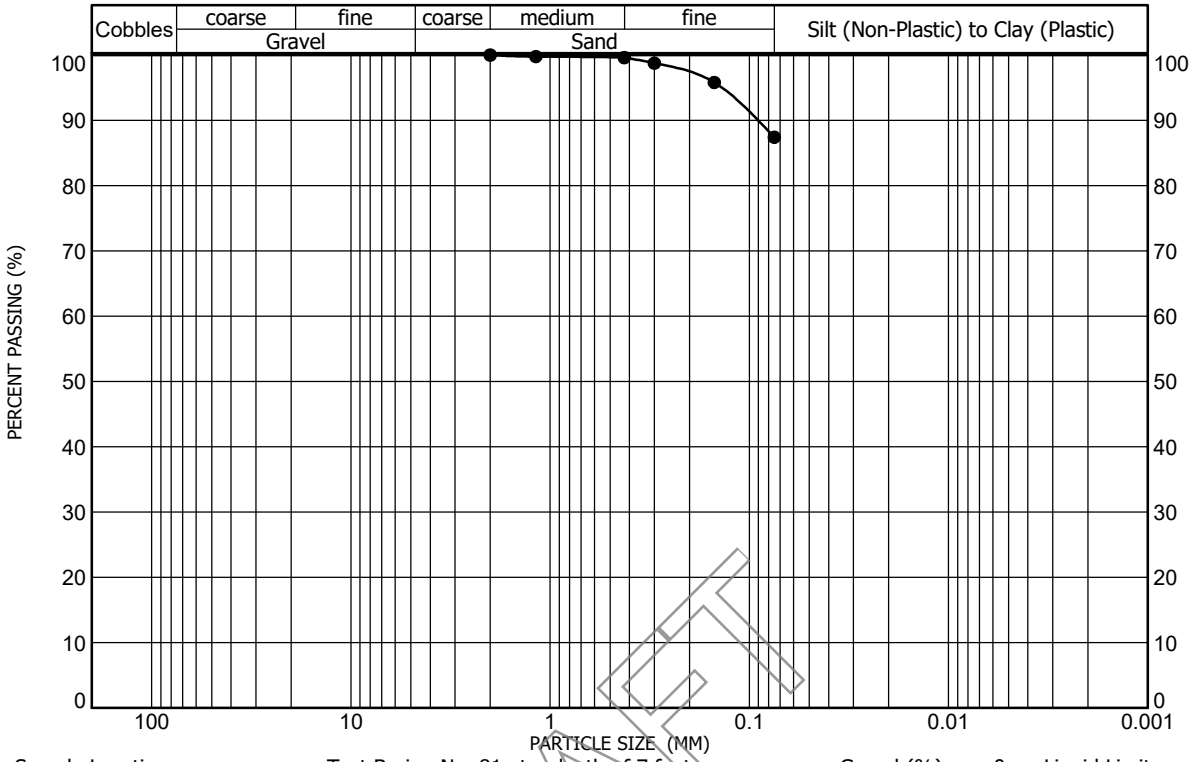
DRAFT



Sample Location: Test Boring No. 81 at a depth of 2 feet
Sample Description: Clay, sandy
Classification: A-6(17), LEAN CLAY with SAND(CL)
Gravel (%): 0
Sand (%): 18
Clay/Silt (%): 82
Liquid Limit: 38
Plasticity Index: 22

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-205
PROJECT NO. 223122

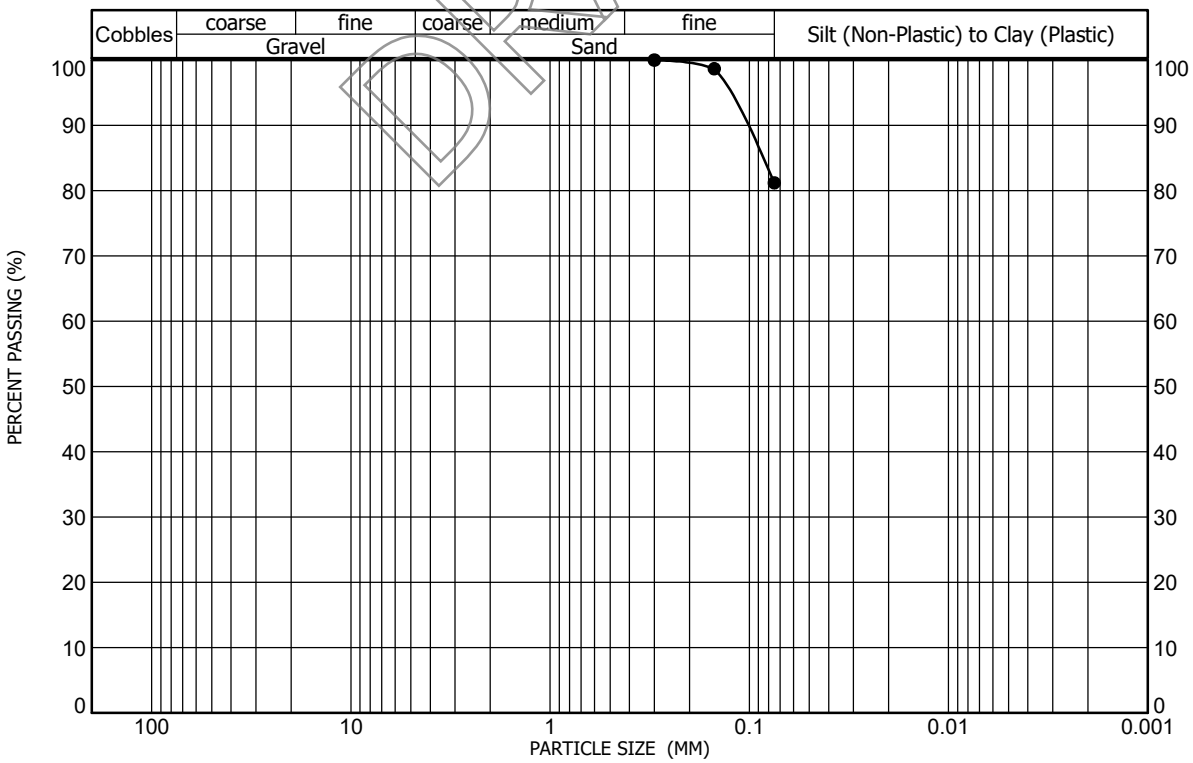
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 81 at a depth of 7 feet
Sample Description: Clay (Weathered Claystone), slightly sandy
Classification: A-6(21), LEAN CLAY(CL)

Gravel (%): 0 | Sand (%): 13 | Clay/Silt (%): 87
Liquid Limit: 40 | Plasticity Index: 25

DRAFT



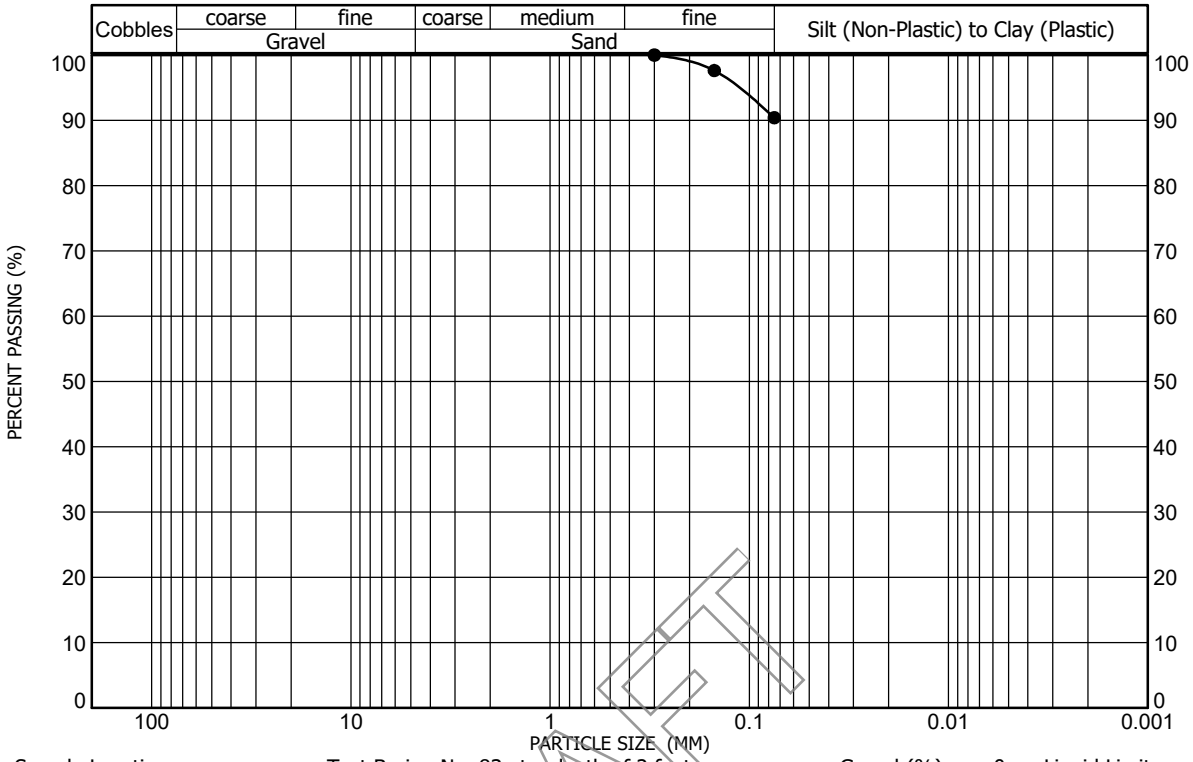
Sample Location: Test Boring No. 81 at a depth of 14 feet
Sample Description: Claystone, sandy (lens)
Classification: A-6(13), LEAN CLAY with SAND(CL)

Gravel (%): 0 | Sand (%): 19 | Clay/Silt (%): 81
Liquid Limit: 33 | Plasticity Index: 18

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-206

PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.

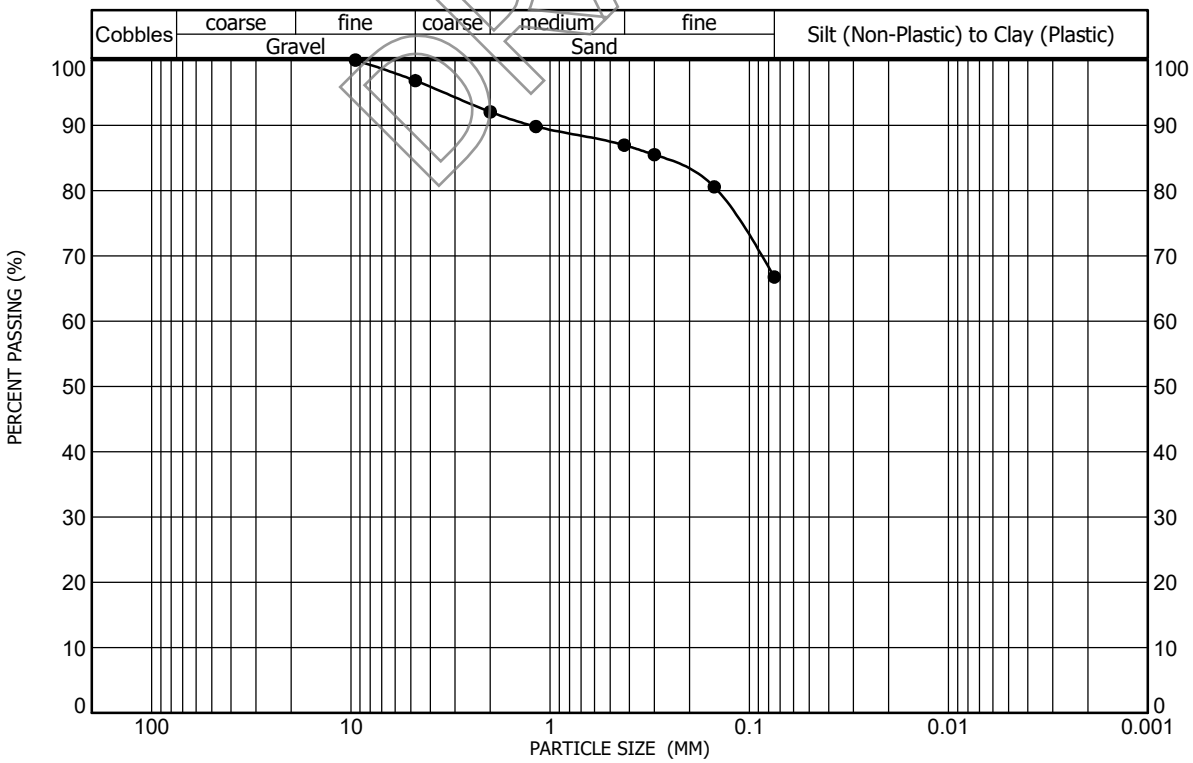


Sample Location: Test Boring No. 83 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(25), LEAN CLAY(CL)

Gravel (%): 0
Sand (%): 10
Clay/Silt (%): 90

Liquid Limit: 44
Plasticity Index: 27

DRAFT



Sample Location: Test Boring No. 83 at a depth of 14 feet
Sample Description: Clay, sandy, trace gravel
Classification: A-6(10), SANDY LEAN CLAY(CL)

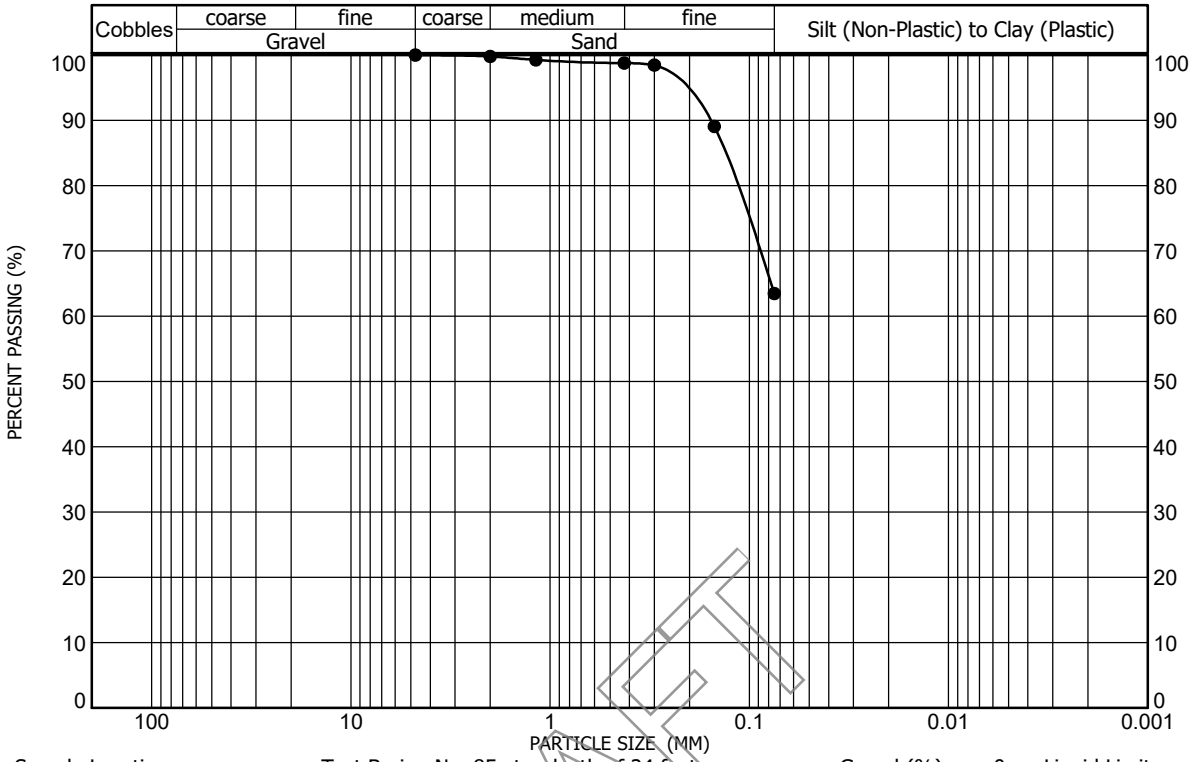
Gravel (%): 3
Sand (%): 30
Clay/Silt (%): 67

Liquid Limit: 33
Plasticity Index: 20

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-207

PROJECT NO. 223122

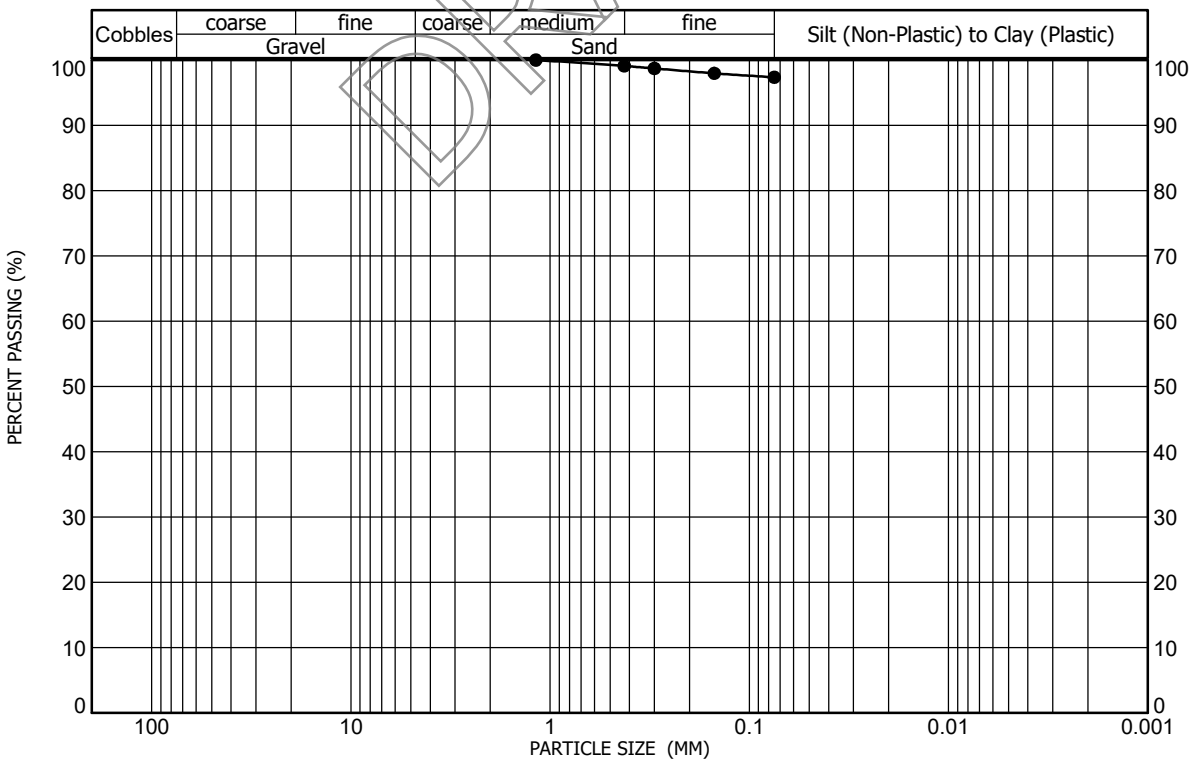
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 85 at a depth of 24 feet
Sample Description: Siltstone, clayey, very sandy
Classification: A-4(2), SANDY SILTY CLAY(CL-ML)

Gravel (%): 0 Liquid Limit: 26
Sand (%): 37 Plasticity Index: 7
Clay/Silt (%): 63

DRAFT



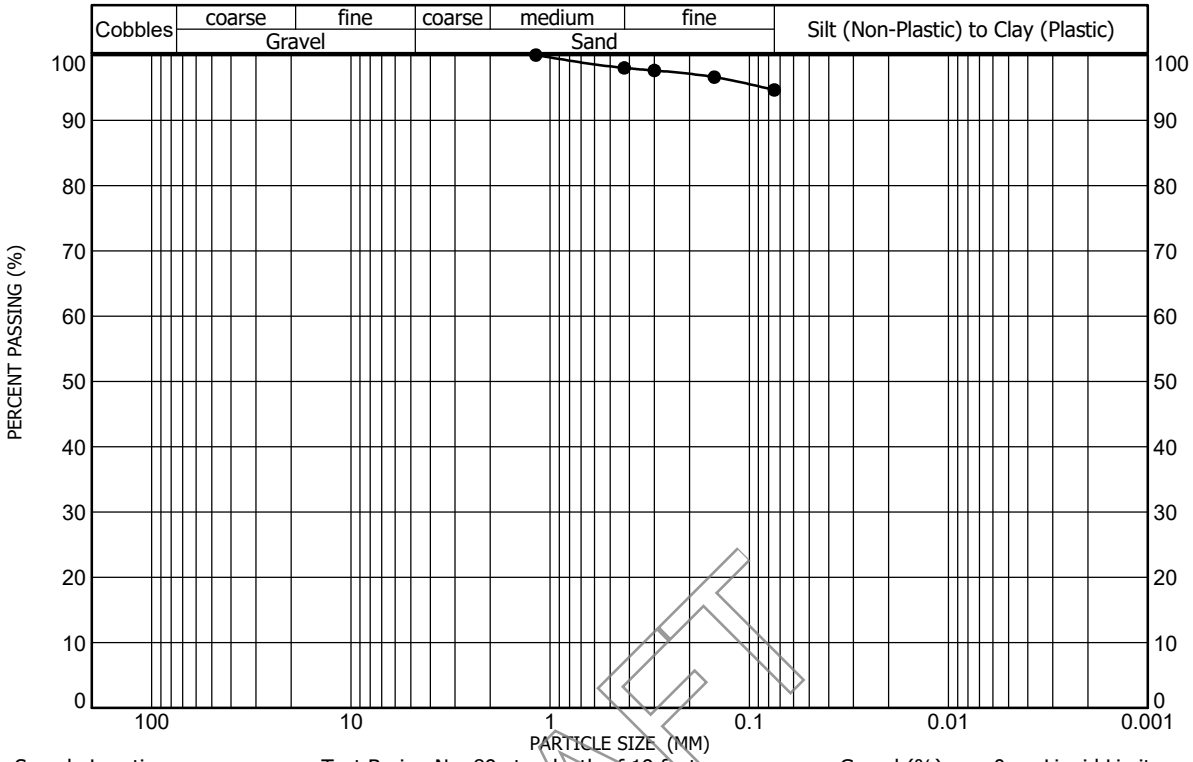
Sample Location: Test Boring No. 87 at a depth of 19 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(45), FAT CLAY(CH)

Gravel (%): 0 Liquid Limit: 62
Sand (%): 3 Plasticity Index: 41
Clay/Silt (%): 97

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-208

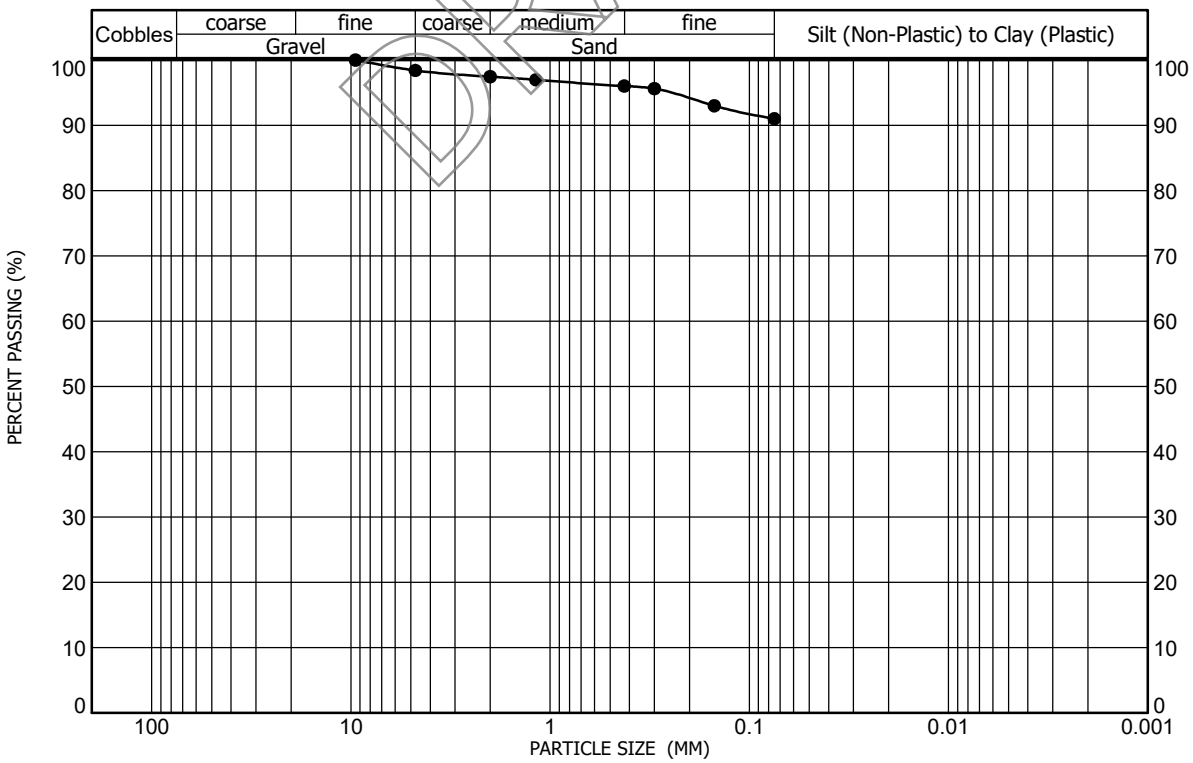
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 89 at a depth of 19 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(29), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 5
Clay/Silt (%): 95
Liquid Limit: 48
Plasticity Index: 28

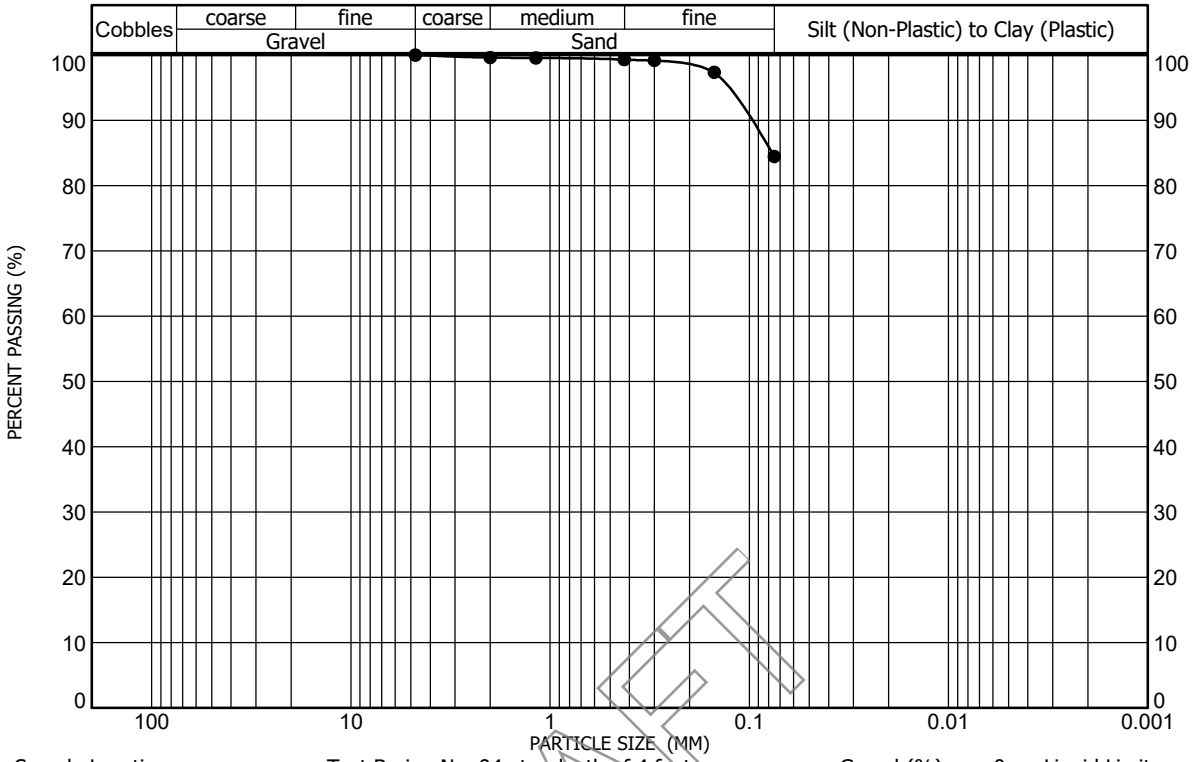
DRAFT



Sample Location: Test Boring No. 91 at a depth of 7 feet
Sample Description: Clay, slightly sandy, trace gravel
Classification: A-7-6(41), FAT CLAY(CH)
Gravel (%): 2
Sand (%): 7
Clay/Silt (%): 91
Liquid Limit: 62
Plasticity Index: 41

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-209
PROJECT NO. 223122

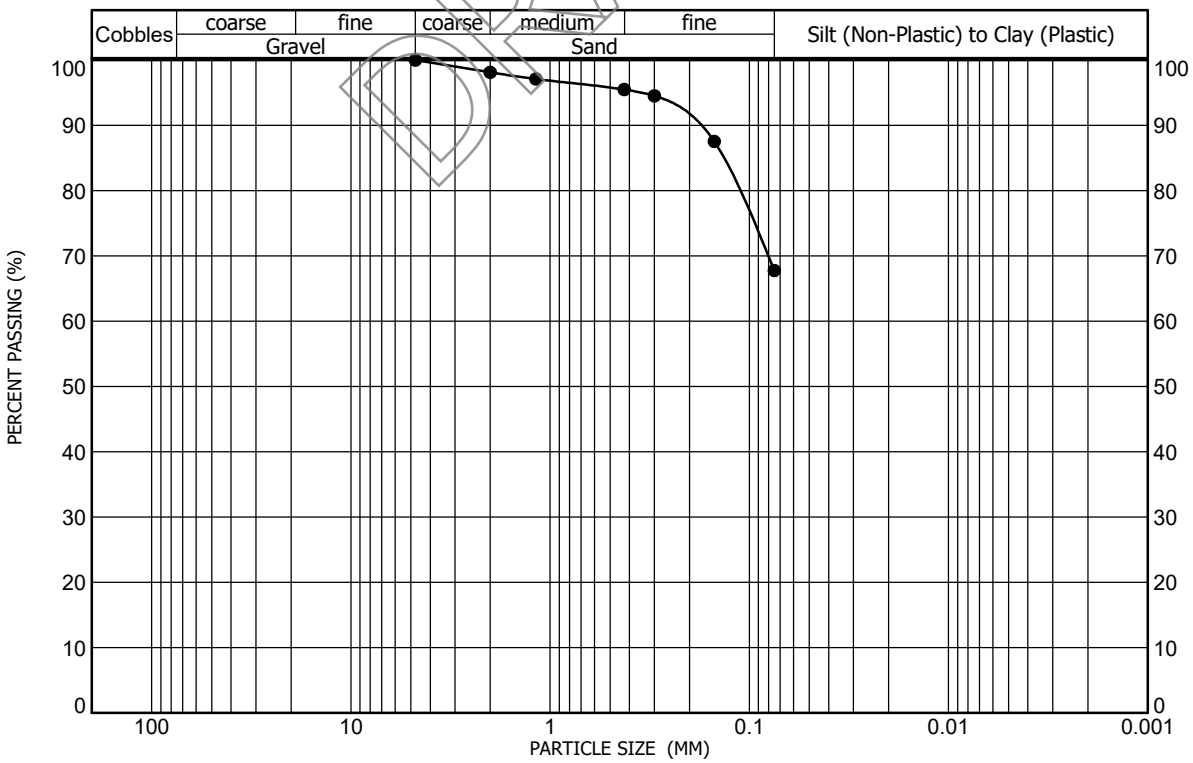
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 94 at a depth of 4 feet
Sample Description: Clay, sandy
Classification: A-6(11), LEAN CLAY with SAND(CL)

Gravel (%): 0 | Sand (%): 16 | Clay/Silt (%): 84
Liquid Limit: 32 | Plasticity Index: 14

DRAFT



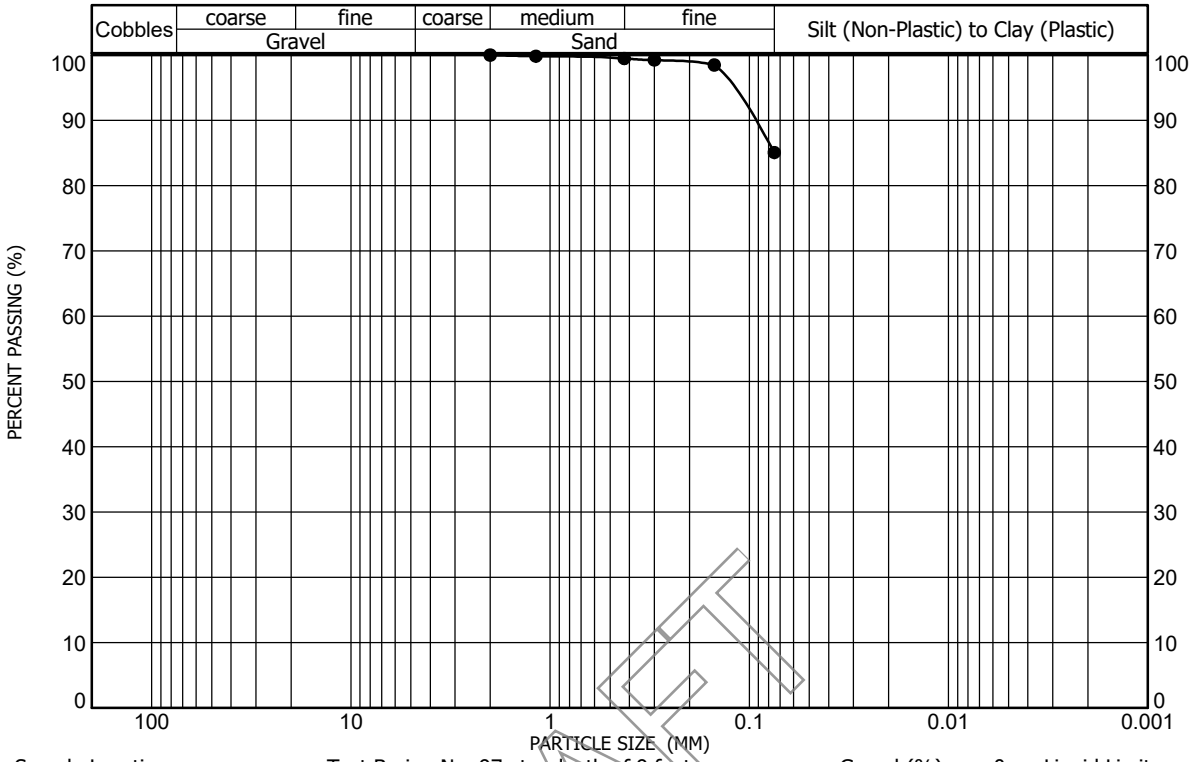
Sample Location: Test Boring No. 96 at a depth of 9 feet
Sample Description: silt, very sandy (lens)
Classification: A-6(9), SANDY SILT(ML)

Gravel (%): 0 | Sand (%): 32 | Clay/Silt (%): 68
Liquid Limit: 40 | Plasticity Index: 14

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-210

PROJECT NO. 223122

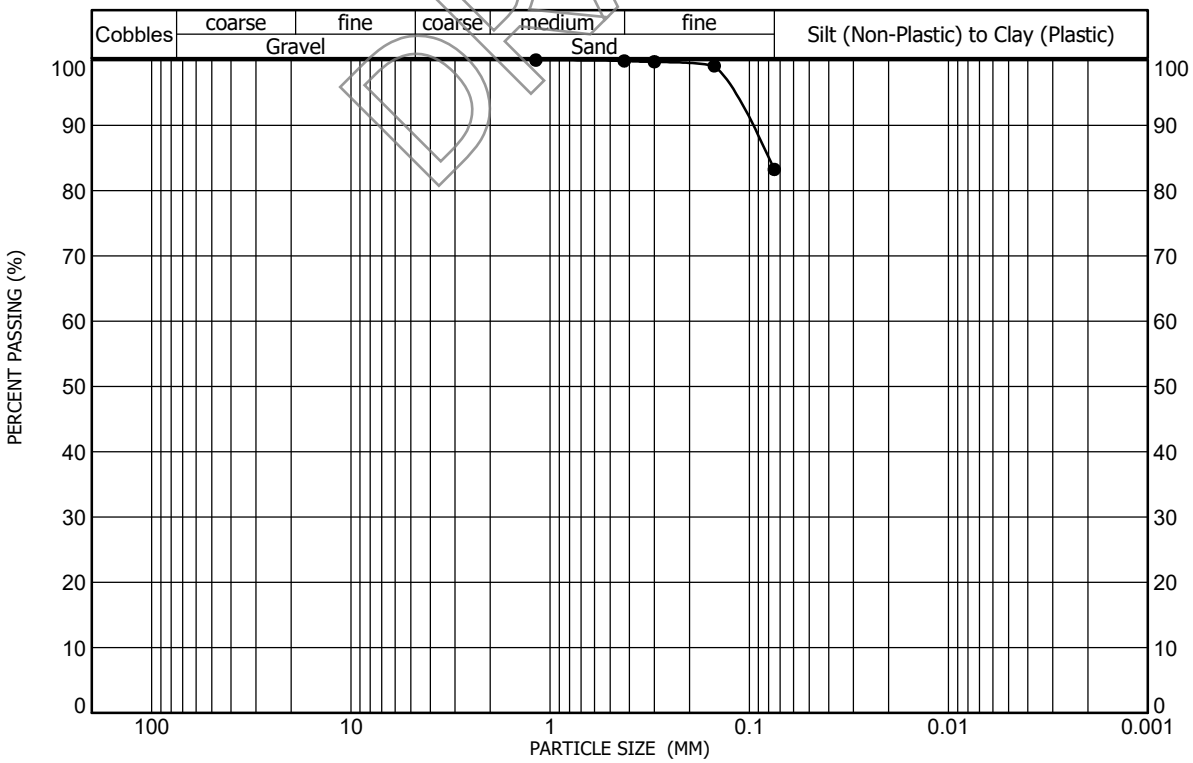
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 97 at a depth of 9 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-6(12), LEAN CLAY(CL)

Gravel (%): 0 | Sand (%): 15 | Clay/Silt (%): 85
Liquid Limit: 32 | Plasticity Index: 16

DRAFT



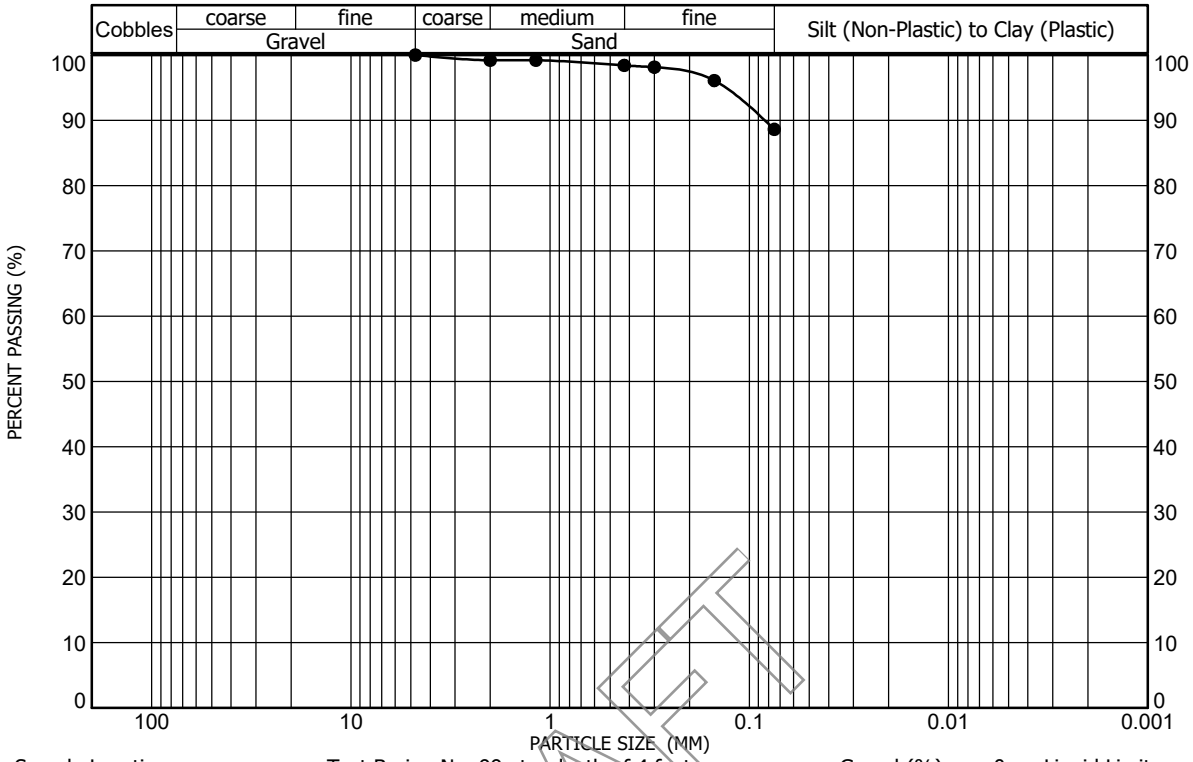
Sample Location: Test Boring No. 98 at a depth of 7 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-4(6), LEAN CLAY with SAND(CL)

Gravel (%): 0 | Sand (%): 17 | Clay/Silt (%): 83
Liquid Limit: 26 | Plasticity Index: 9

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-211

PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.

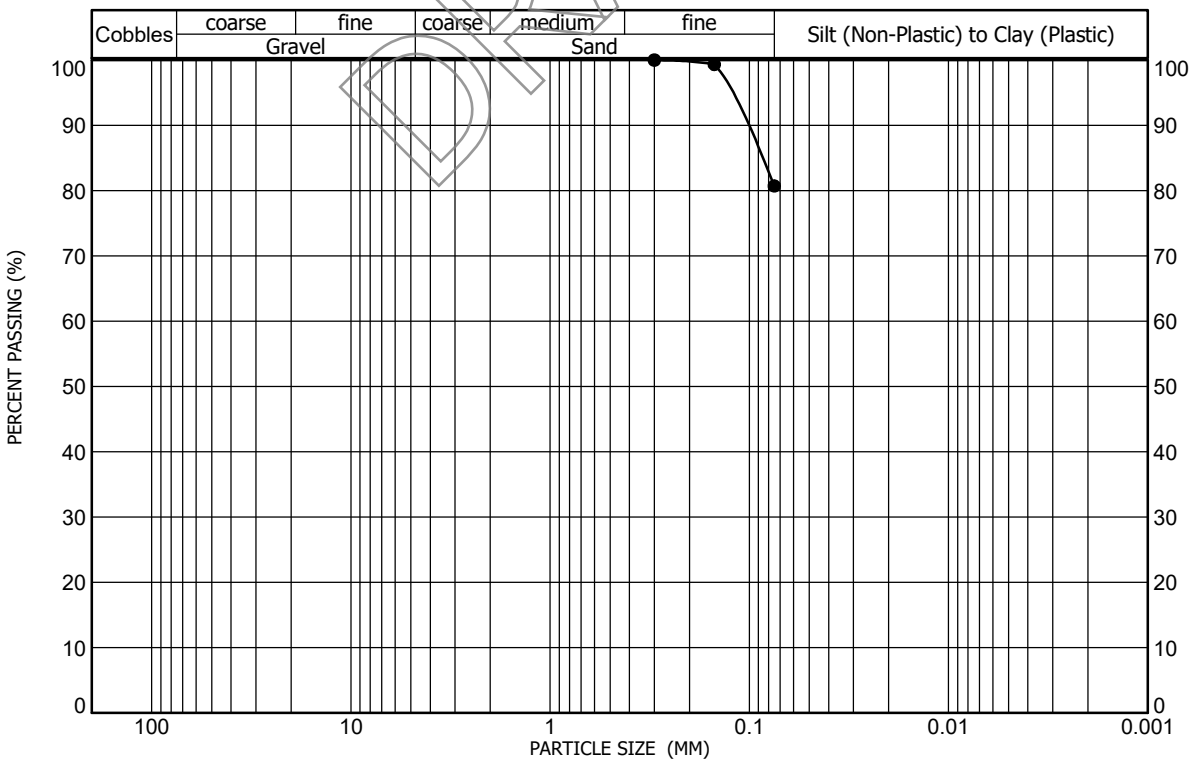


Sample Location: Test Boring No. 99 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(25), LEAN CLAY(CL)

Gravel (%): 0
Sand (%): 11
Clay/Silt (%): 89

Liquid Limit: 44
Plasticity Index: 28

DRAFT



Sample Location: Test Boring No. 102 at a depth of 4 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-4(3), SILTY CLAY with SAND(CL-ML)

Gravel (%): 0
Sand (%): 19
Clay/Silt (%): 81

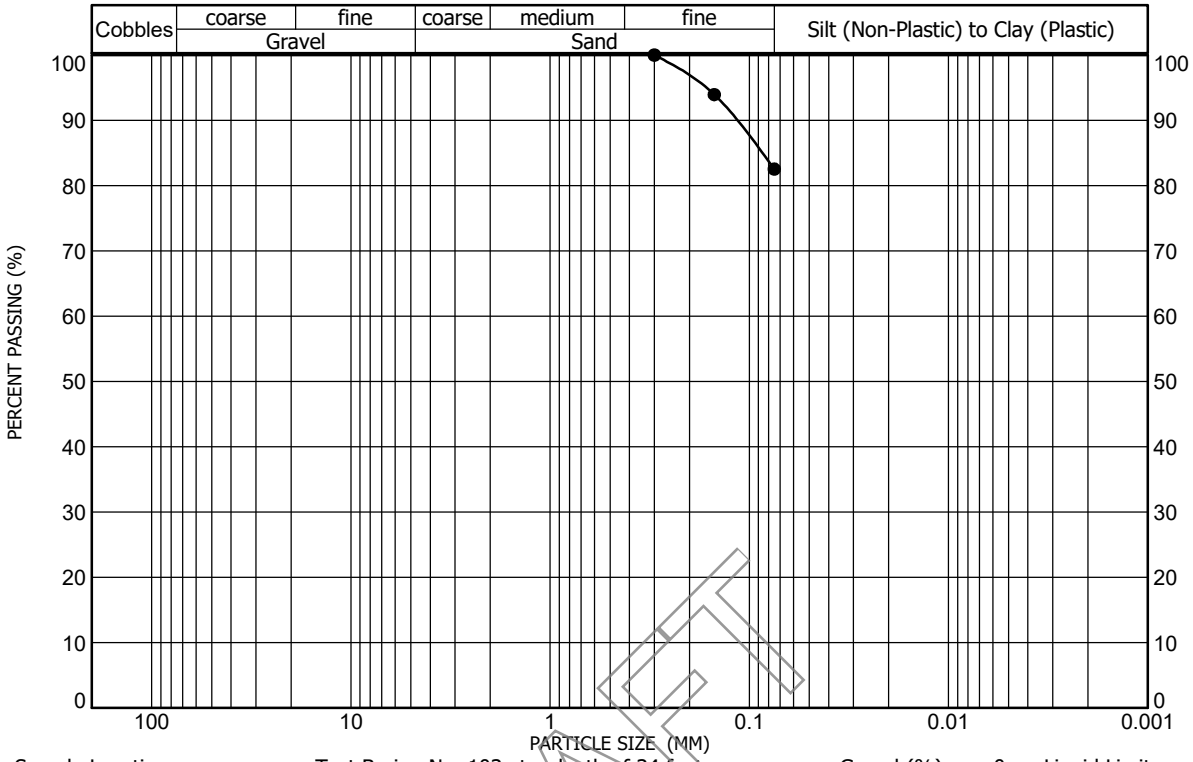
Liquid Limit: 25
Plasticity Index: 6

GRADATION AND ATTERBERG TEST RESULTS

FIGURE A-212

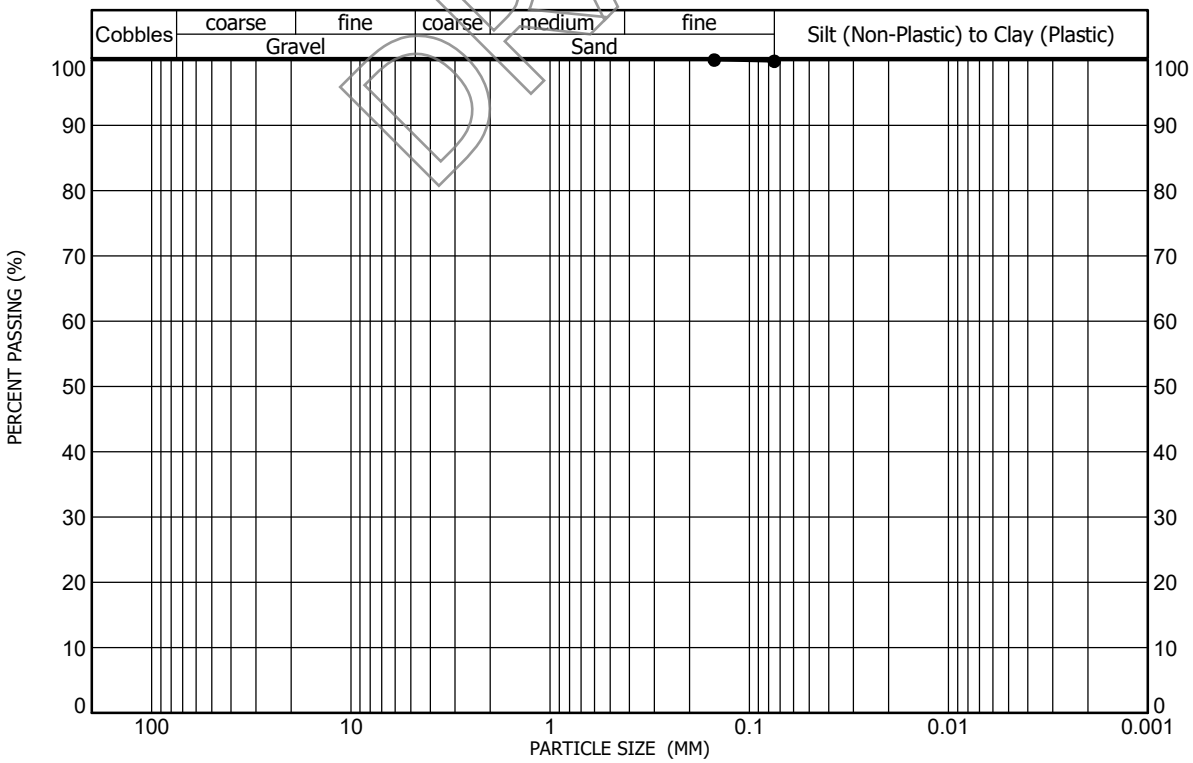
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 103 at a depth of 34 feet
Sample Description: Claystone, sandy
Classification: A-7-6(17), LEAN CLAY with SAND(CL)
Gravel (%): 0 Sand (%): 17 Clay/Silt (%): 83
Liquid Limit: 43 Plasticity Index: 20

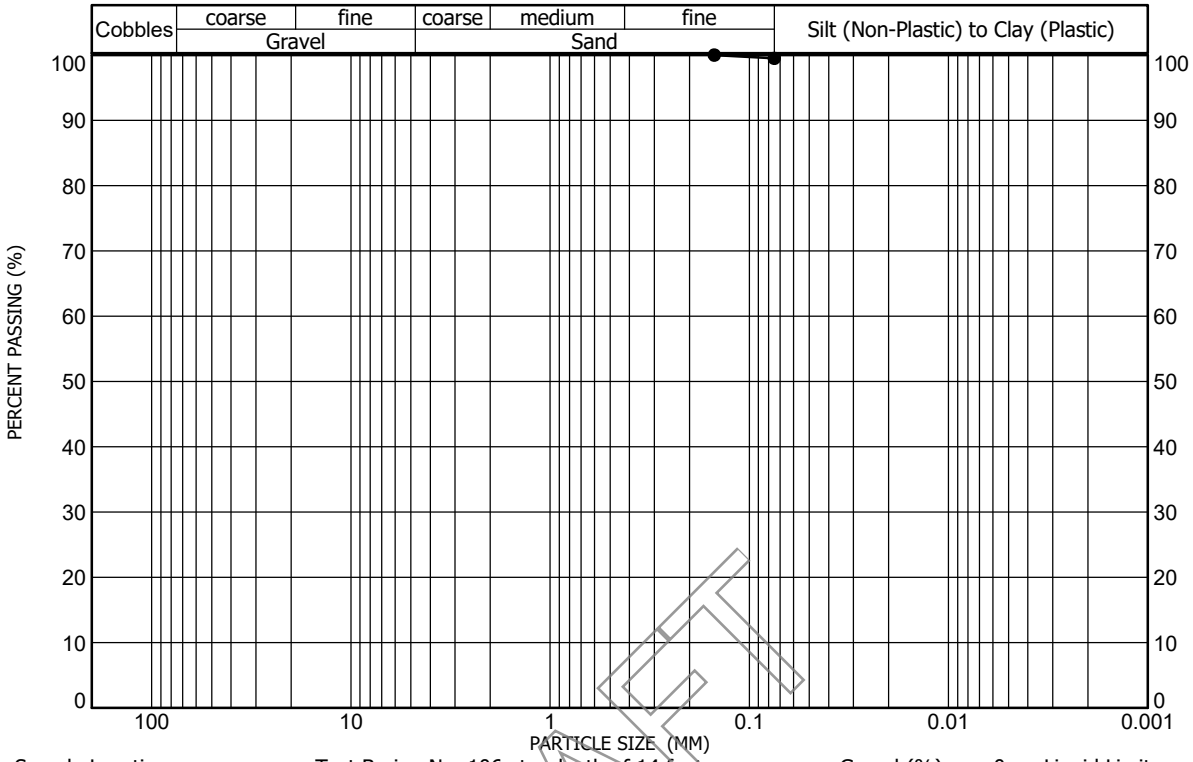
DRAFT



Sample Location: Test Boring No. 105 at a depth of 24 feet
Sample Description: Claystone, silty
Classification: A-7-6(28), LEAN CLAY(CL)
Gravel (%): 0 Sand (%): 0 Clay/Silt (%): 100
Liquid Limit: 47 Plasticity Index: 25

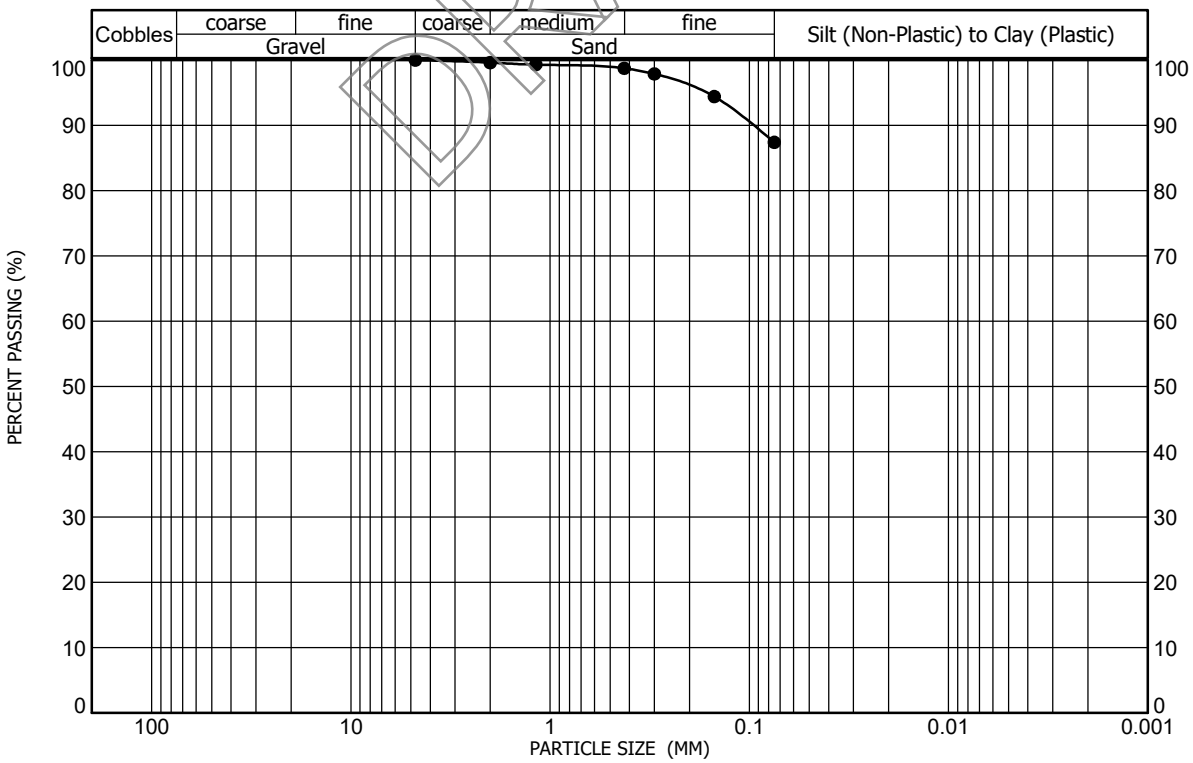
GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-213
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 106 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(47), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 1
Clay/Silt (%): 99
Liquid Limit: 63
Plasticity Index: 42

DRAFT

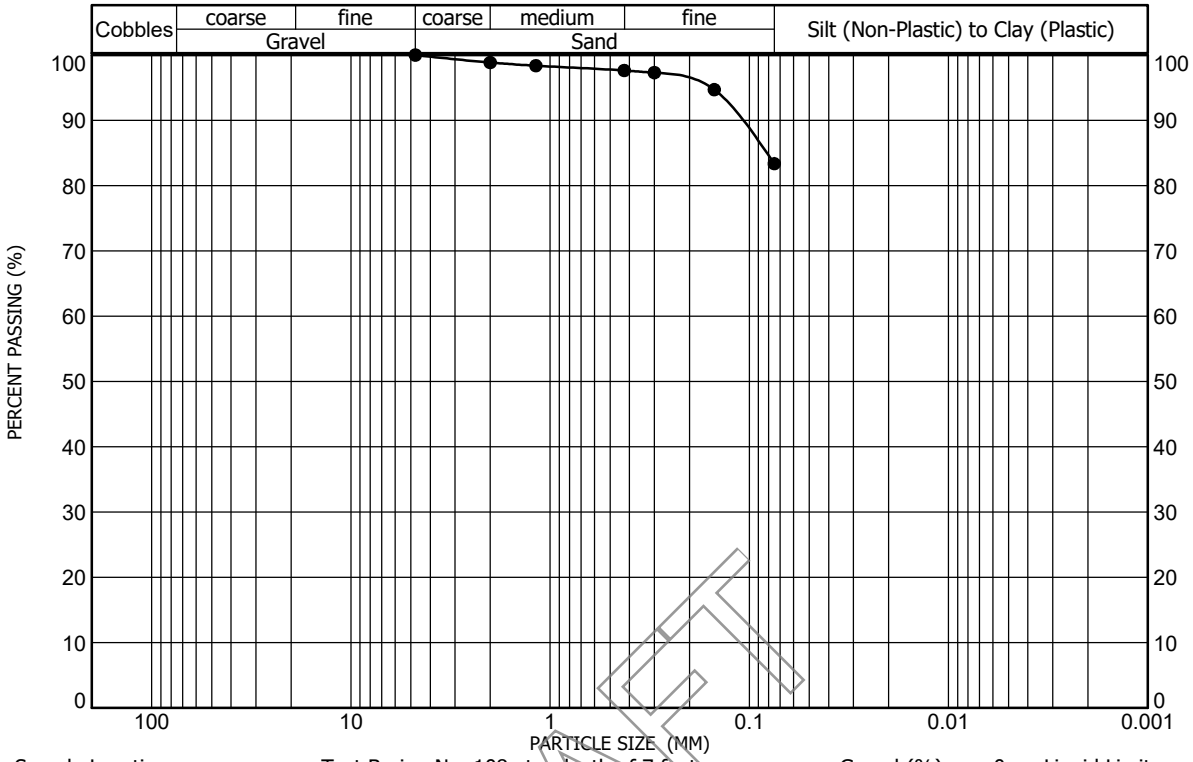


Sample Location: Test Boring No. 107 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(27), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 13
Clay/Silt (%): 87
Liquid Limit: 50
Plasticity Index: 30

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-214

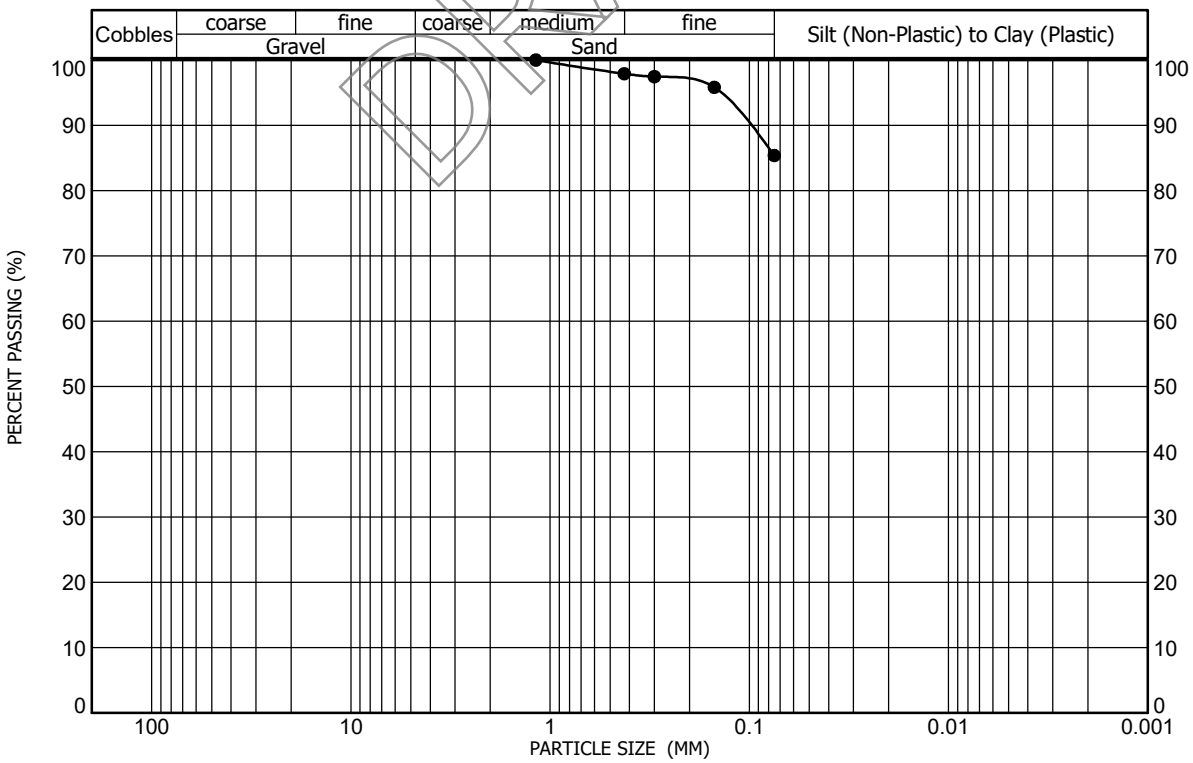
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 108 at a depth of 7 feet
Sample Description: Clay, sandy
Classification: A-7-6(26), LEAN CLAY with SAND(CL)
Gravel (%): 0
Sand (%): 17
Clay/Silt (%): 83
Liquid Limit: 49
Plasticity Index: 31

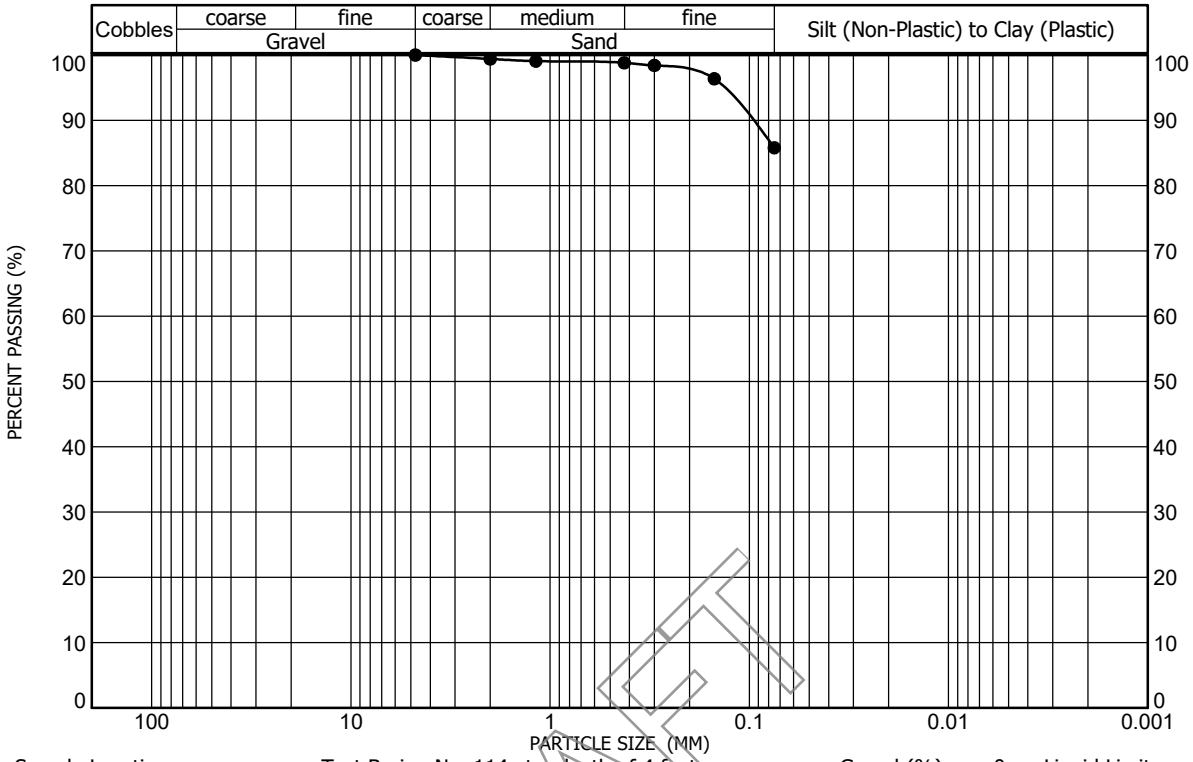
DRAFT



Sample Location: Test Boring No. 112 at a depth of 19 feet
Sample Description: Claystone, sandy
Classification: A-7-6(22), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 15
Clay/Silt (%): 85
Liquid Limit: 44
Plasticity Index: 26

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-215
PROJECT NO. 223122

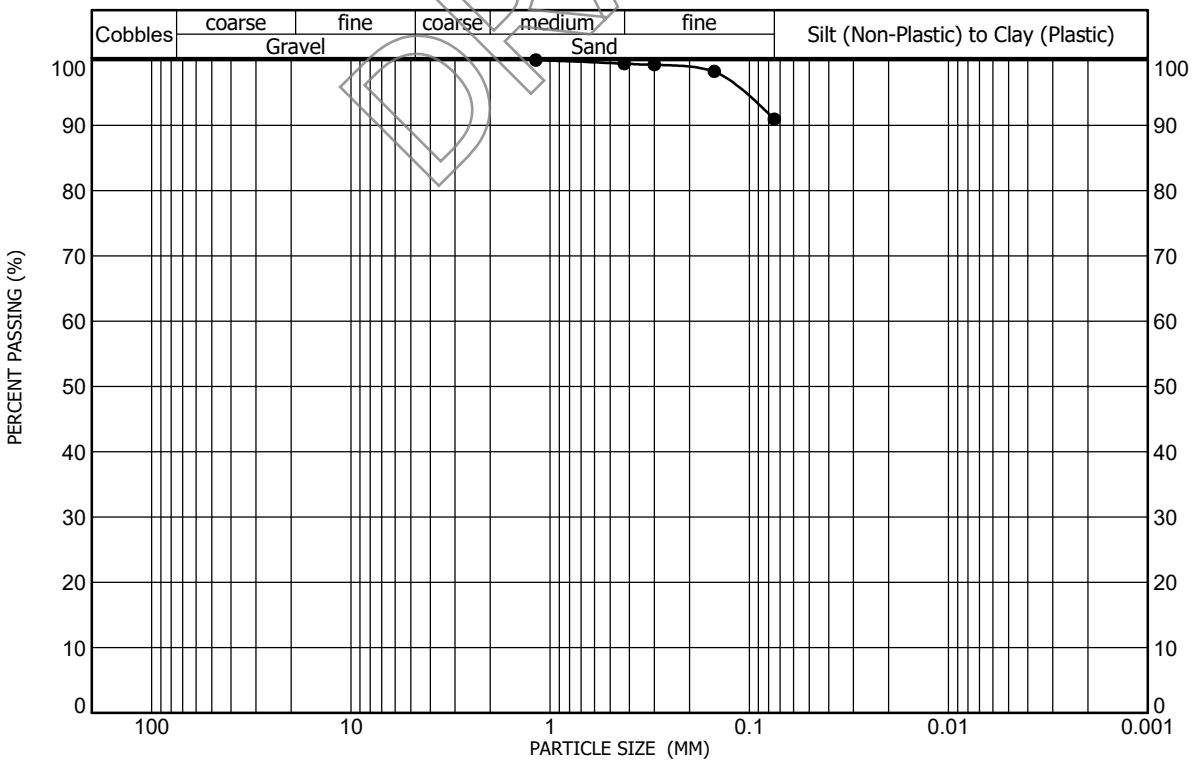
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 114 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Classification: A-6(19), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 40
Sand (%): 14 Plasticity Index: 23
Clay/Silt (%): 86

DRAFT



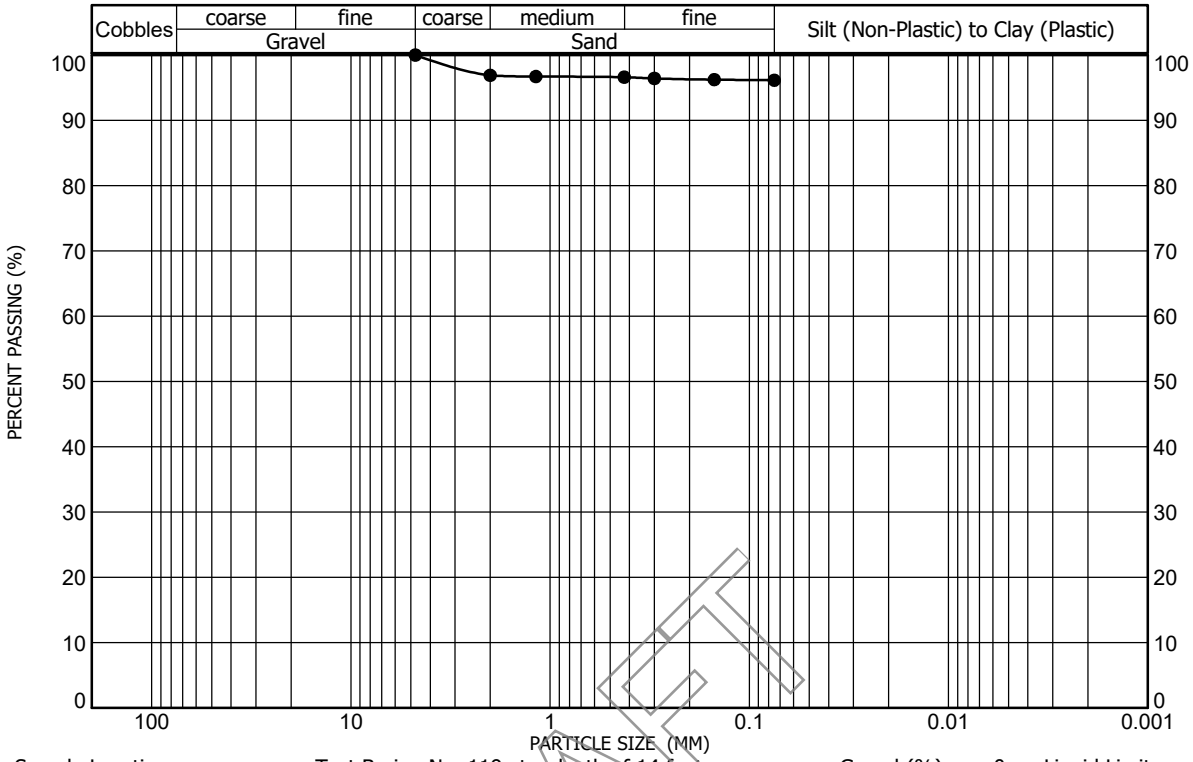
Sample Location: Test Boring No. 115 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Classification: A-6(21), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 38
Sand (%): 9 Plasticity Index: 23
Clay/Silt (%): 91

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-216

PROJECT NO. 223122

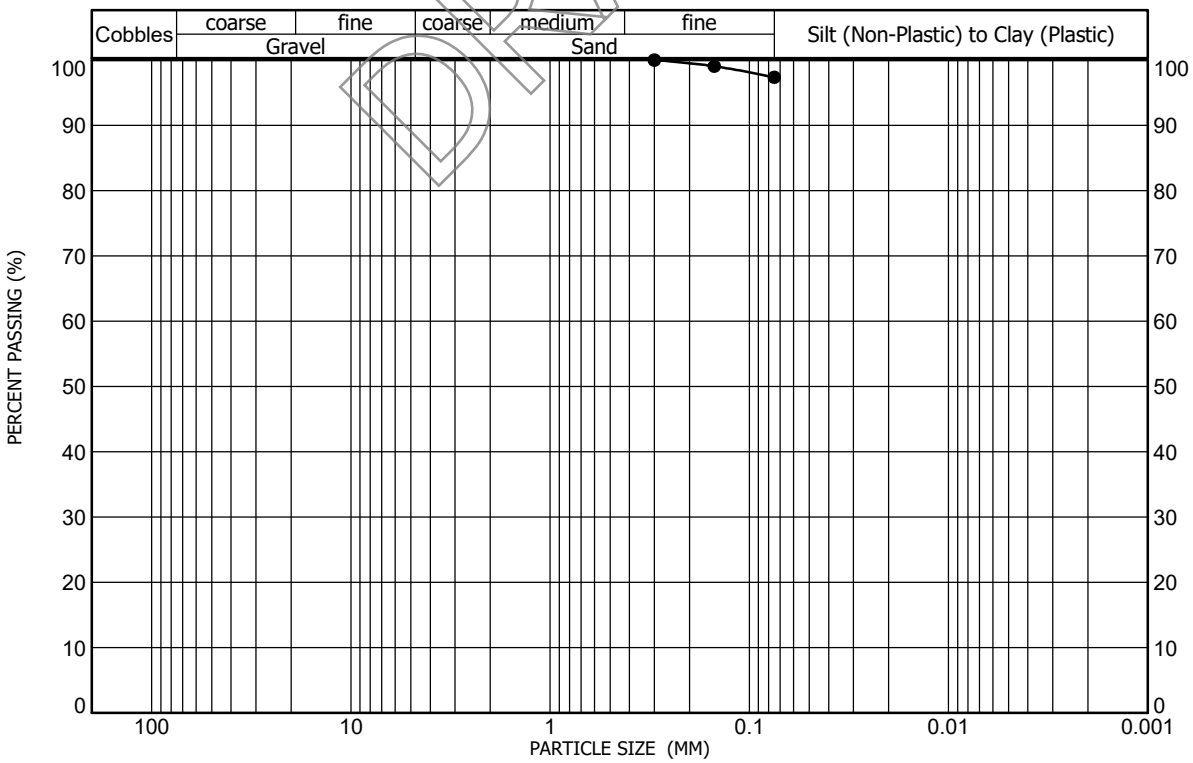
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 119 at a depth of 14 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(44), FAT CLAY(CH)

Gravel (%): 0 Liquid Limit: 61
Sand (%): 4 Plasticity Index: 41
Clay/Silt (%): 96

DRAFT



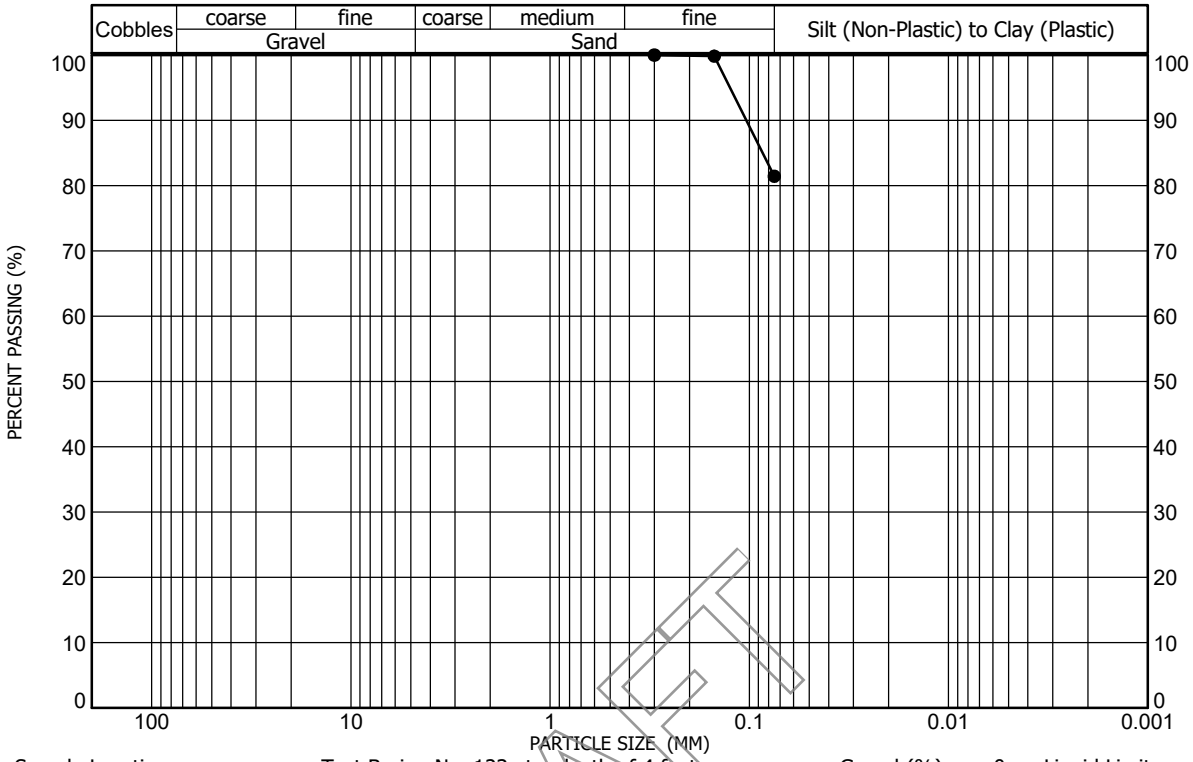
Sample Location: Test Boring No. 121 at a depth of 29 feet
Sample Description: Claystone, trace sand
Classification: A-7-6(39), FAT CLAY(CH)

Gravel (%): 0 Liquid Limit: 60
Sand (%): 3 Plasticity Index: 35
Clay/Silt (%): 97

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-217

PROJECT NO. 223122

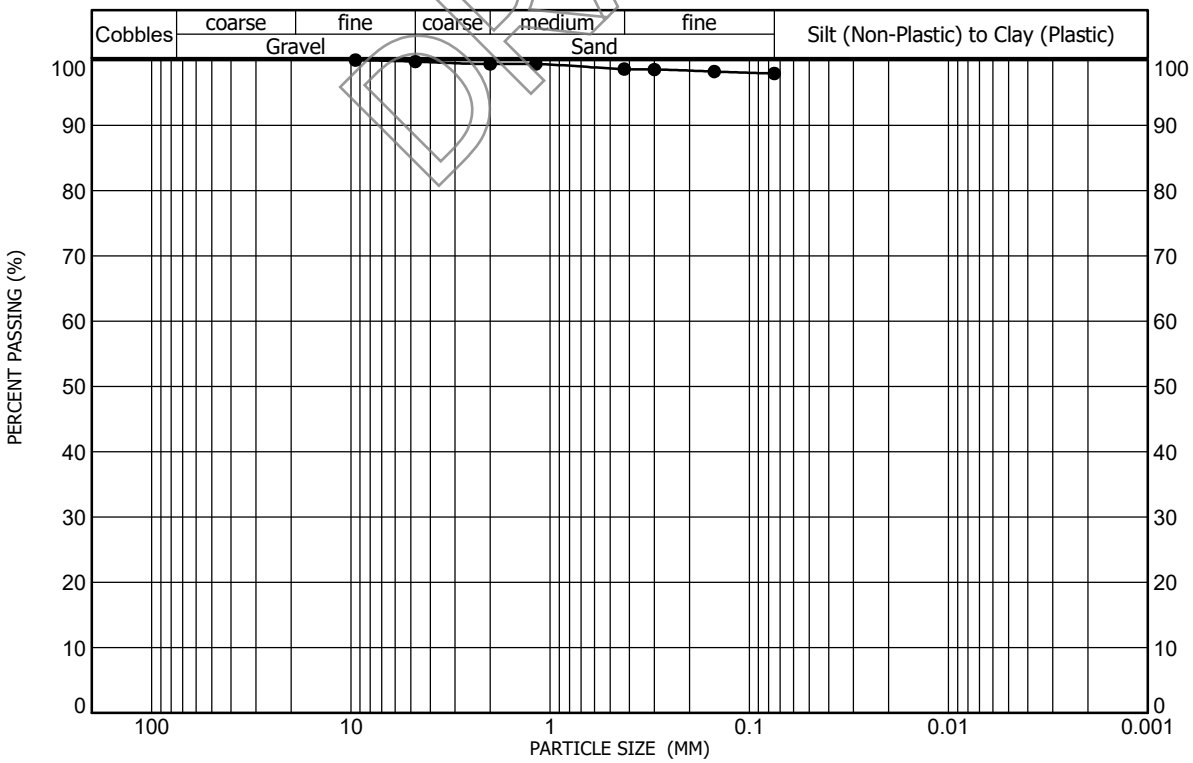
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 123 at a depth of 4 feet
Sample Description: Claystone, sandy
Classification: A-6(9), LEAN CLAY with SAND(CL)

Gravel (%): 0 Liquid Limit: 29
Sand (%): 19 Plasticity Index: 13
Clay/Silt (%): 81

DRAFT



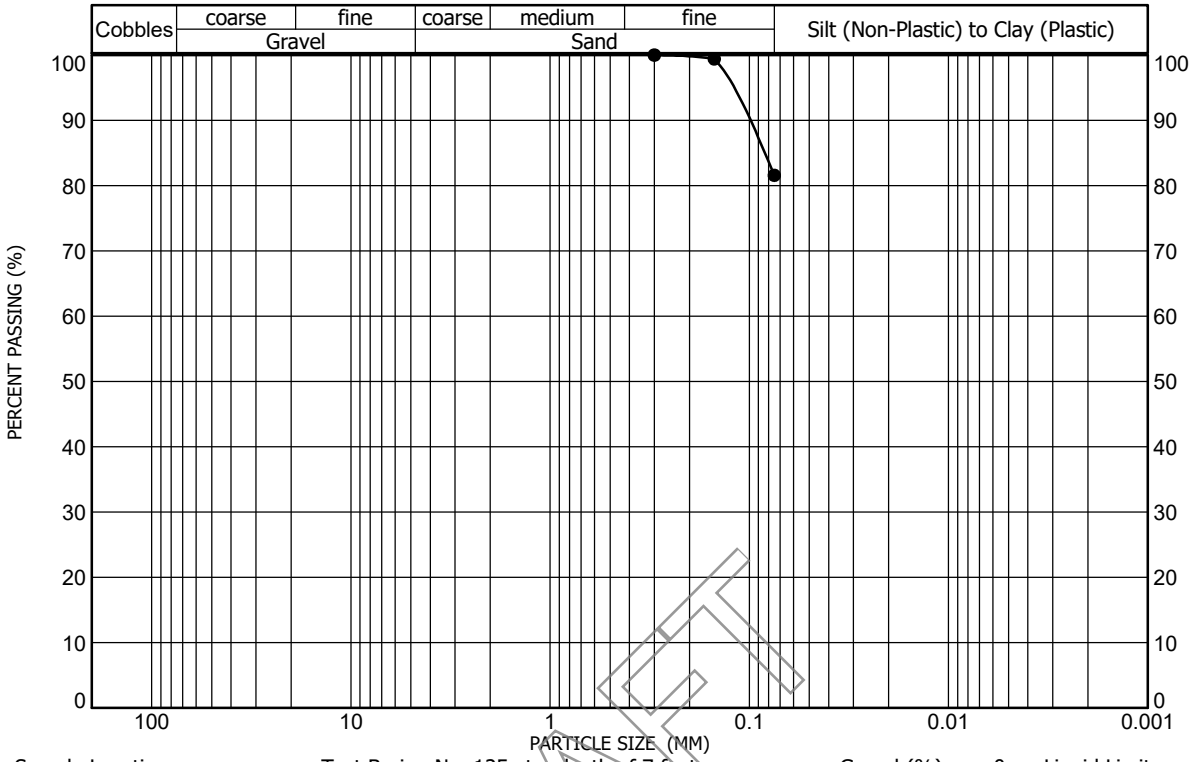
Sample Location: Test Boring No. 124 at a depth of 9 feet
Sample Description: Claystone, trace sand
Classification: A-6(13), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 32
Sand (%): 2 Plasticity Index: 14
Clay/Silt (%): 98

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-218

PROJECT NO. 223122

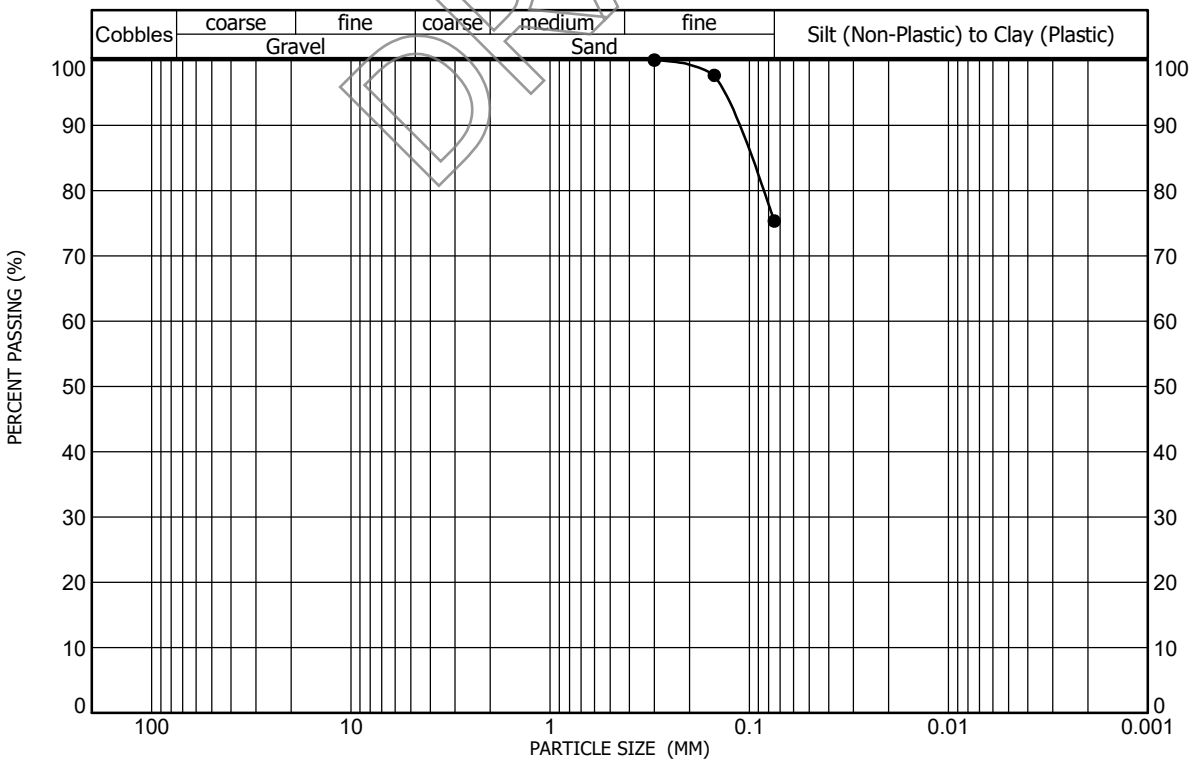
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 125 at a depth of 7 feet
Sample Description: Claystone, sandy
Classification: A-7-6(39), FAT CLAY with SAND(CH)

Gravel (%): 0 Liquid Limit: 68
Sand (%): 18 Plasticity Index: 44
Clay/Silt (%): 82

DRAFT



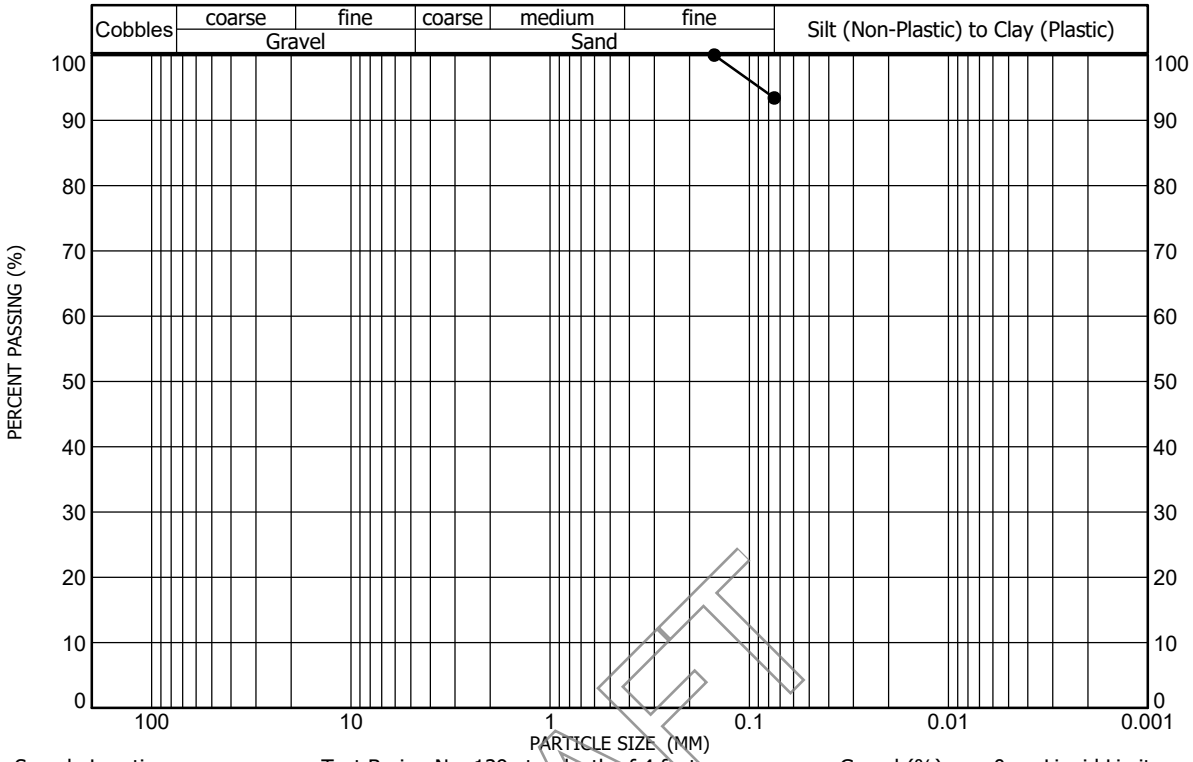
Sample Location: Test Boring No. 125 at a depth of 14 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-4(4), SILTY CLAY with SAND(CL-ML)

Gravel (%): 0 Liquid Limit: 27
Sand (%): 25 Plasticity Index: 7
Clay/Silt (%): 75

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-219

PROJECT NO. 223122

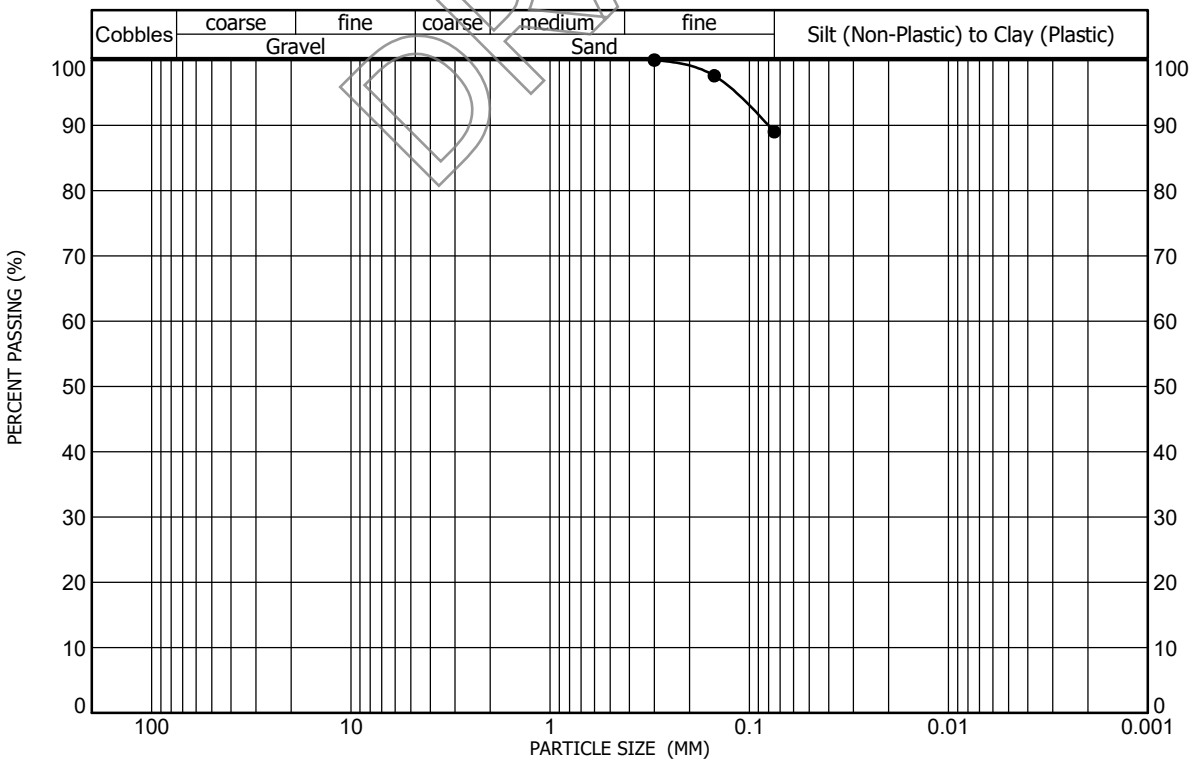
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 129 at a depth of 4 feet
Sample Description: Siltstone, clayey, slightly sandy (lens)
Classification: A-6(15), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 37
Sand (%): 7 Plasticity Index: 15
Clay/Silt (%): 93

DRAFT



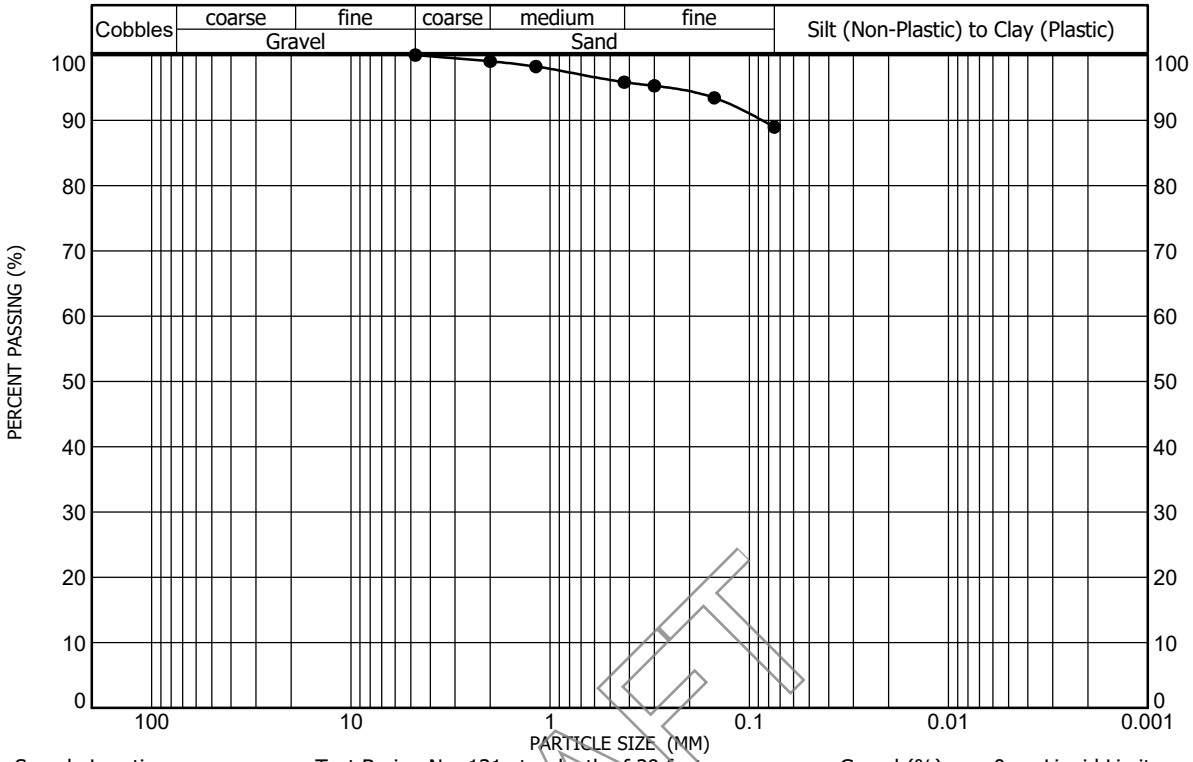
Sample Location: Test Boring No. 129 at a depth of 9 feet
Sample Description: Claystone, slightly sandy
Classification: A-6(19), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 36
Sand (%): 11 Plasticity Index: 23
Clay/Silt (%): 89

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-220

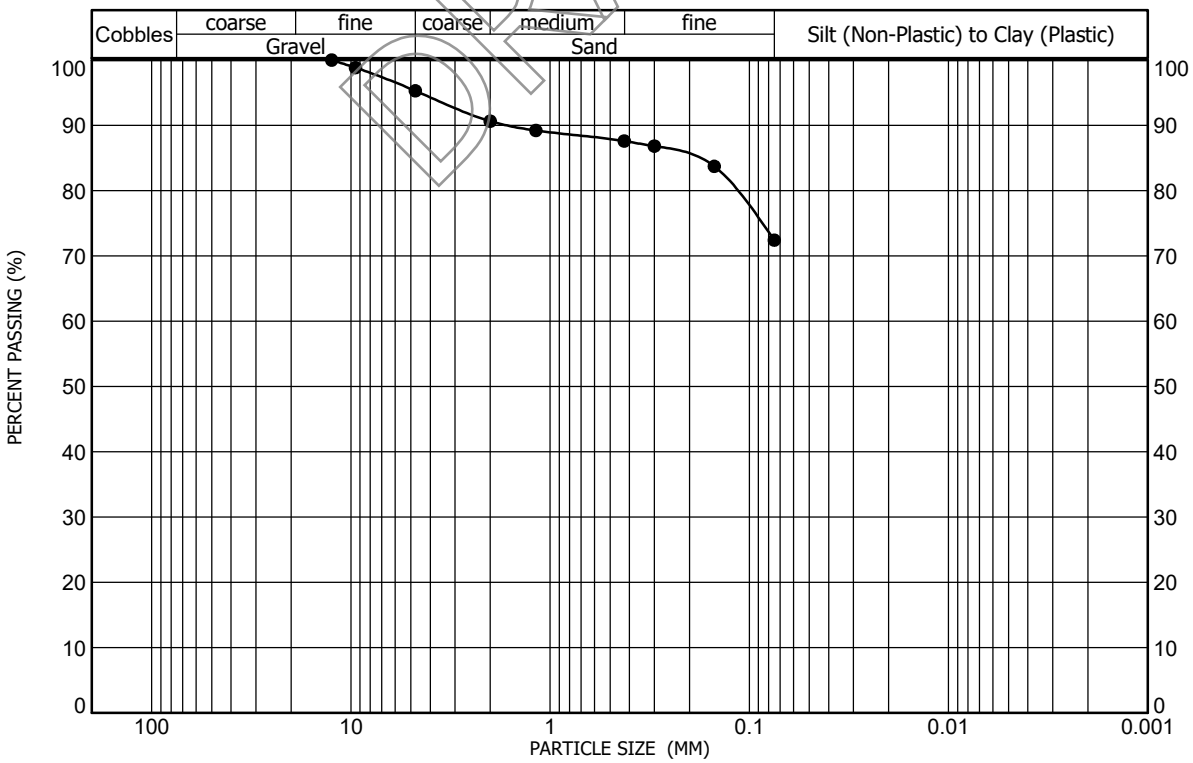
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 131 at a depth of 29 feet
Sample Description: Claystone, slightly sandy
Classification: A-6(22), LEAN CLAY(CL)
Gravel (%): 0 Sand (%): 11 Clay/Silt (%): 89
Liquid Limit: 39 Plasticity Index: 26

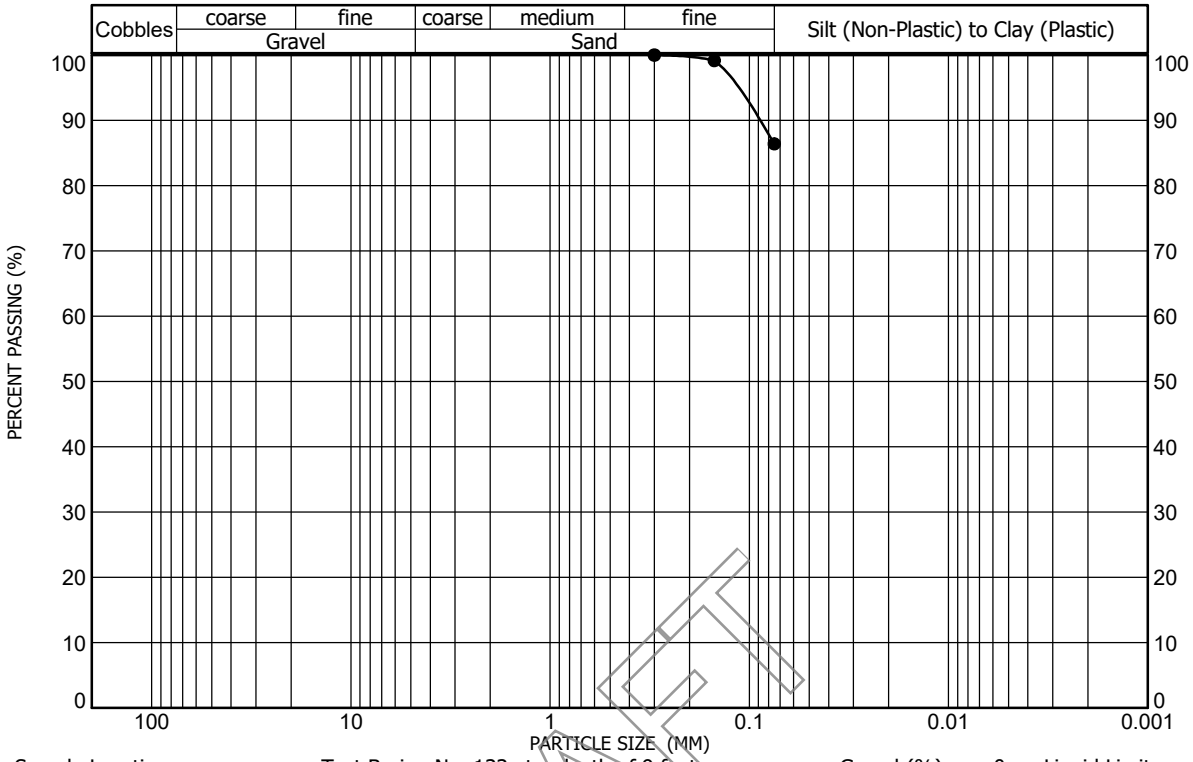
DRAFT



Sample Location: Test Boring No. 132 at a depth of 7 feet
Sample Description: Clay, sandy, slightly gravelly
Classification: A-7-6(16), LEAN CLAY with SAND(CL)
Gravel (%): 5 Sand (%): 23 Clay/Silt (%): 72
Liquid Limit: 44 Plasticity Index: 23

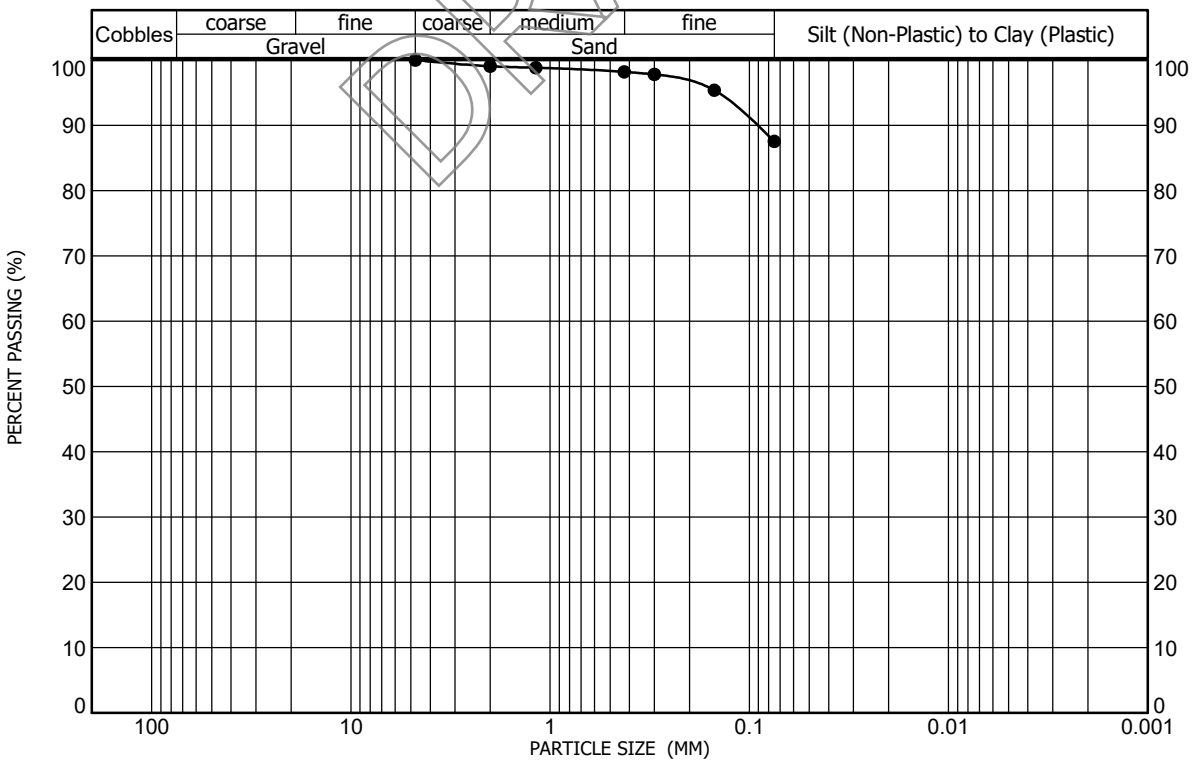
GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-221
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 133 at a depth of 9 feet
Sample Description: Siltstone, slightly sandy
Classification: A-6(17), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 14
Clay/Silt (%): 86
Liquid Limit: 37
Plasticity Index: 21

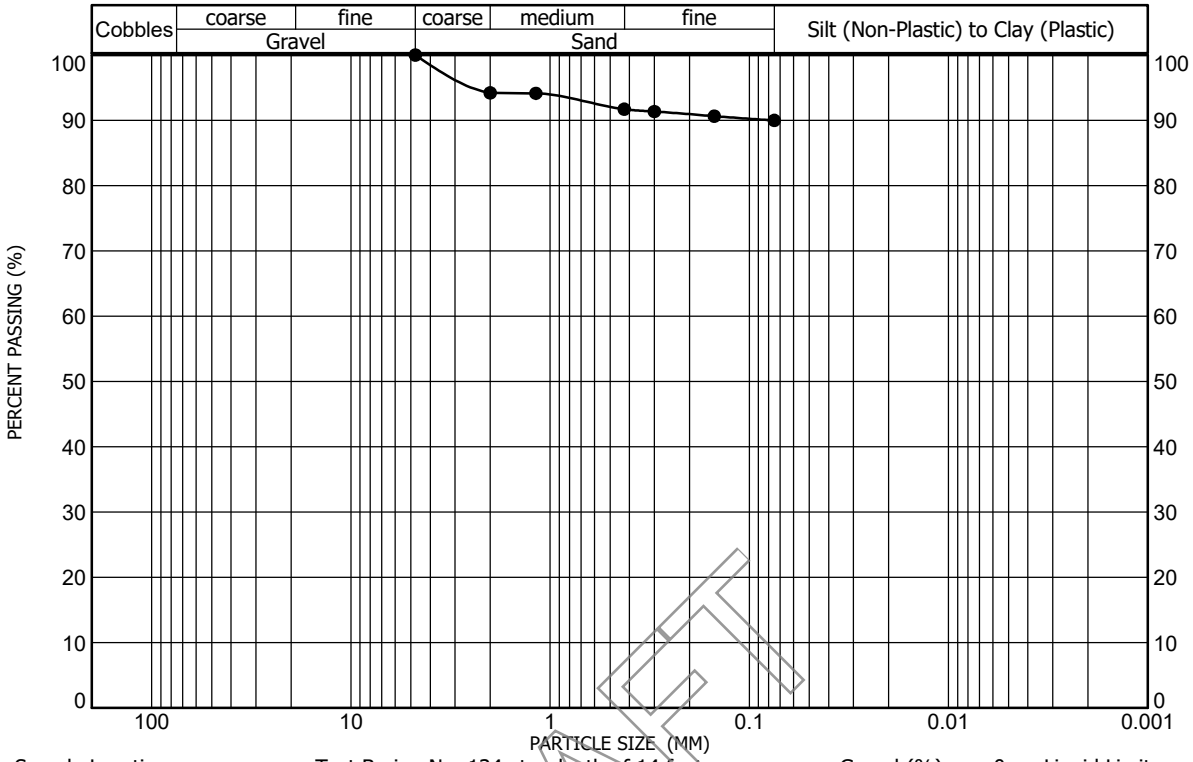
DRAFT



Sample Location: Test Boring No. 134 at a depth of 2 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(26), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 12
Clay/Silt (%): 88
Liquid Limit: 47
Plasticity Index: 29

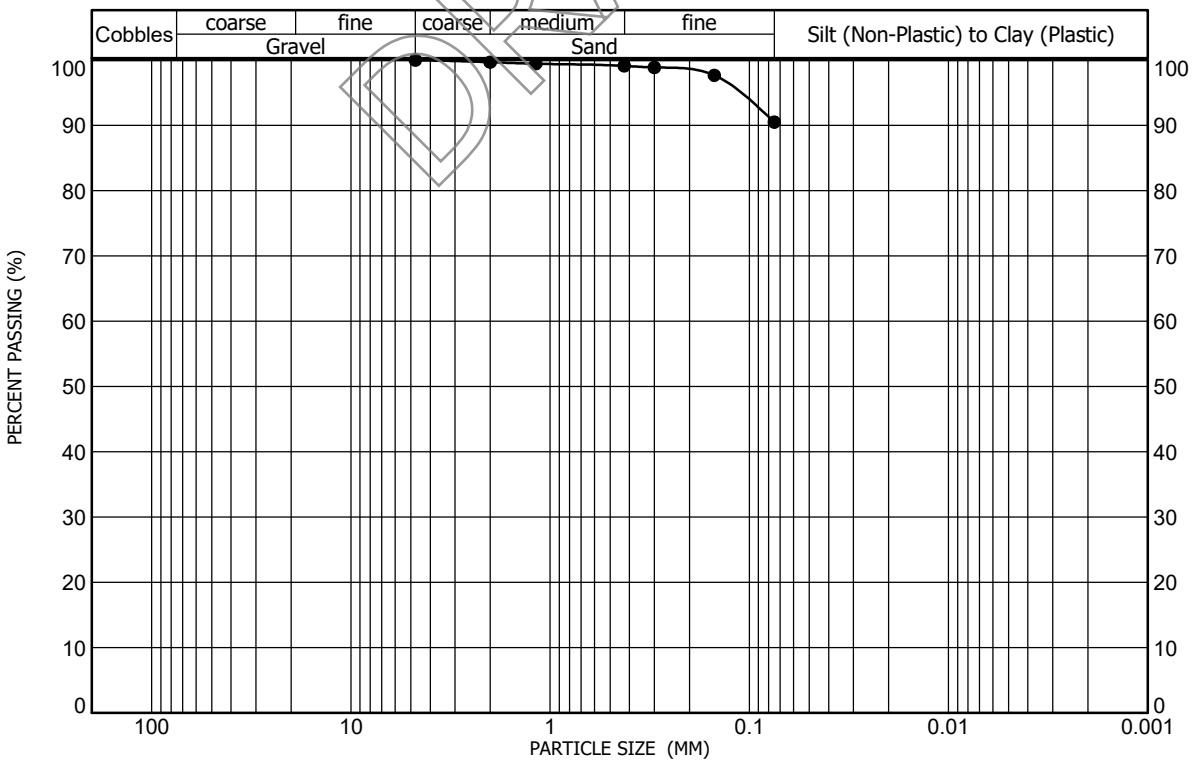
GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-222
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 134 at a depth of 14 feet
Sample Description: Claystone, slightly sandy
Classification: A-7-6(39), FAT CLAY(CH)
Gravel (%): 0
Sand (%): 10
Clay/Silt (%): 90
Liquid Limit: 61
Plasticity Index: 40

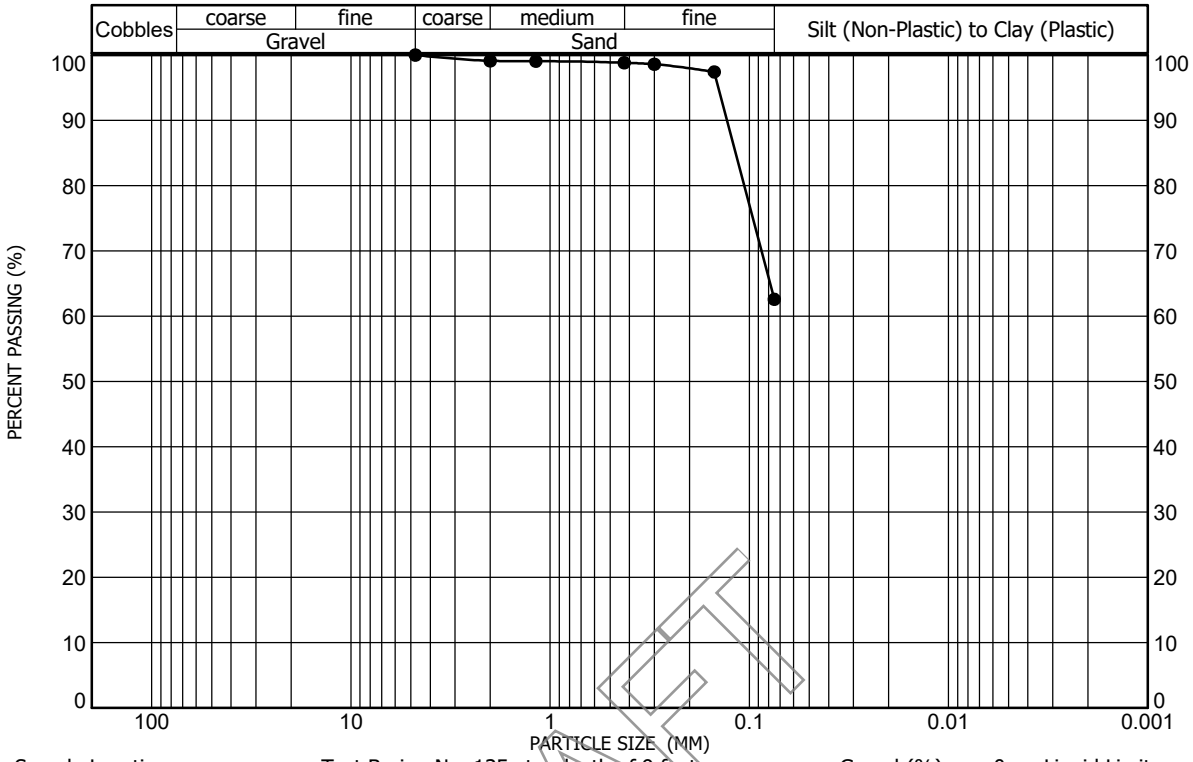
DRAFT



Sample Location: Test Boring No. 135 at a depth of 4 feet
Sample Description: Clay, slightly sandy
Classification: A-7-6(28), LEAN CLAY(CL)
Gravel (%): 0
Sand (%): 10
Clay/Silt (%): 90
Liquid Limit: 46
Plasticity Index: 30

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-223
PROJECT NO. 223122

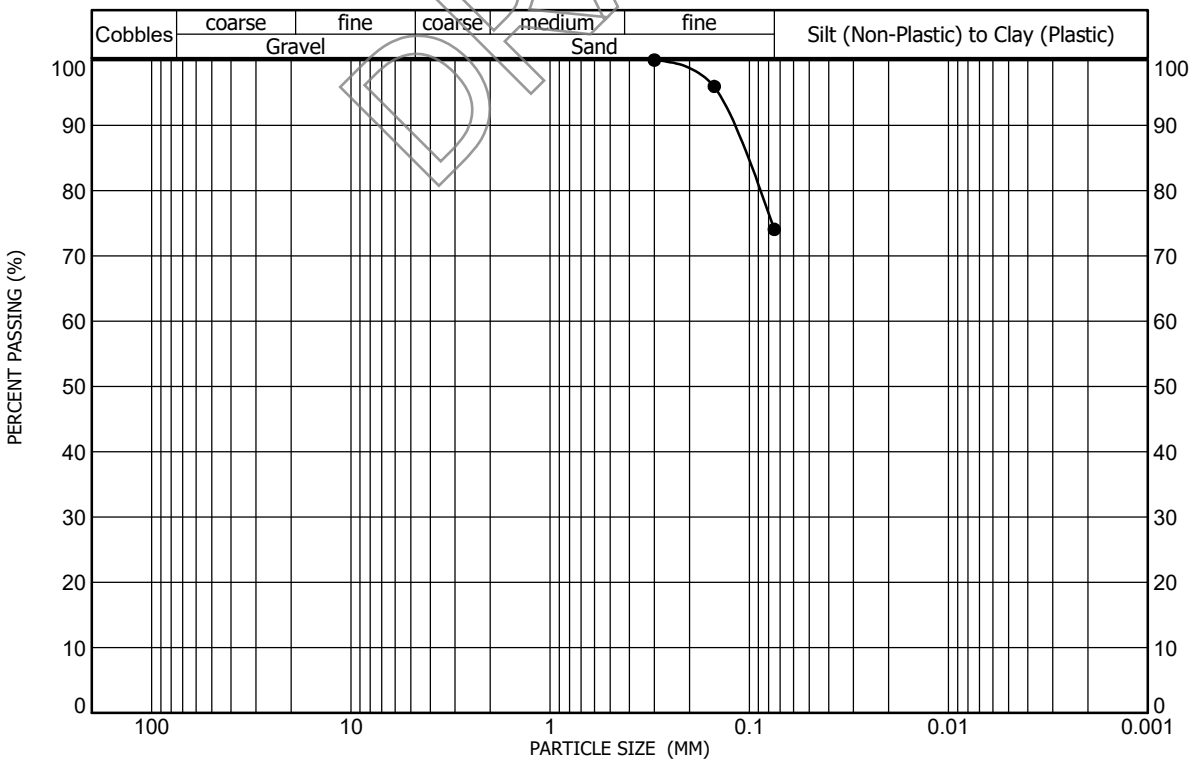
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 135 at a depth of 9 feet
Sample Description: Siltstone, very sandy, clayey
Classification: A-4(3), SANDY LEAN CLAY(CL)

Gravel (%): 0 Sand (%): 37 Clay/Silt (%): 63
Liquid Limit: 25 Plasticity Index: 9

DRAFT



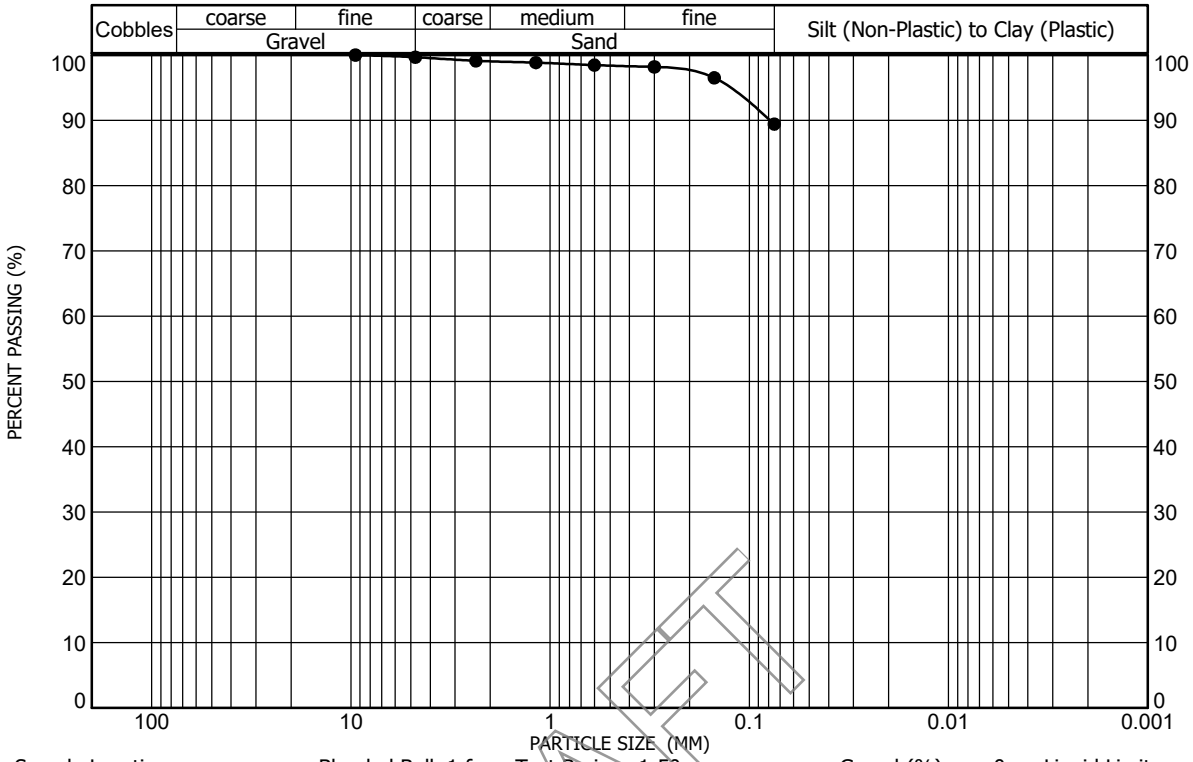
Sample Location: Test Boring No. 137 at a depth of 9 feet
Sample Description: Siltstone, clayey, sandy
Classification: A-4(4), LEAN CLAY with SAND(CL)

Gravel (%): 0 Sand (%): 26 Clay/Silt (%): 74
Liquid Limit: 29 Plasticity Index: 8

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-224

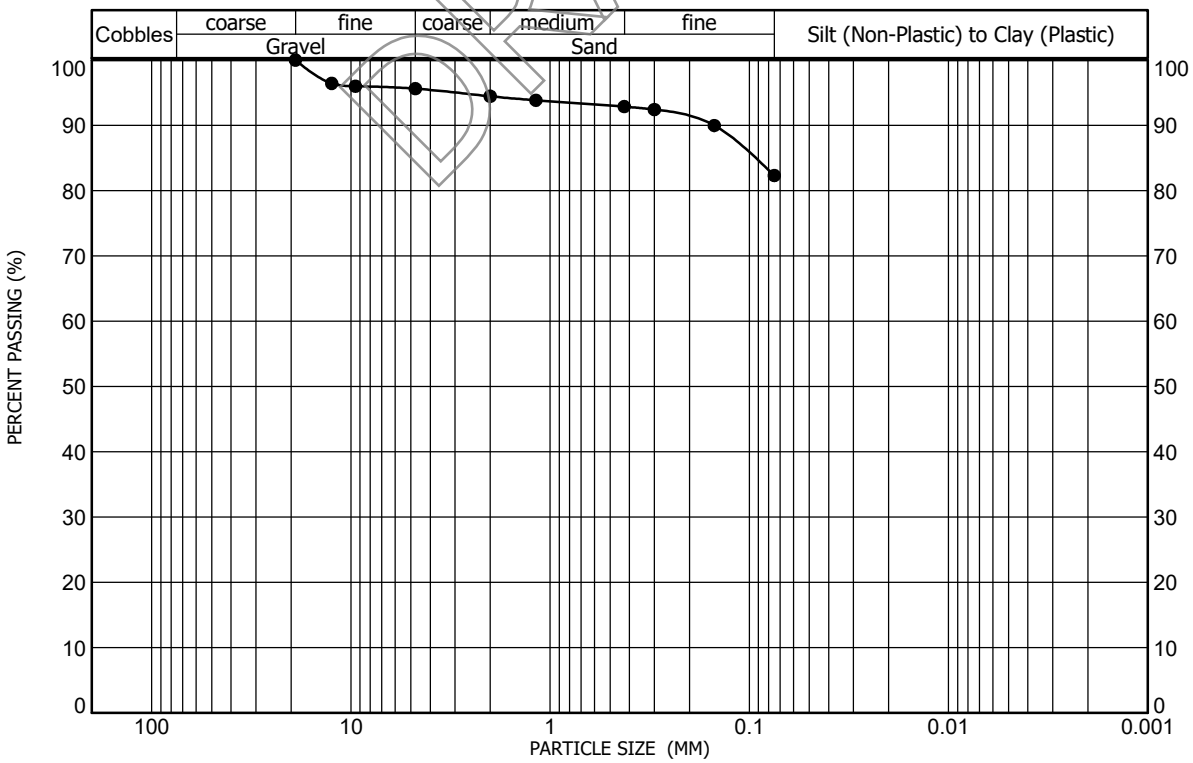
PROJECT NO. 223122

AGW
A.G. WASSENAAR, INC.



Sample Location: Blended Bulk 1 from Test Borings 1-50 | Gravel (%): 0 | Liquid Limit: 41
Sample Description: Clay, slightly sandy | Sand (%): 10 | Plasticity Index: 23
Classification: A-7-6(21), LEAN CLAY(CL) | Clay/Silt (%): 89

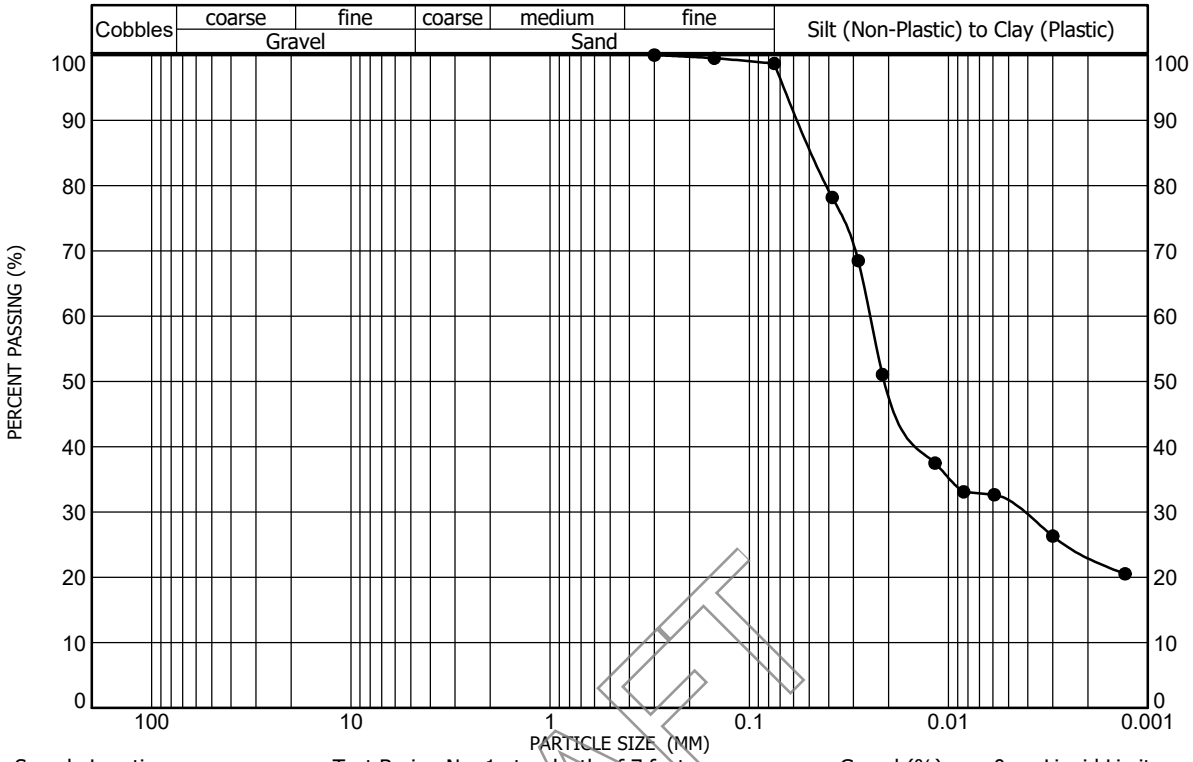
DRAFT



Sample Location: Blended Bulk 2 from Test Borings 51-137 | Gravel (%): 4 | Liquid Limit: 43
Sample Description: Clay, slightly sandy, trace gravel | Sand (%): 13 | Plasticity Index: 22
Classification: A-7-6(18), LEAN CLAY with SAND(CL) | Clay/Silt (%): 82

GRADATION AND ATTERBERG TEST RESULTS
FIGURE A-225
PROJECT NO. 223122

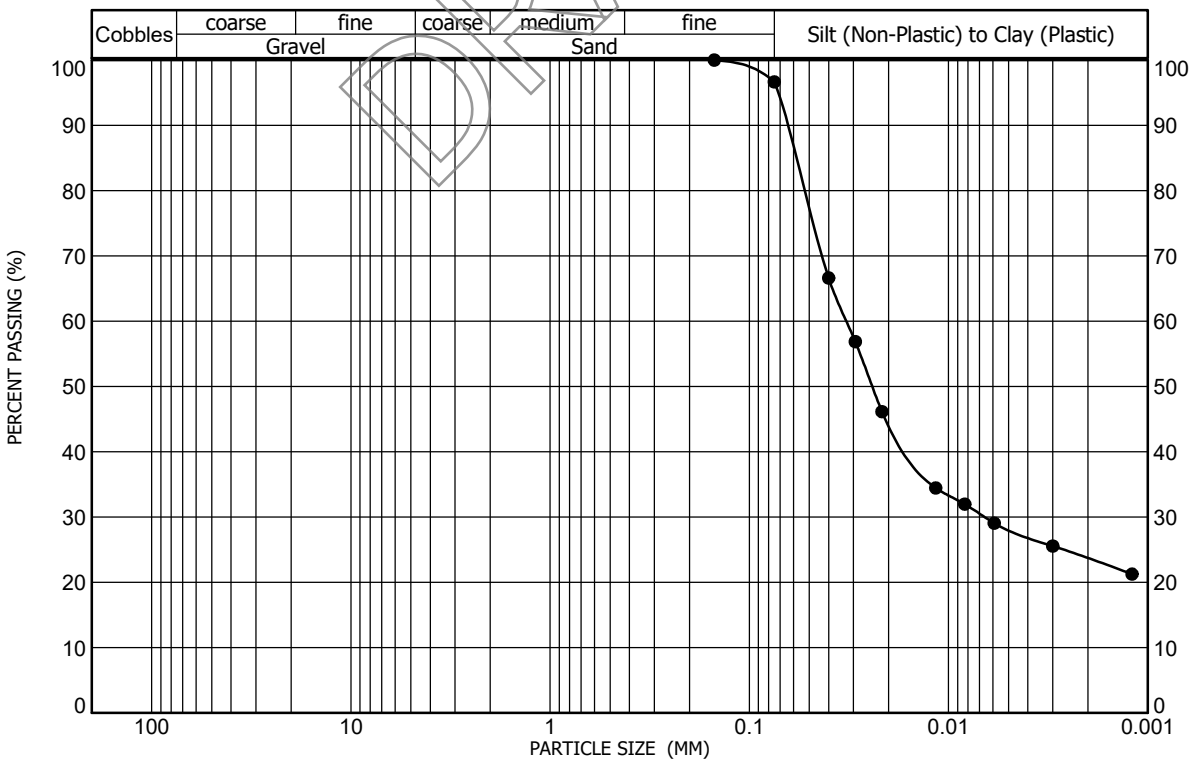
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 1 at a depth of 7 feet
Sample Description: Siltstone, clayey, trace sand
Classification: A-4(8), LEAN CLAY(CL)

Gravel (%): 0 | Liquid Limit: 29
Sand (%): 1 | Plasticity Index: 8
Silt (%): 75 | Clay (%): 24

DRAFT



Sample Location: Test Boring No. 3 at a depth of 24 feet
Sample Description: Siltstone, clayey, trace sand
Classification: A-6(10), LEAN CLAY(CL)

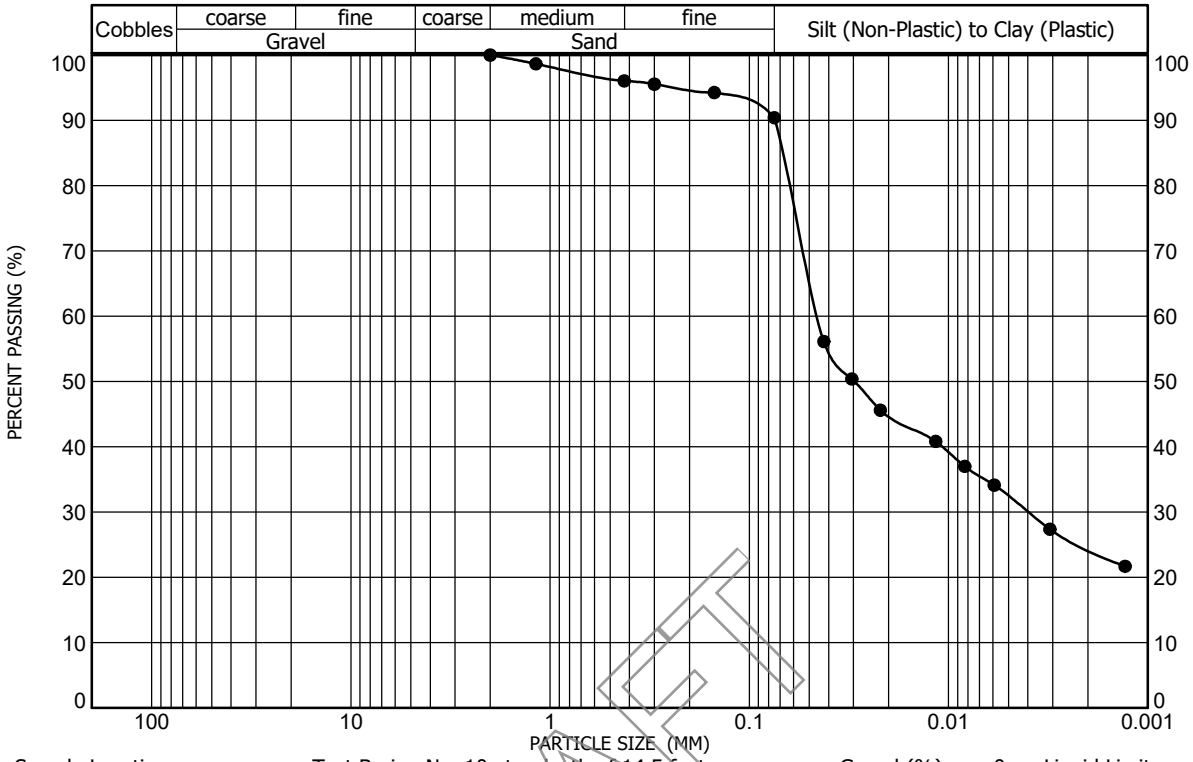
Gravel (%): 0 | Liquid Limit: 30
Sand (%): 3 | Plasticity Index: 11
Silt (%): 73 | Clay (%): 24

GRADATION WITH HYDROMETER AND ATTERBERG TEST RESULTS

FIGURE A-226

PROJECT NO. 223122

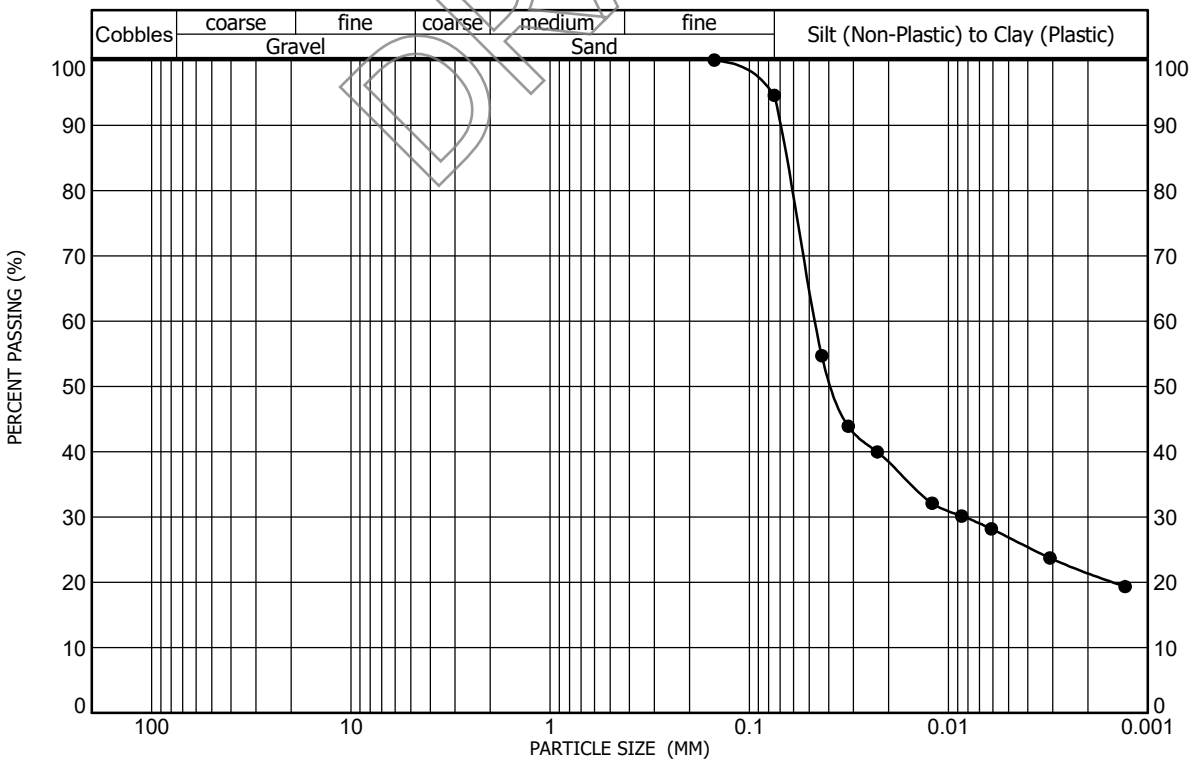
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 10 at a depth of 14.5 feet
Sample Description: Siltstone, clayey, slightly sandy
Classification: A-4(6), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 25
Sand (%): 10 Plasticity Index: 9
Silt (%): 66 Clay (%): 25

DRAFT



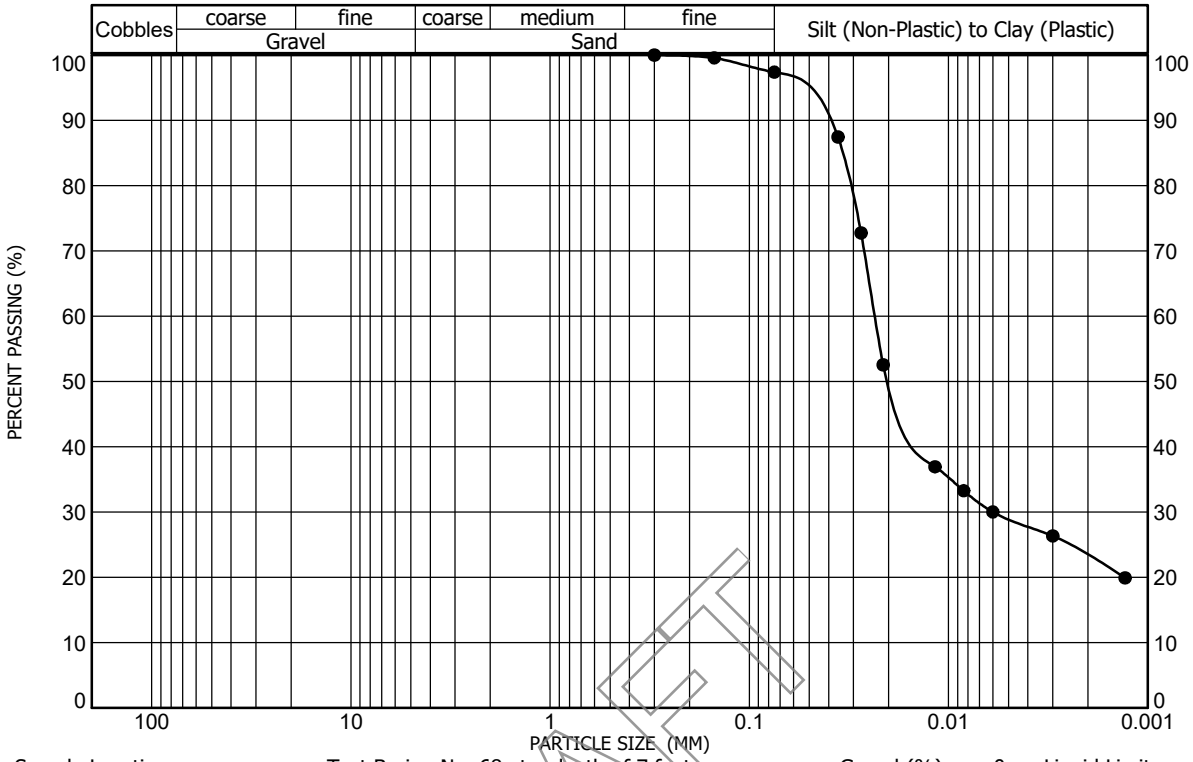
Sample Location: Test Boring No. 11 at a depth of 14 feet
Sample Description: Siltstone, clayey, slightly sandy
Classification: A-4(8), LEAN CLAY(CL)

Gravel (%): 0 Liquid Limit: 29
Sand (%): 5 Plasticity Index: 9
Silt (%): 73 Clay (%): 22

GRADATION WITH HYDROMETER AND ATTERBERG TEST RESULTS
FIGURE A-227

PROJECT NO. 223122

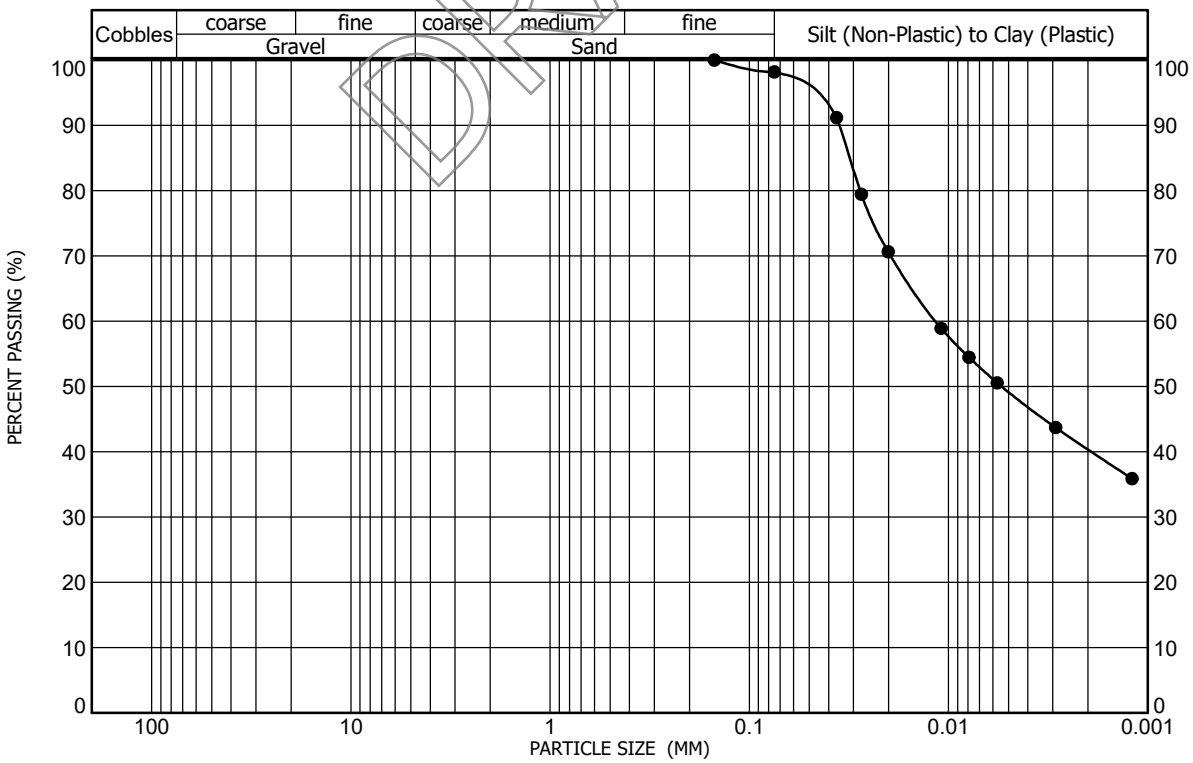
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 68 at a depth of 7 feet
Sample Description: Siltstone, clayey, trace sand
Classification: A-4(8), LEAN CLAY(CL)

Gravel (%): 0 | Liquid Limit: 28
Sand (%): 3 | Plasticity Index: 9
Silt (%): 74 | Clay (%): 23

DRAFT



Sample Location: Test Boring No. 85 at a depth of 14 feet
Sample Description: Siltstone, very clayey, trace sand
Classification: A-7-6(28), LEAN CLAY(CL)

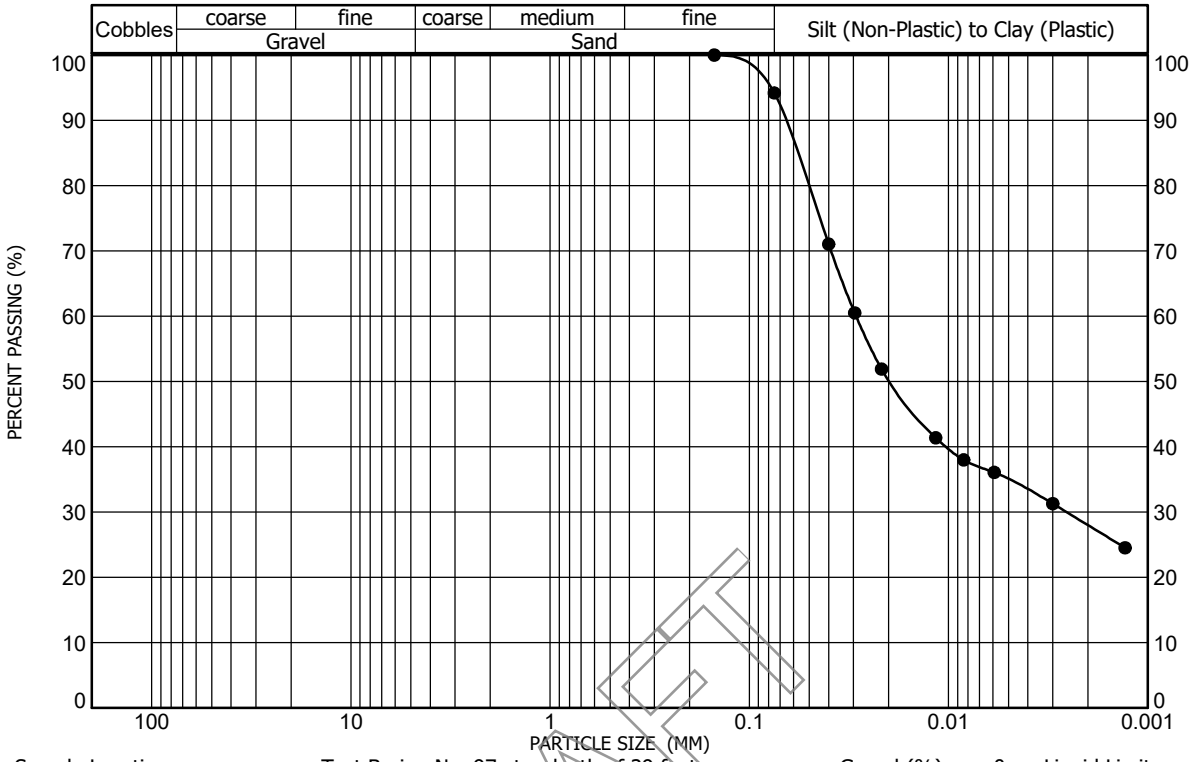
Gravel (%): 0 | Liquid Limit: 44
Sand (%): 2 | Plasticity Index: 27
Silt (%): 58 | Clay (%): 40

GRADATION WITH HYDROMETER AND ATTERBERG TEST RESULTS

FIGURE A-228

PROJECT NO. 223122

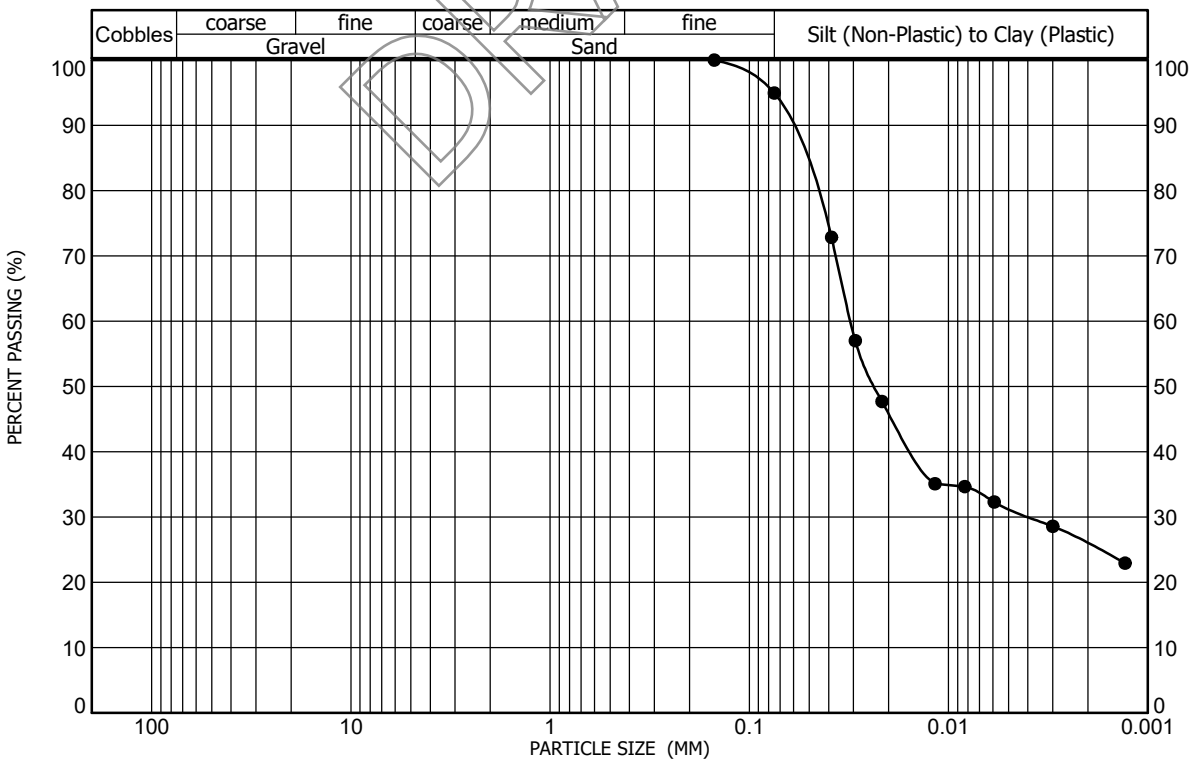
AGW
A.G. WASSENAAR, INC.



Sample Location: Test Boring No. 97 at a depth of 29 feet
Sample Description: Siltstone, clayey, slightly sandy
Classification: A-4(6), LEAN CLAY(CL)

Gravel (%): 0 | Liquid Limit: 25
Sand (%): 6 | Plasticity Index: 8
Silt (%): 66 | Clay (%): 28

DRAFT



Sample Location: Test Boring No. 136 at a depth of 14 feet
Sample Description: Siltstone, clayey, slightly sandy
Classification: A-6(12), LEAN CLAY(CL)

Gravel (%): 0 | Liquid Limit: 32
Sand (%): 5 | Plasticity Index: 13
Silt (%): 69 | Clay (%): 26

GRADATION WITH HYDROMETER AND ATTERBERG TEST RESULTS

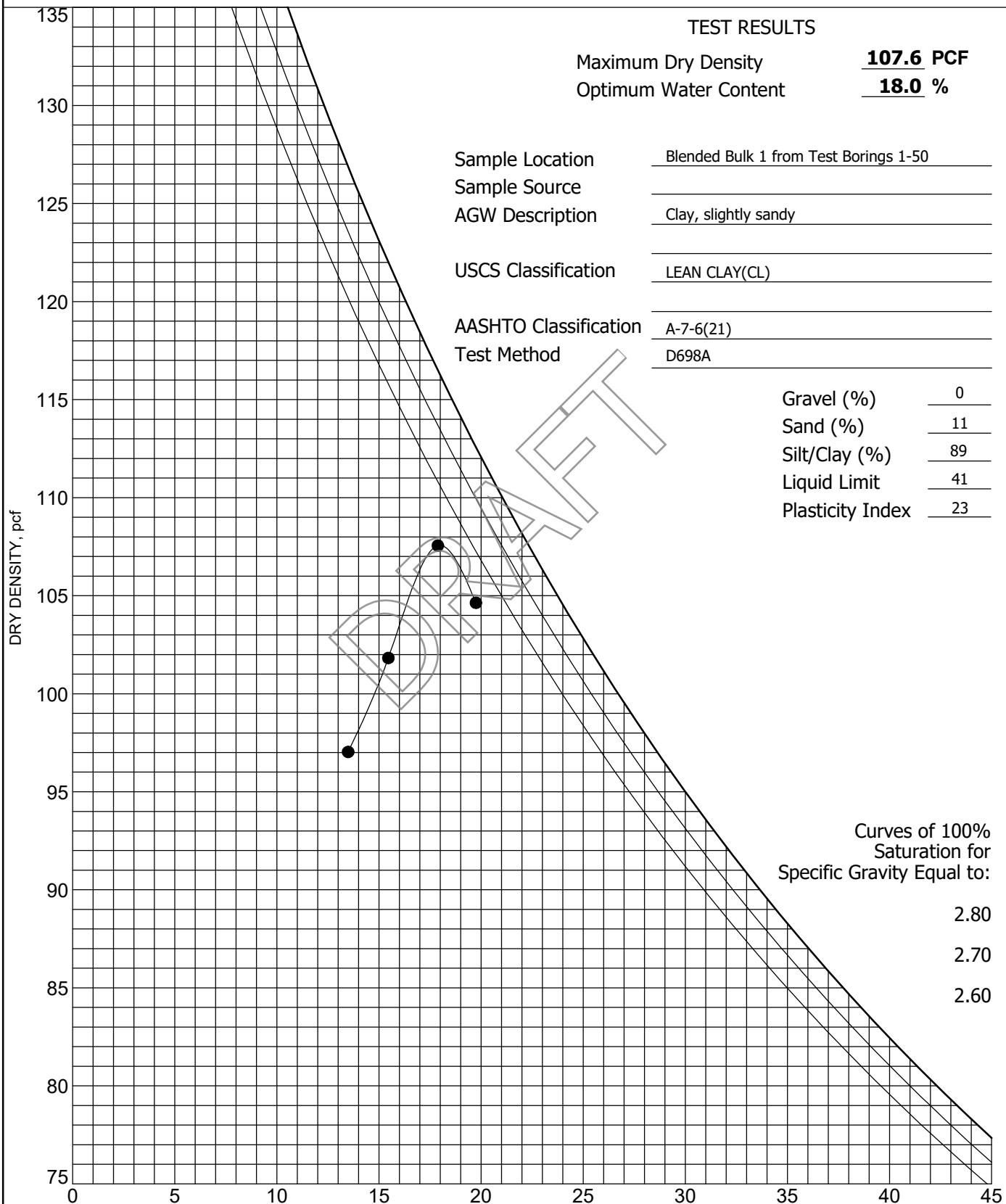
FIGURE A-229

PROJECT NO. 223122

MOISTURE-DENSITY RELATIONSHIP

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC
PROJECT NAME Colorado State Land Board Parcel
PROJECT NUMBER 223122
PROJECT LOCATION Erie, Colorado



TEST RESULTS

Maximum Dry Density	**107.6** PCF
Optimum Water Content	**18.0** %

Sample Location	Blended Bulk 1 from Test Borings 1-50
Sample Source	
AGW Description	Clay, slightly sandy
USCS Classification	LEAN CLAY(CL)
AASHTO Classification	A-7-6(21)
Test Method	D698A

Gravel (%)	0
Sand (%)	11
Silt/Clay (%)	89
Liquid Limit	41
Plasticity Index	23

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Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

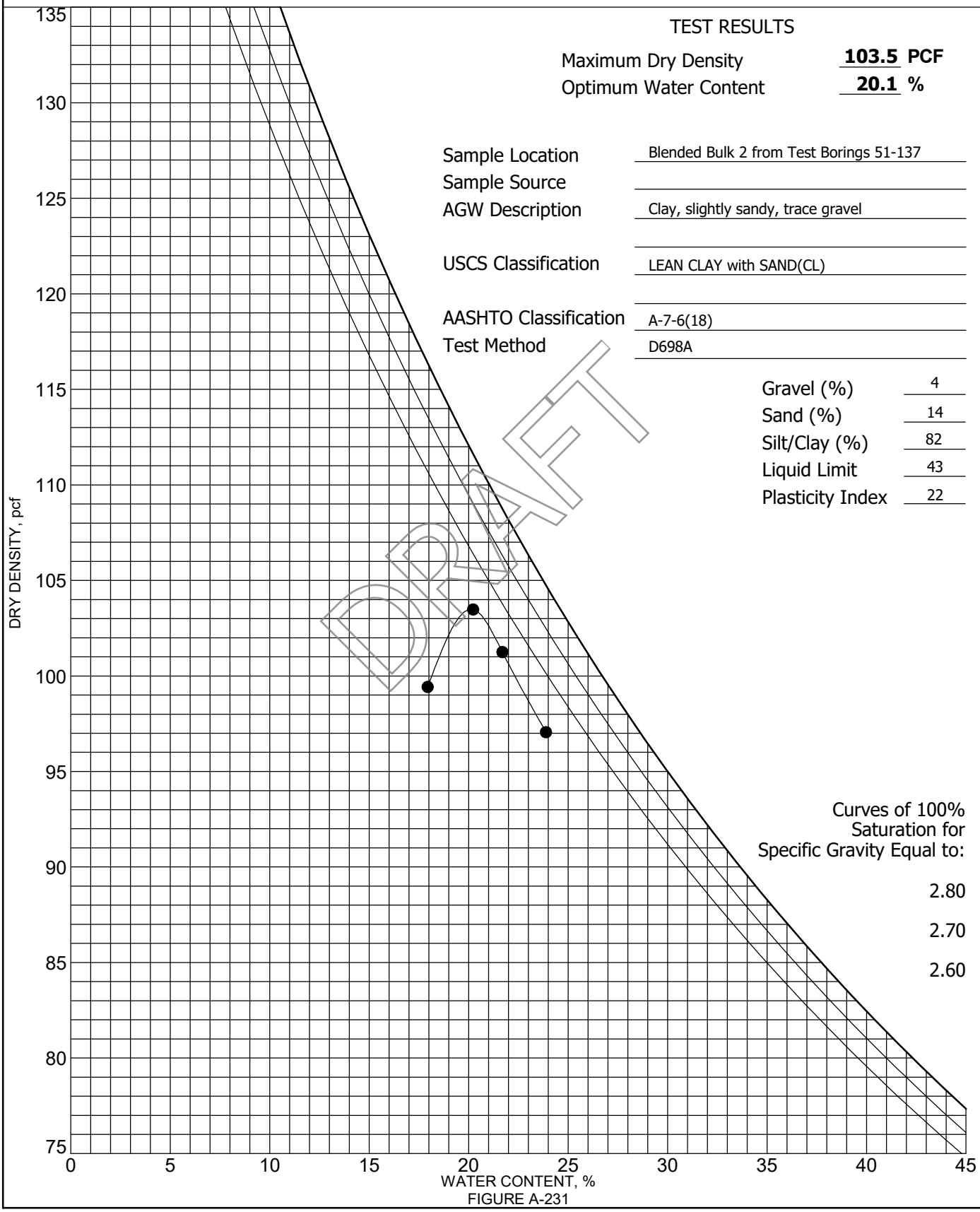
FIGURE A-230

MOISTURE-DENSITY RELATIONSHIP

A.G. WASSENAAR, INC.

CLIENT Southern Land Company, LLC **PROJECT NAME** Colorado State Land Board Parcel

PROJECT NUMBER 223122 **PROJECT LOCATION** Erie, Colorado



TEST RESULTS

Maximum Dry Density	**103.5** PCF
Optimum Water Content	**20.1** %

Sample Location	Blended Bulk 2 from Test Borings 51-137
Sample Source	
AGW Description	Clay, slightly sandy, trace gravel
USCS Classification	LEAN CLAY with SAND(CL)
AASHTO Classification	A-7-6(18)
Test Method	D698A

Gravel (%)	4
Sand (%)	14
Silt/Clay (%)	82
Liquid Limit	43
Plasticity Index	22

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Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

FIGURE A-231

APPENDIX B
SPECIFICATIONS FOR PLACEMENT OF FILL

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APPENDIX B
SPECIFICATIONS FOR PLACEMENT OF FILL

General

AGW, as the Client's representative, should observe fill placement and conduct tests to determine if the materials placed, methods of placement, and compaction are in reasonable conformance with these specifications. Specifications presented in this Appendix are general in nature. They should be used for construction except where specifically superseded by those presented in the attendant geotechnical study.

For the purpose of this specification, structural areas include those areas that will support constructed appurtenances (e.g., foundations, slabs, flatwork, pavements, etc.) and fill embankments or slopes that support significant fills or constructed appurtenances. Structural areas will be as defined by AGW.

Fill Material

Fill material should consist of on or off-site soils which are relatively free of vegetable matter and rubble. Off-site materials should be evaluated by AGW prior to importation. No organic, frozen, perishable, rock greater than 6 inches, or other unsuitable material should be placed in the fill. For the purpose of this specification, cohesive soil is defined as a mixture of clay, sand, and silt with more than 35% passing a U. S. Standard #200 sieve and a Plasticity Index of at least 11. These materials will classify as an A-6 or A-7 by the AASHTO Classification system. Granular soils are all materials which do not classify as cohesive.

Preparation of Fill Subgrade

Vegetation, organic topsoil, any existing fill, and any other deleterious materials should be removed from the fill area. The area to be filled should then be scarified, moistened or dried as necessary, and compacted to the moisture content and compaction level specified below prior to placement of subsequent layers of fill.

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Placement of Fill Material

The materials should be delivered to the fill in a manner which will permit a well and uniformly compacted fill. Before compacting, the fill material should be properly broken down, mixed, and spread in approximately horizontal layers not greater than 8 inches in loose thickness.

Moisture Control

The material must contain uniformly distributed moisture for proper compaction. The Contractor will be required to add moisture to the materials if, in the opinion of AGW, sufficient and uniform moisture is not present in the fill. If the fill materials are too wet for proper compaction, aerating and/or mixing with drier materials will be required.

Moisture content should be controlled as a percentage deviation from optimum. Optimum moisture content is defined as the moisture content corresponding to the maximum density of a laboratory compacted sample performed according to ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The moisture content specifications for the various areas are as follows:

		Cohesive Soils	Granular Soils
1.	Beneath Structural Areas:	0 to +4%	−2 to +2%
2.	Beneath Non-Structural Areas:	−3 to +3%	−3 to +3%
3.	Moisture Treated Fill:	0 to +4%	−2 to +2%

Compaction

When the moisture content and conditions of each layer spread are satisfactory, the fill should be compacted. Laboratory moisture-density tests should be performed on typical fill materials to determine the maximum density. Field density tests must then be made to determine fill compaction. The compaction standard to be utilized in determining the maximum density is ASTM D698 for cohesive soils or ASTM D1557 for granular soils. The following compaction specifications should be followed for each area:

1. Beneath Structural Areas: 95% of Maximum Dry Density
2. Beneath Non-Structural Areas: 90% of Maximum Dry Density
3. Moisture Treated Fill: 95% of Maximum Dry Density

If the fill contains less than 10% passing the No. 200 sieve, it may be necessary to control compaction based on relative density (ASTM D2049). If this is the case, then compaction around the structures and beneath walkway or other slabs should be to at least 70% relative density, and compaction beneath foundations and vehicle supporting should be to at least 80% relative density.

Deep Fills

In areas where fill depths exceed 20 feet beneath structural areas, additional compaction considerations will be required to reduce fill settlement. Fill placed within 20 feet of final overlot grade should be compacted as required above. Deeper fills should be compacted to 100% of maximum dry density at a moisture content of ±2% of optimum moisture content. Relative density of at least 85% will be required when necessary.

Responsibility

Any mention of essentially full-time testing and observation does not mean AGW will accept responsibility for future fill performance. AGW shall not be responsible for constant or exhaustive inspection of the work, the means and methods of construction or the safety procedures employed by Client's contractor. Performance of construction observation services does not constitute a warranty or guarantee of any type, since even with diligent observation, some construction defects, deficiencies or omissions in the Contractor's work may occur undetected. Client shall hold its contractor solely responsible for the quality and completion of the project, including construction in accordance with the construction documents. Any duty hereunder is for the sole benefit of the Client and not for any third party, including the contractor or any subcontractor.

DRAFT

MINE SUBSIDENCE INVESTIGATION

North Westerly
414.38 Acres in Section 16,
Township 1 North, Range 68 West,
Erie, Colorado



Prepared For:

SOUTHERN LAND COMPANY

105 Wells Street, Suite 200A
Erie, Colorado 80516

WESTERN ENVIRONMENT AND ECOLOGY, INC.

2217 West Powers Avenue
Littleton, Colorado 80210
phone (303) 730-3452

MINE SUBSIDENCE INVESTIGATION

North Westerly
414.38 Acres in Section 16,
Township 1 North, Range 68 West,
Erie, Colorado

Prepared For:

SOUTHERN LAND COMPANY

105 Wells Street, Suite 200A
Erie, Colorado 80516

Project Number 778-005-02

1994 – 2024
30
YEARS OF EXCELLENCE
Western Environment & Ecology

July 11th, 2024

Greg D. Sherman, P.G.
President

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APPENDICES:

Appendix A Architectural Techniques to Reduce Subsidence
Appendix B Lithologic Descriptions and Geophysical/Caliper Logs

1.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the mine subsidence investigation completed on the Erie Land Company's North Westerly Project, consisting of 414.38 acres in Section 16, Township 1 North, Range 68 West, Erie, Weld County, Colorado, identified two abandoned coal mines beneath the proposed residential development. Based upon these data, Western Environment and Ecology, Inc. (Western Environment) presents the following:

- The depth to the Clayton Mine "main" seam beneath **Subsidence Zone A** is **302 feet**.
- The depth to the Morrison Mine "main" seam beneath **Subsidence Zone B** is **188 feet**.
- The "theoretical" surface strain calculated for **Subsidence Zone A** is **0.113%.**
- The "theoretical" subsidence occurring within **Subsidence Zone A** is **0.25 feet**.
- The "theoretical" surface strain calculated for **Subsidence Zone B** is **0.310%.**
- The "theoretical" subsidence occurring within **Subsidence Zone B** is **0.78 feet**.

Using these conclusions, the following general subsidence related recommendations for development are presented:

- Areas occurring east of the **0% strain line** as shown on Figure 3, have **no mine subsidence related development restrictions**.
- The theoretical "worst case" strains identified for **Subsidence Zone A** will allow construction of buildings or building segments equal to or less than **151 feet**. Larger structures may be built if additional studies, including drilling, are conducted. Structures within the **Subsidence Zone A**, should be limited to two stories or less (without additional analysis) and be constructed using wood or metal framing. Utilities should take into account the potential for 0.113% surface strains and 0.25 feet of subsidence over 286 feet.
- The theoretical "worst case" strains identified for **Subsidence Zone B** will allow construction of buildings or building segments equal to or less than **64 feet**. Larger structures may be built if additional studies, including drilling, are conducted. Structures within the **Subsidence Zone B**, should be limited to two stories or less and be constructed using wood or metal framing. Utilities should take into account the potential for 0.310 % surface strains and 0.78 feet of subsidence over 207 feet.
- **A structural cap**, as presented in the Appendix, and pressure grouting, should be performed on both the "Main" and "Air" shafts of the Clayton Mine. These features must be accurately field located and shown on the proposed development plat. **No structures should be located within 25 feet of the capped shafts**.

2.0 INTRODUCTION

Western Environment was retained by Ms. Heidi Majerik of the Southern Land Company to conduct a mine subsidence investigation of 414.38 acres in Section 16, Township 1 North, Range 68 West, Erie, Colorado (Figure 1). The working name of this residential project is the North Westerly PD.

The purpose of this investigation is to evaluate the subsidence potential of the Clayton and Morrison Mines, and estimate "theoretical" surface strains from a "worst case" subsidence event. Additionally, recommendations for subsidence resistant development procedures and techniques are given.

In addition to the current assessment, Western Environment has completed several mine subsidence investigations adjacent to the North Westerly Property. However, only a report conducted adjacent to the North Westerly PUD entitled ***"Mine Subsidence Investigation, Proposed Erie High School Site, May 10, 2003 (Project Number 256-002-01)*** was incorporated in this report**.**

The results and recommendations contained within the current report are intended for use as an aid in planning and design. This report should accompany the PD submitted to the Town of Erie. The Town will then forward the report to the Colorado Geological Survey review and comment. This process will aid in assuring a more predictable and thus economic development process.



Drill support equipment

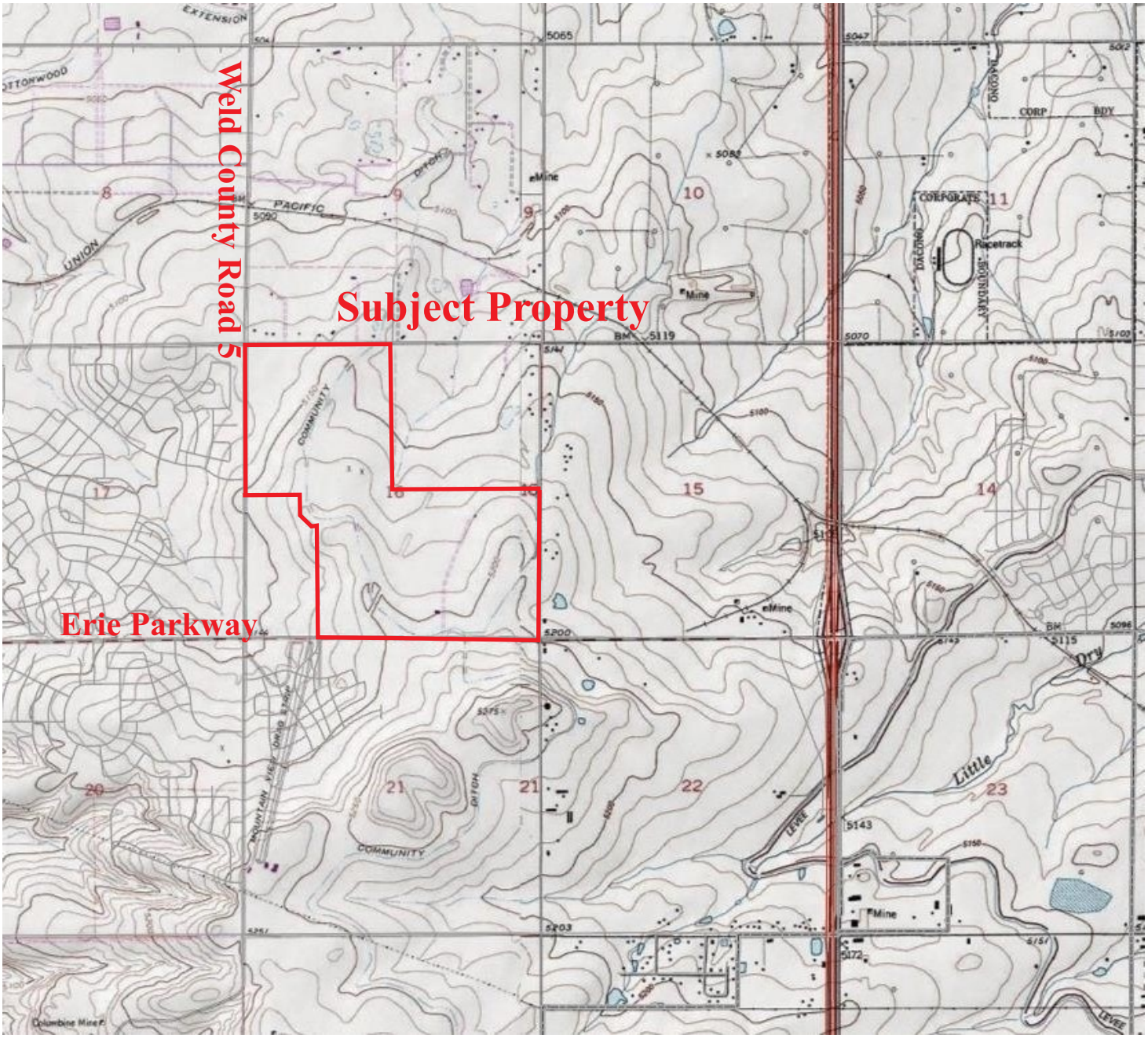

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Figure 1 -Location Map
414.38 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156

3.0 SITE CHARACTERISTICS

This Mine Subsidence Assessment was conducted for approximately 414.38 acres within Section 16, Township 1 North, Range 68 West, Town of Erie, Weld County, Colorado (Figure 1). According to the Weld County Assessor's Office, the property, currently owned by North Westerly, LLC and is zoned for agricultural use.

The site is located between Erie Parkway on the south Weld County Road (WCR) 10 on the north, WCR's 5 and WCR 7 on the west and east respectively (Figure 2). Portions of the site had recently been cultivated. Remnants of the abandoned Clayton Coal Mine, including hoist house, load out tipple and main and air shafts foundations, occur on the property. The Union Pacific State Coal Mine rail spur right-of-way, the Community Ditch, and a communication line right-of-way bisect the site.

Surrounding properties include the Erie Junior and Senior High Schools to the west, rural acreage residences to the north and east, and large single family residential developments to the west and southwest. Currently, the Westerly residential subdivision is present to the south, across Erie Parkway. The Public Service Company of Colorado Valmont Power Station, 230 kv high tension electric transmission power line is present along the northern boundary. Panhandle Eastern Pipeline Company, Amoco Oil and Vessels Oil have natural gas and liquid petroleum gathering lines along the parameter of the site.



View to south showing Erie Parkway and residential development



EL-1 40.050128, -105.006889
EL-2 40.045642, -105.009297
EL-3 40.050283, -105.011505
EL-4 40.052637, -105.013800
EL-6 40.056573, -105.016316
EL-8 40.056255, -105.009298

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Figure 2 -Boring Location Map
North Westerly Parcel
414.38 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156

The site occurs at an elevation range of approximately 5,140 to 5,200 feet above sea level (USGS Erie 7.5 Minute Quadrangle, 2016). The topography is generally level, with gradual slopes to the north and northwest on the west half of the project. The site geology consists of the Cretaceous Age Laramie Formation and Fox Hills Sandstone (Ogden Tweto, 1979). The USRCS classifies the site soils as Weld loam on 1 to 3 percent slopes, Nunn loam on 1-3% slopes, Ulm clay loam on 0 to 3 and 3 to 5 percent slopes, Wiley-Colby complex on 3 to 5 percent slopes, and Renohill clay loam on 3 to 9 percent slopes. Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Maps indicate that the site is not located within the 100-year flood plain.

Records maintained by the Colorado Division of Water Resources records identified a piezometer well constructed by the Town of Erie and three groundwater monitoring wells constructed by Kerr McGee Oil & Gas Onshore LP are located on the property. Lithologic logs for the wells identified sandy clay from the surface to between 7 and 15 feet below grade. Weathered claystone to silty sandstone was described between 7 to 22 feet below grade, where medium gray claystone was encountered. Static groundwater was measured between 10 and 21 feet.



1937 air photo showing Clayton Mine

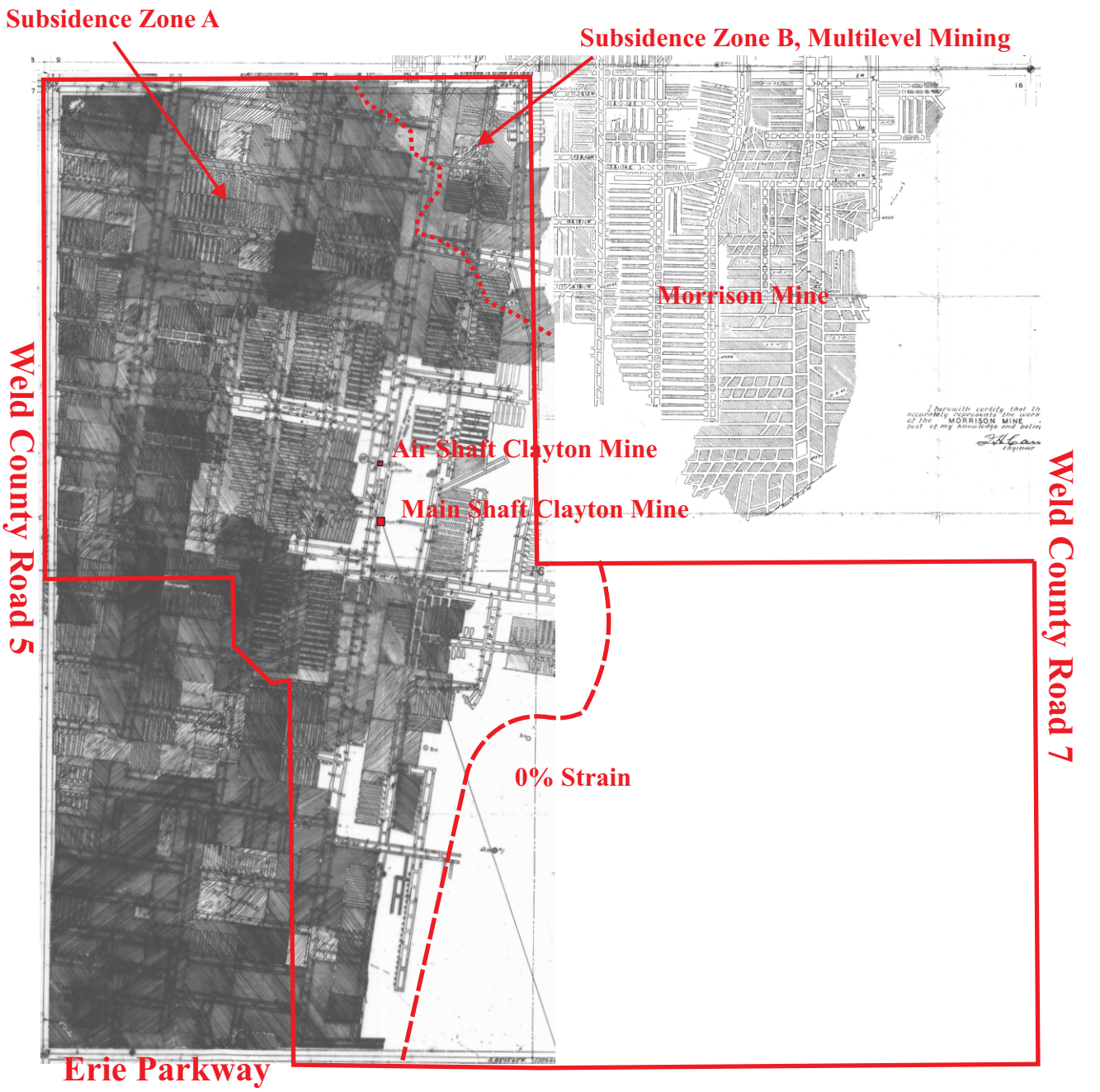
4.0 COAL MINE DESCRIPTIONS

Two abandoned coal mines occur beneath the North Westerly Parcel. The mine present in a portion of the northeast corner of the project is referred to as the **Morrison Mine** (Figure 3). Records on file with the Colorado Division of Mines (attached) show that production began in 1930 and the operation was officially closed on December 20th 1966 after producing 2,169,664 tons. Entry to the Morrison Mine was gained via a 160 foot deep shaft located approximately 2,500 feet northeast of the subject property in Section 9. Maximum production for the Morrison Mine was 132,000 tons in 1945. At the time the mine closed, it was owned by the Clayton Coal Company.



Clayton Mine, Photo provided by the Erie Historical Society

The second mine occurring beneath the west one half of Section16 is the **Clayton Mine** (Figure 3). The Clayton Mine began operation in 1920 and continued to 1942 having a recorded production of 3,333,225 tons. The maximum yearly production of 260,000 tons occurred in 1925. Based upon review of the original maps, the mining method was classified as a modified room and pillar mine using the Pillar Retreat method of mining. Entry to the mine occurred from a 350 foot deep production shaft located on the subject property (Figure 3). An air shaft also approximately 350 feet in depth was located 250 feet north of the main production shaft.





Approximate Scale in Feet

0 1320 2640

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Figure 3 - Mine Location Map
North Westerly Parcel
414.38 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156



Clayton Mine 1923. Photo provided by the Erie Historical Society

Unlike other large operations the Clayton Mine did not convert to the shortwall mining method introduced in the early to mid 1940's. This equipment radically changed coal mining after its wide spread use in the early 1950's, substantially increasing production and worker safety. Western Environment has determined that coal extraction rates increased from 60-70% in the older (Pillar Retreat) mines, to 70-80% or greater in the mines operating after introduction of the continuous miner.

Western Environment reviewed the records of the Colorado Department of Natural Resources, Mined Land Reclamation Division and found that the Main and Air shafts of the Clayton Mine had been "stabilized" in 1990 by injecting with low strength "fly ash based" grout. This would eliminate the potential for a open void forming, however not surface subsidence resulting from shaft fill compaction. Western Environment recommends that the location of the shafts be surveyed and, prior to development, capped and pressure grouted to prevent subsidence.



Room and Pillar mining



Continuous Miner

5.0 DRILLING PROCEDURES

Thirteen mud rotary borings (Figures 1 and 2), were completed on the North Westerly Project and the adjacent Erie High School site. These borings were completed under the supervision of Western Environment. A truck mounted drill was used to advance the borings completed on the High School Project (SV-1 through SV-7, Figure 1) while the recent borings (EL-1,2,3,4,6 and 8, Figure 1 and 2) utilized a track mounted drill. To reduce fluid loss, the recent borings advanced 5.5 inch surface casing to the soil/bedrock interface. The casing was removed following the completion of the borings.

All holes were both lithologically and geophysically logged. Lithologic strip logs were taken of cutting samples at five foot intervals. Geophysical logs consisting of natural gamma, spontaneous potential (SP), single point resistance, 16" and 64 " resistance were run on the holes complete for the North Westerly Project. A three arm caliper was run on all holes intercepting the mine workings for both the North Westerly and High School Projects.

The caliper tool was calibrated prior to each use to graphically show the diameter of the hole. The full extension of the arms would indicate a cavity of at least greater than 18 inches. The drill will normally make a 5.125 hole. Therefore, any significant variance in hole diameter could indicate mining activity.

After drilling and logging, each hole required plugging in a manner which would not allow water to enter the workings. On all holes, a simple cement plug was set from 2 to 15 feet or the bottom of the surface casing (after removal) with the remaining footage of the hole being filled with bentonite chips to inhibit fluid penetration. Native soil was then replaced from 2 feet to the surface.



Drilling and logging equipment, view to the west of EL-4

6.0 REGIONAL GEOLOGY

6.1 Outcropping Units

Outcropping units within and surrounding the project area are the Pierre Shale, the Fox Hills Sandstone, the Laramie Formation and Quaternary gravels and soils (Figure 4).

The Pierre Shale is a lead gray to brown and black shale of marine origin. Total thickness in the area is greater than 7,000 feet (Blair 1951), with the majority of the formation made up of shale. Near the top of the Pierre Shale it becomes increasingly sandy and contains beds of fine sandstones and siltstones as it grades into the Fox Hills Sandstone.

The Fox Hills Sandstone is a massive to crossbedded sandstone. It was deposited in a beach and/or delta-front environment and comfortably overlies the Pierre Shale. The lower two-thirds of the formation is a fine to coarse grained, bluff colored sandstone which weathers to a light tan to tan color. The Fox Hills Sandstone contains numerous iron colored calcareous concretions, ranging in size from fractions of an inch to several feet. The upper one-third of the Fox Hills Sandstone is a fine to medium grained, light grey to pale yellow, crossbedded sandstone. The total thickness of the formation near this location is about 140 feet as measured in the NW 1/4 of Section 28, T1S, R70W. However, thickness varies from 60 feet near Ralston Creek (Van Horn, 1957) to 250 feet near Baseline Reservoir.

The Laramie Formation, which underlies the site, is predominantly a fresh water deltaic sequence, consisting of clays, sands, silts and coals (Figure 5). The lower portion is approximately 100 feet thick and is composed of sandstones, sandy shales, claystones, and coal beds. The upper unit has a thickness of approximately 600 feet and is made up of mostly clay shales, very fine sandy shales, and lenticular beds of sandstone. The shales are largely carbonaceous and in places becomes lignitic. The Laramie Formation lies comfortably on the Fox Hills Sandstone.

6.2 Structure

The proposed subdivision lies on the western edge of the Denver-Julesberg Basin against the Front Range Uplift. This basin contains up to 13,000 feet of sediments derived from the ancestral Rockies which laid to the west. Three kinds of faulting occur in this portion of the basin. A basement-controlled late Cretaceous Laramide faulting is the most prevalent and is the result of deformation associated with uplift. The second has been described by Davis and Weimer (1976) as growth-faulting as a result of differential loading of the deltaic sequence at the time of deposition. The third type, recently identified, is low angle reverse faults.

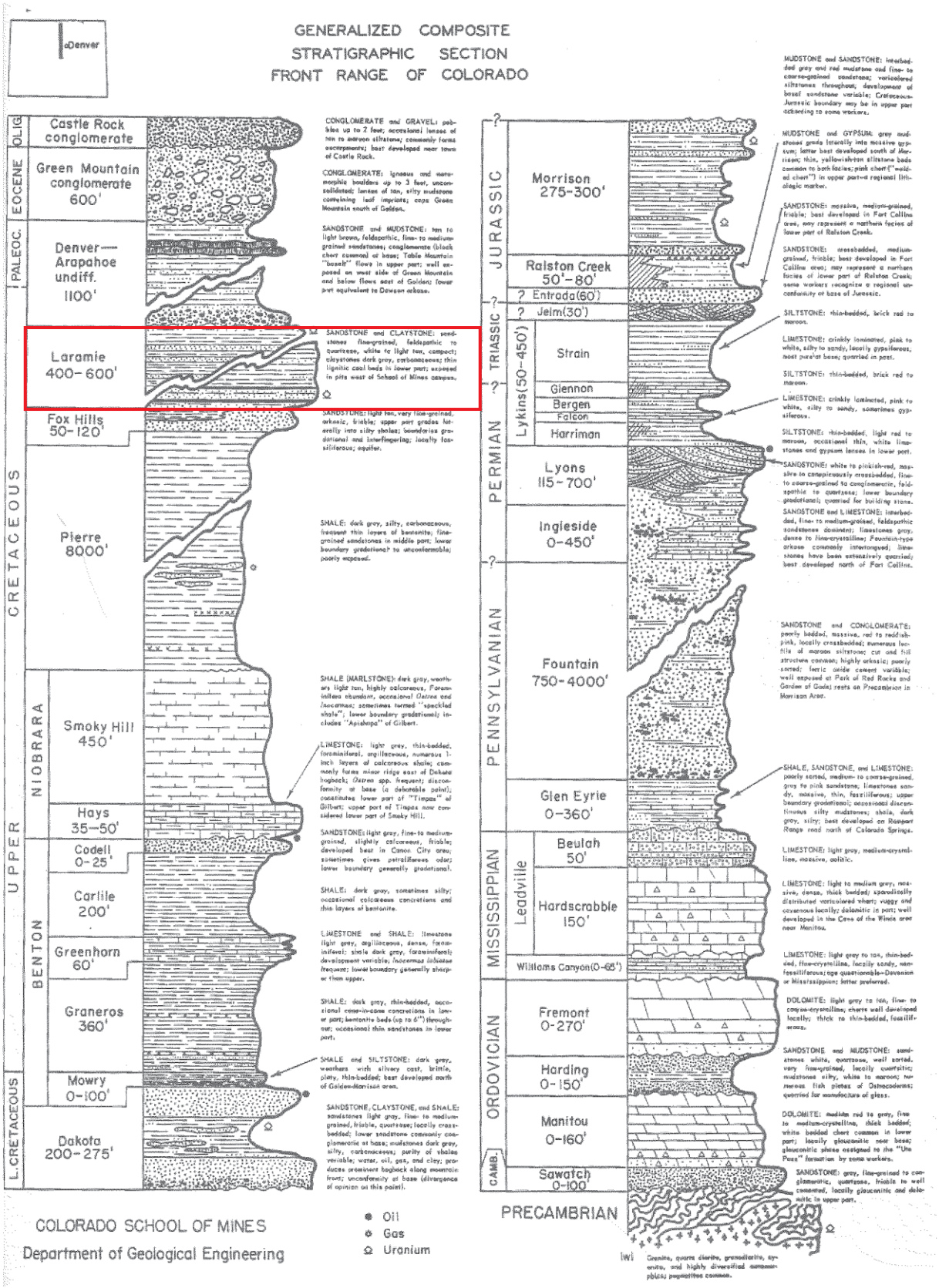

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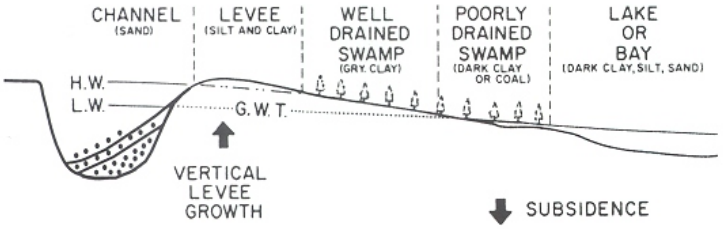
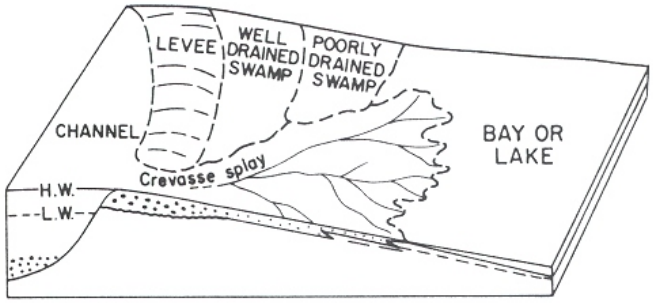
Figure 4- Generalized Stratigraphic Section
North Westerly Project
Section 16, Township 1 North, Range 68 West
Weld County, Colorado

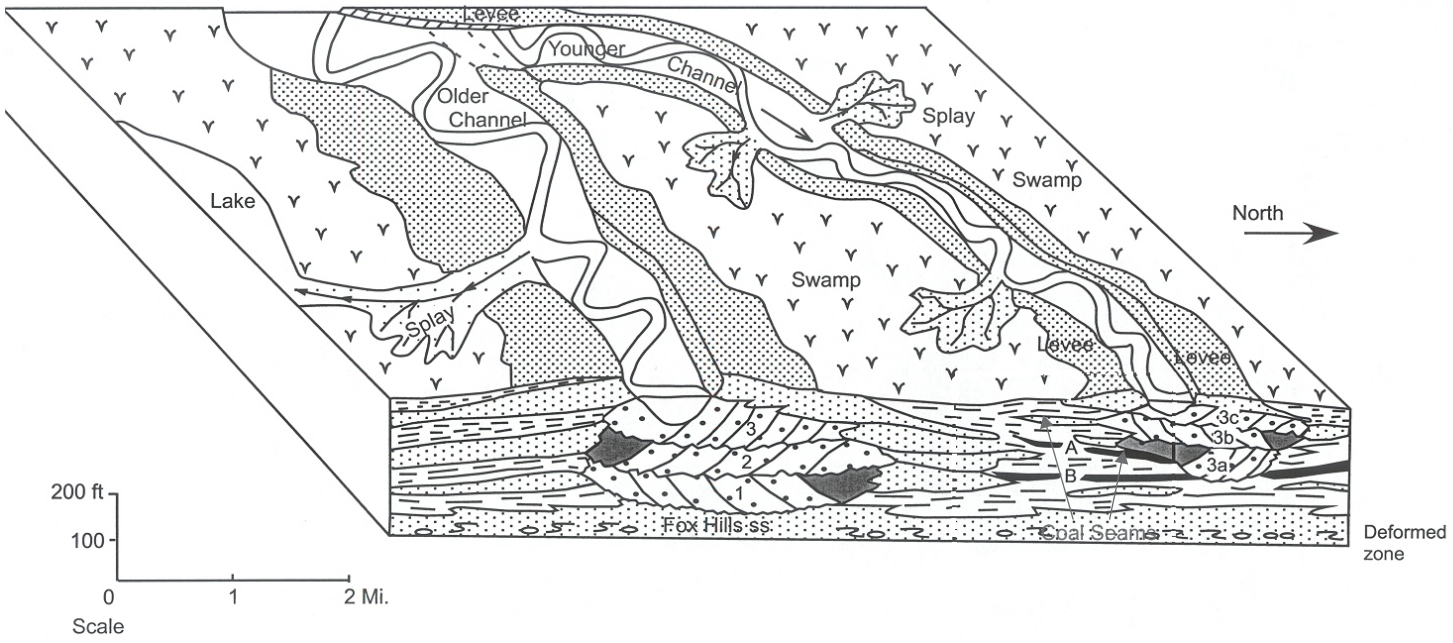


Channel and channel margin environments for lithologies in Laramie Formation.



LARAMIE ENVIRONMENTS OF DEPOSITION

Relationship of channel margin environments to crevasse splay deltas.



Figures from: A Guide to the uppermost Cretaceous stratigraphy, central Front Range Colorado, deltaic sedimentation, growth faulting and early Lamide vertical Movement
Weimer, R.J. 1973

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Figure 5 - Generalized Stratigraphic Model
Laramie Formation
North Westerly Project
Section 16, Township 1 North, Range 68 West
Weld County, Colorado

Growth faulting is the major structural feature seen in the area. A zone is present with dominant faults trending in a northeasterly direction. This system is ten miles wide and thirty miles long. These faults are high-angle, normal structures near the surface, but seismic work has shown that they tend to flatten and die out at depth. Work by Davis and Weimer (1976) shows that these listric normal faults do not continue below the Hygiene Member of the Pierre Shale. Antithetic faults resulting from tension then form horst and grabens. This effect had resulted in the increased thickness of sediments in the graben areas. The Fox Hills Sandstone has been reported to have a thickness near a growth fault of 484 feet (Spencer, 1961). The Laramie Formation also has increased thickness in these zones and this is believed to be the reason for the increased thickness of the coal seams in the Boulder-Weld coal field.

Recently investigators have recognized low angle reverse faults in the Boulder-Weld area. Kittleson (2009) describes the Longmont Detachment and identifies the Romero Fault as the footwall to the Detachment. These detachments are analogous to landslides, on a vastly larger scale, and occur in rocks exhibiting incomplete lithification. The footwalls to these detachments are low angle reverse faults seen on several projects in the Erie area.



1950 aerial photo Morrison Mine

7.0 SITE GEOLOGY

Three distinct lithologic units were encountered during drilling for the North Westerly and High School projects. Geologically, the most recent unit, of Pleistocene to Holocene Age, is a silty sandy soil occurring from the surface to 40 feet in depth. This unit appears to be aeolian (wind deposited) in origin. Western Environment's experience with the geo-technical properties of the unit has shown that, although high swell potentials are unlikely, collapsing upon saturation can occur.

Below the soil was the interbedded clays, silts, fine-grained sands, and coals of the Cretaceous Age Laramie Formation. This formation occurred from approximately 25 to 40 feet beneath the surface over the majority of the Erie Land Project site. A persistent 5 foot thick coal, designated the A Seam, occurred from 140 to 188 feet beneath the surface. Western Environment concluded that this coal was also the "main seam" of the Morrison Mine. Between 130 and 136 feet separated the A Seam (Morrison Mine) from the Clayton Mine "main seam". The depth of the Clayton Mine "main" coal seam ranged from 276 (EL-6) to 348 (EL-3) feet with an average depth of 302 feet. The average thickness of the Clayton Mine "main seam" varied from 5.0 to 10.0 feet. The depth of the Morrison Mine "main seam" was 188 feet as encountered in boring EL-8. The third significant geologic unit, identified only in the borings completed of the Erie High School Project, was the fine-grained quartzose sands of the Cretaceous Fox Hills Formation. The contact between the Laramie and the Fox Hills occurred at 355 in feet boring SV-1.

8.0 DESCRIPTION OF HOLES

The description of rotary holes drilled on the project and adjacent projects are from the drill cuttings taken every five feet, and interpretation of geophysical logs for each boring. North Westerly project borings are shown with **EL**, with **SV** indicating borings drilled on the Erie High School project.

Erie Land

EL-1 A light gray silt with sand soil occurred from 0 to 31 feet. Casing was set from the surface to 30 feet where light gray claystone was penetrated from 31 to 50 feet. A light gray very fine grained quartzose sandstone was encountered from 52 to 64. From 64 feet to 120 feet light gray claystone with thin sandstone lens occurred. The boring was not advanced due to an advancing thunderstorm with heavy rain requiring the equipment to be moved to a dry location. Total depth of the boring was 120 feet. No mine workings were encountered.

EL-2 A light gray silt with sand occurred from the surface 40 feet. Casing was set to 40 feet where light gray claystone was present to 51 feet. Light gray very fine grained quartzose sandstone was penetrated from 51 to 56 feet with gray claystone with thin sandstone lens encountered to 100 feet. A gray fine grained sandstone occurred from 100 to 105 feet. Medium gray claystone was penetrated from 105 to 174 feet where the **A seam** (Morrison Mine main seam) was encountered. The **A seam** was present from 174 to 180 feet carbonaceous claystone with thin sandstone ledges was drilled to 210 feet. Light gray very fine grained quartzose sandstone occurred from 210 feet to the total depth of the boring at 250 feet. Circulation was not lost and no mine workings were encountered.

EL-3 A light gray silt with sand occurred from the surface to 44 feet. Casing was set to 47 feet. Light gray claystone was encountered from 44 feet to 185 feet where medium gray carbonaceous claystone with thin quartzone sandstone lens was penetrated to 218 feet. The **A seam** (Morrison Mine main seam) was drilled from 218 feet to 222 feet. Medium gray claystone with sandstone lens occurred from 222 feet to 305 feet where circulation was momentarily lost with partial circulation returning at 315 feet. The **Clayton Mine main seam interval** was encountered from 348 feet to 355 feet the total depth of the boring. The calipar log indicated that collapse was complete with **no open voids**.

EL-4 Light gray silt with sand soil occurred from 0 to 52 feet. Light gray sandstone occurred from 52 to 64 feet. Light gray claystone was penetrated from 52 to 105 feet. Surface casing was set to 70 feet. Light gray very fine grained quartzose sandstone occurred from 105 feet 120 feet. Medium gray claystone was drilled from 120 feet to 182 feet where the **A seam** (Morrison Mine main seam) was encountered. The **A seam** was penetrated from 182 feet to 188 feet. Dark gray carbonaceous claystone with thin sandstone lens occurred from 188 feet to 230 where medium gray claystone was penetrated 280 feet where **circulation was lost**. From 280 feet to the total depth of the boring at 320 feet loose drilling and no sample recovery occurred. The **Clayton Mine main seam interval** was penetrated from 314 feet to 320 feet the total depth of the hole. The maximum caliper deflection of **9 inches** was observed from 276 to 277 feet. The caliper log indicated collapse was complete with **no open voids**.

EL-6 Light gray silt with sand occurred from the surface to 30 feet. Light gray claystone with thin fine grained quartzose sandstone lens was observed from 30 feet to 140 feet. Casing was set from the surface to 36 feet. The **A seam** (Morrison Mine main seam) was encountered from 140 to 145 feet. From 145 feet to 255 feet dark gray carbonaceous claystone with fine grained sandstone lens was observed. Circulation was momentarily lost from 256 feet to 263 feet. Loose drilling occurred from 286 to 292 feet. The **Clayton Mine main seam** interval was penetrated from 276 feet to 290 feet. The total depth of the boring was 310 feet. The caliper log indicated that collapse was complete with no open voids.

EL-8 Light gray silt with sand soil occurred from the surface to 35 feet. Surface casing was set to 36 feet. From 35 feet to 152 feet light gray claystone with thin sandstone lens was present. Circulation was lost at 152 feet with loose drilling to 175 feet. The **Morrison Mine main seam interval** (A seam) was present from 188 to 195. The total depth of the boring was 200 feet. No caliper log was run due to an equipment failure

Erie High School

SV-1 Light brown argillaceous soil was penetrated from 0 to 10 feet. From 10 to 40 feet medium brown claystone was drilled. Medium brown to medium gray claystone was penetrated from 40 to 60 feet. From 60 to 145 feet medium gray claystone was found. Medium gray carbonaceous claystone was drilled from 145 to 155 feet. Medium gray claystone was found from 155 to 260 feet. From 260 to 295 feet carbonaceous claystone was penetrated. Vitreous coal was drilled from 295 to 305 feet. Medium gray claystone was found from 305 to 355 feet. The Fox Hills Sandstone was penetrated from 355 to 360 feet. The total depth of the boring was 360 feet. No mine workings were encountered.

SV-2 From 0 to 5 feet light brown argillaceous soil with claystone was drilled. From 5 to 40 feet medium brown to medium gray claystone was found. Medium gray claystone was drilled from 40 to 65 feet. Medium gray carbonaceous claystone was penetrated from 65 to 70 feet. Medium gray to brown claystone was found from 70 to 100 feet. Medium gray claystone with carbonaceous intervals was drilled from 100 to 160 feet. Vitreous coal was found from 160 to 165 feet. Medium gray claystone with slight carbonaceous intervals was drilled from 165 to 190 feet. From 190 to 300 feet medium gray claystone was found. Circulation was lost at 300 feet. No samples were obtained from 300 to 340 feet. The maximum caliper deflection was 9.70 inches at 292 feet. The "main" seam interval was encountered from 292 to 298 feet. The total depth of the boring was 340 feet. Collapse was complete with no open voids.

SV-3 From 0 to 5 feet light brown argillaceous soil was penetrated. Medium brown to medium gray claystone was drilled from 5 to 50 feet. Medium gray claystone was penetrated from 50 to 115 feet. From 115 to 120 feet carbonaceous claystone was drilled. From 120 to 165 feet medium gray claystone was found. Medium gray carbonaceous claystone was drilled from 165 to 170 feet. From 170 to 175 feet medium gray claystone was penetrated. Vitreous coal and dark gray claystone was found from 175 to 180 feet. Medium gray claystone was drilled from 180 to 300 feet. Circulation was lost at 300 feet. From 300 to 340 feet no samples were

obtained. The maximum caliper deflection was 12.6 inches at 301 feet. The "main" seam interval was encountered from 298 to 304 feet. The total depth of the boring was 340 feet. Collapse was complete with no open voids.

SV-4 Light brown argillaceous soil was found from 0 to 10 feet. Light gray claystone was drilled from 10 to 40 feet. From 40 to 50 feet medium brown claystone was found. From 50 to 55 feet medium gray claystone was drilled. Light gray claystone was penetrated from 55 to 120 feet. Medium gray claystone was found from 120 to 165 feet. Vitreous coal was drilled from 165 to 170 feet. Medium gray claystone with carbonaceous intervals was found from 170 to 300 feet. Circulation was lost at 300 feet. No samples were obtained from 300 to 320 feet. The maximum caliper deflection was 14.5 inches at 298 feet. The "main" seam interval was encountered from 297 to 300 feet. The total depth of the boring was 320 feet. Collapse was complete with no open voids.

SV-5 Light brown argillaceous soil was found from 0 to 10 feet. From 10 to 135 feet light to medium gray claystone was drilled. Dark gray claystone was penetrated from 135 to 160 feet. Dark gray carbonaceous claystone was found from 160 to 165 feet. Medium gray claystone was found from 165 to 205 feet. From 205 to 220 feet dark gray carbonaceous claystone was penetrated. Medium gray claystone was found from 220 to 240 feet. From 240 to 275 medium gray claystone with sandstone was drilled. Dark gray carbonaceous claystone was found from 275 to 290 feet. Circulation was lost at 290 feet. No samples were retrieved from 290 to 320 feet. The maximum caliper deflection was 6.2 inches at 293 feet. The "main" seam interval was encountered from 292 to 298 feet. The total depth of the boring was 320 feet. Collapse was complete with no open voids.

SV-6 Light brown argillaceous soil was penetrated from 0 to 5 feet. From 5 to 40 feet light gray claystone was found. From 40 to 50 feet dark gray carbonaceous claystone was drilled. Light gray claystone was found from 50 to 80 feet. Dark gray claystone was penetrated from 80 to 90 feet. From 90 to 115 feet light gray fine-grained quartzose sandstone was drilled. From 115 to 175 light to medium gray claystone was found. From 175 to 185 feet dark gray claystone was found. Light to medium gray claystone was penetrated from 185 to 275 feet. From 275 to

280 feet light gray fine-grained quartzose was penetrated. Medium gray claystone

was drilled from 280 to 300 feet. From 300 to 310 feet vitreous coal was drilled. Medium gray claystone with slight vitreous coal was found from 310 to 315 feet. From 3 15 to 340 feet dark gray claystone was drilled. The total depth of the boring was 340 feet. No mine workings were encountered.

SV-7 Light brown argillaceous soil was drilled from 0 to 10 feet. From 10 to 80 feet light to medium gray claystone was penetrated. From 80 to 90 feet light gray fine-grained quartzose sandstone was drilled. Light to medium gray claystone was penetrated from 90 to 125 feet. Dark gray claystone was found from 125 to 130 feet. Light gray claystone was drilled from 130 to 180 feet. Light gray fine-grained quartzose sandstone was drilled from 180 to 185 feet. From 185 to 260 feet light to medium gray claystone was drilled. Dark gray claystone was penetrated from 260 to 265 feet. Light gray fine-grained quartzose sandstone was found from 265 to 270 feet. Medium gray claystone was drilled from 270 to 285 feet. Circulation was lost at 285 feet. No samples were obtained from 285 to 320 feet. The maximum caliper deflection was 5.5 inches at 290 feet. The top of the mined interval was at 290 feet. The total depth of the boring was 320 feet. Collapse was complete with no open voids.

9.0 DISCUSSION OF SUBSIDENCE PREDICTION METHODS

Piggot and Eynon (1977) states that "subsidence will not propagate to the ground surface over room and pillar workings where the overburden to extraction thickness ratio (H/h) exceeds 10." Additionally, Piggot and Eynon indicate that "Caving of the roof above a mine can continue until the extraction and collapse area is filled with broken and bulked rock or caving reaches the surface." Using a bulking factor of 40% as referenced in Piggot and Eynon (1977) and applying a safety factor of 1.5, caving will not propagate more than 90 feet above the mine. These assessments result in Piggot and Eynon concluding erroneously that no significant effects of subsidence occurs when a mine is greater than 90 feet in depth.

However, in a paper presented at the 1985 Conference on Coal Mine Subsidence in the Rocky Mountain Region, Sherman (1986) inventoried structural damage to over 100 buildings in the Louisville and Lafayette area constructed before mining. The results of this study were used to confirm, if not the validity, the conservatism of using the British National Coal Boards (NCB) Graphical Strain Profiling Method of subsidence prediction for projects in the Boulder/Weld Coal Field. Subsequently, the study also determined that "no two-story brick buildings built prior to mining survived through the late 1920's." This investigation together with other studies (Amuedo and Ivey, 1975) and (Myers, 1975), and reports of damage to buildings and roads in local newspapers (Denver Post, 1969) and (Louisville Times, 1978) indicate that surface subsidence as a result of coal mining has occurred throughout the Boulder/Weld area at mining depths greater 400 feet.

The subsidence prediction method employed by Western Environment, the NCB Graphical Strain Prediction method, was developed for long wall mining methods. It is our opinion that the pillar retreat method and certainly the shortwall method used in the Boulder Valley, Columbine and Eagles Mines, more closely resembles the long wall method in recovery percentage and surface subsidence (Oravecz, 1977) and (Sherman, 1986) then the classical room and pillar method evaluated by Piggot and Eynon (1977).

The use of the Piggot and Eynon (1977) research regarding collapse and bulking is valid when mine geometry is similar to room and pillar extraction methods. However, Western Environment would agree that post-extraction collapse of mines that utilize the pillar retreat method, would more closely resemble room failure and therefor not propagate to the surface when a bedrock thicknesses are in excess of 90 feet.

10.0 STRAIN ANALYSIS

The strain analysis performed for this study is adapted from the United Kingdom National Coal Board's graphical strain profiling system. This method of strain prediction was developed for on-going long wall mining operations. To make the method applicable to abandoned room and pillar mines, several modifications and assumptions were made.

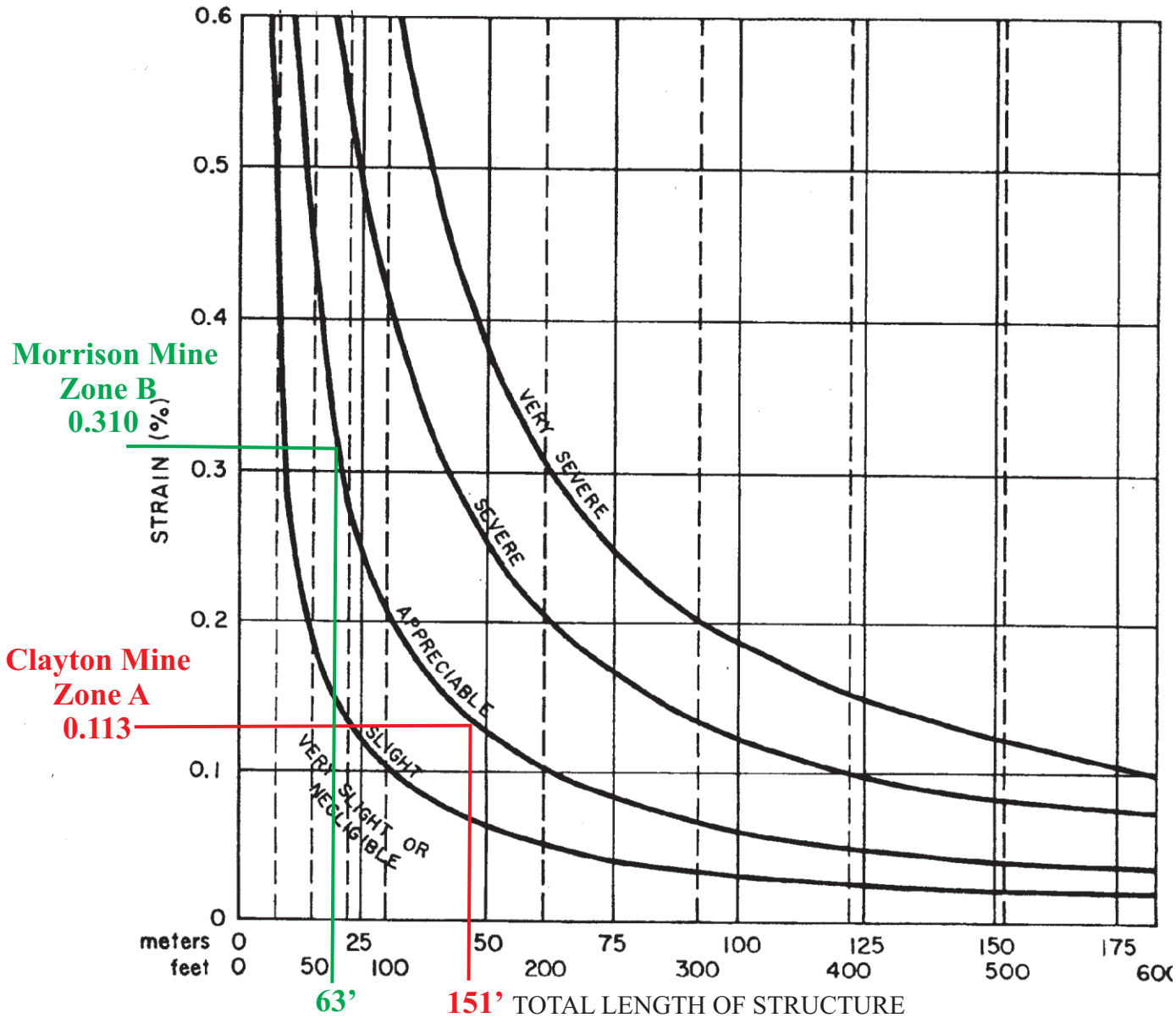
The first modification is to define the thickness of the void space. The standard method is to use the actual mined thickness of coal. However, the drill holes completed on the referenced projects show collapse to be complete. Therefore, to proceed with a "worst case" theoretical analysis, the following assumption was made: any increase in hole diameter greater than 50% (9 inches for 5 1/8 inch boring) will be treated as an open void. The amount of "theoretical" void for all holes intercepting the "main seam" mine of the Clayton Mine was averaged as **0.94 feet**. Western Environment used the average the depth to the top of the Clayton Mine or mine interval for all borings completed within Section 16. These produced an average depth of **302 feet.**

Table 1. Depth to top of mined interval and theoretical void, Clayton Mine

Boring	Depth to Top of Main Seam/Mined Interval (Feet)	Theoretical Void (Feet)
EL-1	N/A	N/A
EL-2	(311')	N/A
EL-3	348'	0.0'
EL-4	314'	1.0'
EL-6	276'	0.0'
EL-8	(323')	N/A
SV-1	295'	N/M
SV-2	292'	2.0'
SV-3	298'	2.5'
SV-4	297'	2.0'
SV-5	292'	0.0'
SV-6	296'	N/M
SV-7	290'	0.0'
AVERAGE	**302'**	**0.94'**

(311') Estimated depth

The width of the extraction is critical to the analysis. Several options are available to use in the analysis. They include distance between drill holes, actual width (length) of the workings, or arbitrary values to produce the maximum amount of subsidence. Western Environment chose to use the actual width (length) of the workings shown on the original mine maps, which is approximately **150 feet** for both the Clayton and Morrison Mines.



CLASS OF DAMAGE	DESCRIPTION OF TYPICAL DAMAGE
VERY SLIGHT OR NEGLIGIBLE	SLIGHT CRACKS SHOWING IN WALLS AND CEILINGS INSIDE BUILDINGS, BUT NOT VISIBLE ON OUTSIDE.
SLIGHT	SLIGHT CRACKS SHOWING INSIDE THE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE.
APPRECIABLE	SLIGHT CRACKS SHOWING BOTH OUTSIDE AND INSIDE BUILDING. DOORS AND WINDOWS WILL NOT CLOSE. DRAINS, SEWERS, AND GAS PIPES FRACTURE.
SEVERE	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.
VERY SEVERE	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
State Land Board Parcel
Section 16, Township 1 North, Range 68 West,
Weld County, Colorado

The reader is here encouraged to review both the United Kingdom National Coal Board's Subsidence Handbook, and the previous studies for the mechanics of the process. By using this information, the maximum "worst case" theoretical horizontal strains for the Clayton Mine with **Subsidence Zone A** would be **0.113%**. This "theoretical worst case" strain would cause "slight" damage to structures or foundation segments (Figure 6)

Both the Morrison and Clayton Mines occur beneath **Subsidence Zone B.** However**,** only a single boring EL-8 penetrated the Morrison Mine. Theoretical surface strains and subsidence in areas above multi-level mining are additive producing appreciably greater strain values and surface subsidence. Western Environment used the theoretical void thickness for the Clayton Mine of 0.94 feet and the depth to the Morrison Mine in boring EL-8 of 188 feet to produce a strain of 0.197% for the Morrison Mine. Adding the Clayton strain to the Morrison strain produced a combined surface strain of **0.310%**. This results in foundation length restriction of **64.0 feet** for Subsidence Zone B (Figure 6).

The areas of the proposed development affected by these structure length restrictions are shown on Figure 3. **Portions of project outside of the 0% strain line shown have no subsidence related development restrictions.**

11.0 CLOSURE

The recommendations provided herein were developed from the information obtained from field exploration which reflect subsurface conditions only at the specific locations, at the particular times designated. Subsurface conditions at other locations and times may differ from conditions occurring at these locations. The nature and extent of any variations between the drill holes may not become evident until or during the course of construction. If variations then appear, it may be necessary to re-evaluate the recommendations of this report after performing on-site observations during the excavation period and noting the characteristics of any variations.

This report was prepared by a Professional Geologist, not an engineer, and should not be construed as, or substituted for, engineering. This report is intended to inform geotechnical and structural engineers working on building design of the potential earth forces that could develop at the site, and to assist the client in determining whether to acquire and build on the site in question.

Our professional services have been performed, our findings, and our recommendations prepared in, accordance with generally accepted geological principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

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Appendix A

Architectural Techniques to Reduce Subsidence

ARCHITECTURAL TECHNIQUES TO REDUCE STRUCTURAL DAMAGE DUE TO SUBSIDENCE

Numerous papers have been written concerning building techniques designed to accommodate strain associated with subsidence (NTIS 1979). Presented below are some very basic strain reduction techniques which could be incorporated into structures located in these areas.

A structure of simple box form, designed to act as a unit, is best suited to resist the effects of mining subsidence. The smaller the plan of the building, the less likelihood there is of damage, and therefore, attached structures should be avoided. Where it is desired to retain the attached plan, this can be achieved by building units with adequate gaps between them to permit movement. Semi-detached buildings are preferable to detached. Outbuildings should not be attached structurally to the main building; they should be able to move independently.

The gaps between the structural units should be kept free from obstructions and should extend through the foundations; they should be sufficient to prevent adjacent units from coming into contact when the ground is deformed by subsidence. A gap of at least four inches is suggested for two-story buildings. Suitable gaps should be provided in all boundary walls especially when they abut a structure.

If required, areas between units should be paved with a flexible material, such as asphalt, incapable of offering any appreciable resistance to horizontal compression. Solid concrete paving should not be used.

Openings are a source of weakness in walls and should be kept as small as other considerations permit. Windows and doors are best arranged with substantial widths of brickwork around them so that the wall, wether reinforced or not, may be as strong as possible. Arched lintels should not be used. Corner windows, bay windows, and other similar projections weaken the structure, door openings have more serious weakening effects than windows and are best located in the shorter sides of buildings. If in the longer sided, they should be installed in the middle rather than at the ends of the building. Front and back doors should not be arranged closely side by side.

Floors and flat roofs should be fastened to all walls and not merely to those which carry joists and rafters. Plasterboard or fiberboard should be used for ceilings. To ensure continued effective drainage if the building has been tilted by subsidence, the gradients of gutters should be kept higher than normal.

For complete protection against damage due to subsidence, a building would have to be able to resist the effects of vertical and horizontal differential movements. Protection against most damage by differential horizontal movements is comparatively simple and may be obtained by building the structure on a lightly reinforced concrete base slab which is bedded on granular material. The base slab ties the walls together and the flat underside forms slip surface. The total tensile strength of the slab in the direction of either principal axis should be adequate to resists a force equal to the product of half the weight of the structure on the slab and the coefficient of friction between the slab and granular material. Before placing the reinforcement and concrete in the base slab, the granular material in the sub-grade should be covered with a layer of stout waterproof paper (to form a slip plane). The provision of a reinforced base slab, combined with the recommendations already made, should be sufficient to prevent damage except where differential vertical movement occur.

The resistance of the walls to flexure may be increased by the introduction of steel reinforcement in any brickwork. The additional cost of such reinforcement is justifiable only in structures certain to be subjected to severe differential vertical movements, such as those near the boundaries of mine workings. Horizontal reinforcement may be used in brick walls of any thickness, but vertical reinforcement can only be used in wall 9 inches thick or more. Special care is necessary where steel reinforcement is to be used in conjunction with brickwork; the metal will not be protected from corrosion in the same way as rods in well made concrete. Lime mortar should be used in brickwork. Damp-proof courses should be of the bituminous type.

The weakest mortar consistent with the normal load-carrying requirements of the walls should be used. This will allow the walls to adjust themselves to moderate changes of curvature of the ground without serious cracking. If the ground on which the structures are built is of a yielding nature, the conditions will be more favorable than if it is yielding since abrupt changes of curvature are less likely.

APPENDIX B

Lithologic and Geophysical Logs

HOLE NUMBER: EL- 1	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 120'
DATE: 5/1/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	
15	
20	
25	
30	Light gray claystone
35	
40	
45	Light gray sandstone
50	
55	
60	
65	Light gray claystone with thin sandstone lens
70	
75	
80	
85	
90	
95	
100	
105	
110	
115	
120	TD-120'
125	NOTE: Hole stopped due to advancing rain
130	
135	
140	
145	
150	
155	
160	
165	
170	
175	
180	
185	
190	
195	
200	

HOLE NUMBER: EL- 2	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 250'
DATE: 5/3/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	
15	
20	
25	
30	
35	
40	Light gray claystone
45	Light gray sandstone
50	Light gray claystone with thin sandstone lens
55	
60	
65	
70	
75	
80	
85	
90	
95	
100	Gray very fine grained quartzose sandstone
105	Medium gray claystone
110	
115	
120	
125	
130	
135	
140	
145	
150	
155	
160	
165	
170	
175	
180	Coal (A seam)
185	Medium gray claystone
190	
195	
200	

HOLE NUMBER: EL- 2	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 250'
DATE: 5/3/24	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
205	Light gray qtz sandstone
210	
215	
220	
225	
230	
235	
240	
245	
250	TD 250' Circulation not lost, no mine workings encountered
255	
260	
265	
270	
275	
280	
285	
290	
295	
300	
305	
310	
315	
320	
325	
330	
335	
340	
345	
350	
355	
360	
365	
370	
375	
380	
385	
390	
395	
400	

HOLE NUMBER: EL- 3	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 360'
DATE: 5/8/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	
15	
20	
25	
30	
35	
40	Light gray claystone
45	
50	
55	
60	
65	
70	
75	
80	
85	
90	
95	
100	
105	
110	
115	
120	
125	
130	
135	
140	
145	
150	
155	
160	Medium gray claystone
165	
170	
175	
180	
185	
190	Light gray qtz sandstone
195	
200	

HOLE NUMBER: EL- 3	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 360'
DATE: 5/7/24	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
205	Light gray qtz sandstone
210	
215	
220	Coal (A seam)
225	Medium gray claystone with thin sandstone lens
230	
235	
240	
245	
250	
255	
260	
265	
270	
275	
280	
285	
290	
295	
300	
305	Lost circulation
310	
315	Circulation partially returned
320	
325	
330	
335	
340	
345	
350	Coal (main seam)
355	Collapse complete no open void
360	TD 360'
365	
370	
375	
380	
385	
390	
395	
400	

HOLE NUMBER: EL- 4	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 320'
DATE: 5/11/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	(5.5" casing from surface to 70')
15	
20	
25	
30	
35	
40	Light gray claystone
45	
50	Light gray very fine grained qtz sandstone
55	
60	
65	Medium gray claystone
70	
75	
80	
85	
90	
95	
100	
105	
110	Light gray very fine grained qtz sandstone
115	
120	Medium gray claystone
125	
130	
135	
140	
145	
150	
155	
160	Medium gray claystone
165	
170	
175	
180	Coal (A seam)
185	Dark gray carbonaceous claystone with thin sandstone lens
190	
195	
200	

HOLE NUMBER: EL- 4	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 320'
DATE: 5/11/24	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
205	Dark gray carbonaceous claystone with thin sandstone lens
210	
215	
220	Light gray very fine grained qtz sandstone
225	
230	Medium gray claystone
235	
240	
245	
250	'
255	
260	
265	
270	
275	
280	Circulation lost, loose drilling to 315' no samples
285	
290	
295	
300	Main seam interval
305	
310	
315	Main seam interval
320	TD 320'
325	
330	
335	
340	
345	
350	
355	
360	
365	
370	
375	
380	
385	
390	
395	
400	

HOLE NUMBER: EL- 6	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 310'
DATE: 5/14/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	
15	
20	
25	Light gray claystone with thin fine grained qtz sandstone lens
30	
35	
40	
45	
50	
55	
60	
65	
70	
75	
80	
85	
90	
95	
100	Medium gray claystone
105	
110	
115	
120	
125	
130	
135	
140	Coal (A seam)
145	
150	Dark gray carbonaceous claystone
155	
160	
165	
170	
175	
180	
185	
190	
195	
200	

HOLE NUMBER: EL- 6	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 310'
DATE: 5/14/24	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
205	Dark gray carbonaceous claystone with thin sandstone lens
210	
215	
220	Light gray very fine grained qtz sandstone
225	
230	Medium gray claystone
235	
240	
245	
250	'
255	Circulation lost 256'-263'
260	
265	
270	Main seam interval
275	
280	Loose drilling 286'-292'
285	
290	Main seam interval
295	
300	
305	
310	TD 310'
315	
320	
325	
330	
335	
340	
345	
350	
355	
360	
365	
370	
375	
380	
385	
390	
395	
400	

HOLE NUMBER: EL- 8	LOCATION: Section 16 Subsidence S16,T1N, R68W	JOB NO.: 778-005-02
DRILLED BY: Authentic (John Tegtmeier)	LOGGED BY: GDS	TOTAL DEPTH: 200'
DATE: 5/17/2024	BIT SIZE: 4.75"	DRILLED WITH: AIR MUD X

DEPTH	SAMPLE DESCRIPTION
5	Light gray silt with sand
10	
15	
20	
25	
30	
35	Light gray claystone with thin fine grained quartzose sandstone lens
40	
45	
50	
55	
60	
65	
70	
75	
80	
85	
90	
95	
100	Medium gray claystone
105	Light gray very fine grained sandstone
110	
115	
120	
125	Medium gray claystone
130	
135	
140	
145	Dark gray carbonaceous claystone
150	Poor circulation
155	Lost circulation 152' no samples loose drilling 152'-175'
160	
165	
170	Coal (A seam) collapse interval 170'-196'
175	
180	
185	
190	
195	
200	TD 200' No caliper log due to equipment failure

COLOG
borehole geophysics / hydrophysics

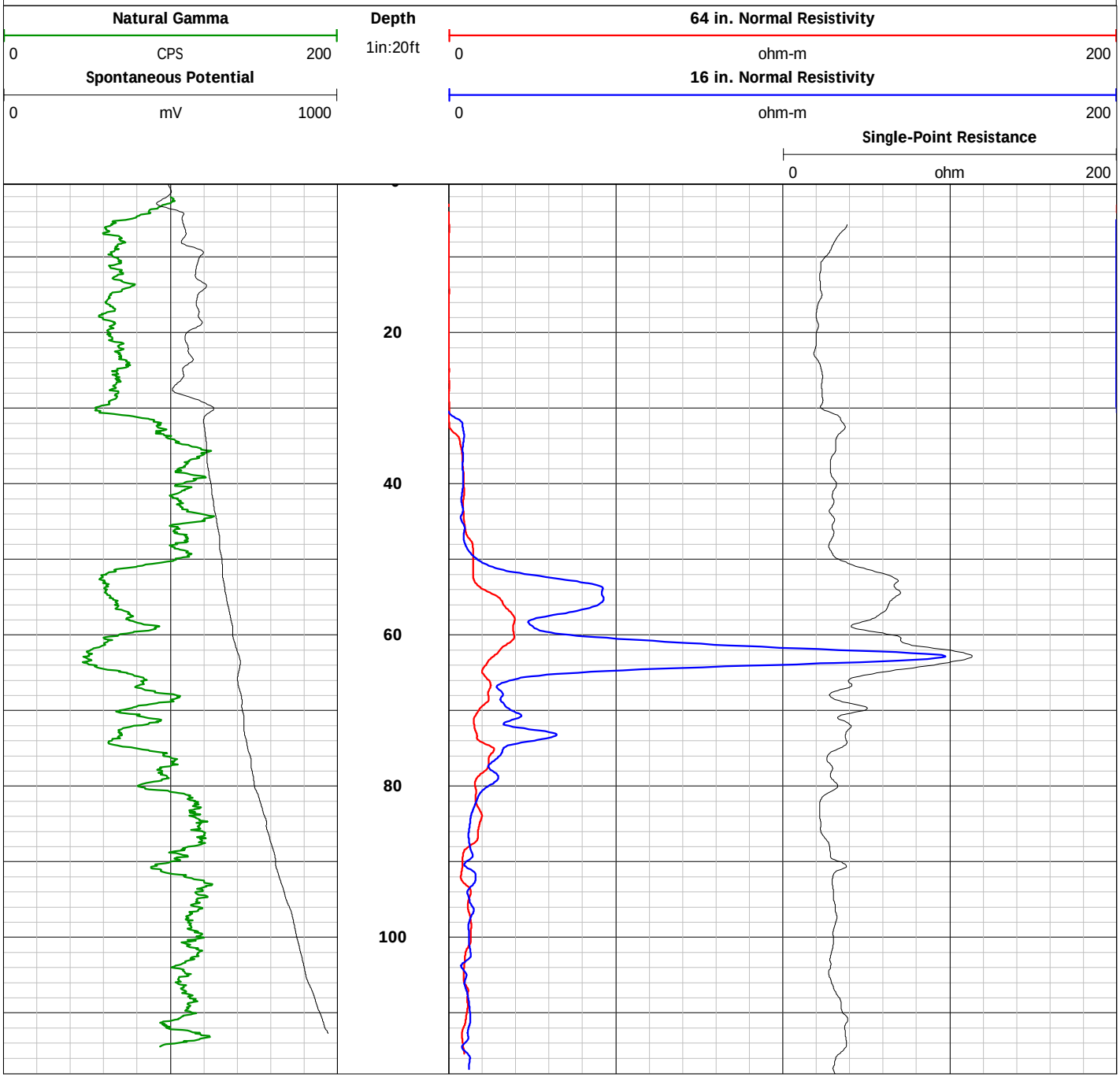
Geophysical Summary

COMPANY: Western Environment | PROJECT: Erie, CO

DATE LOGGED: 3 May 2024 | WELL: EL-1

833 Hogback Drive
Golden, CO 80403
(303) 279-0171
www.colog.com

COMMENTS:



COLOG
borehole geophysics / hydrophysics

Geophysical Summary

COMPANY: Western Environment | PROJECT: Erie, CO

DATE LOGGED: 3 May 2024 | WELL: EL-2

833 Hogback Drive
Golden, CO 80403
(303) 279-0171
www.colog.com

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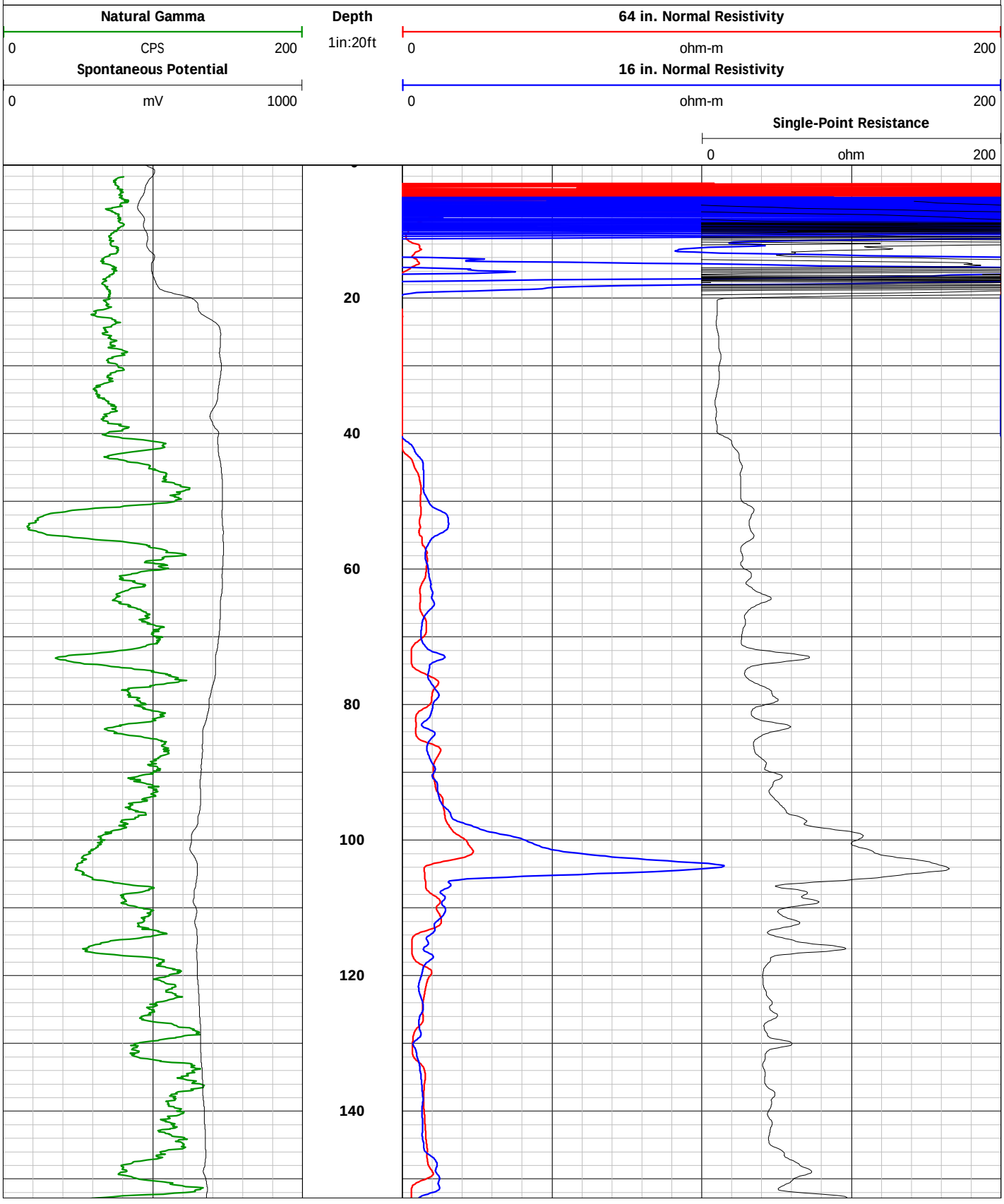

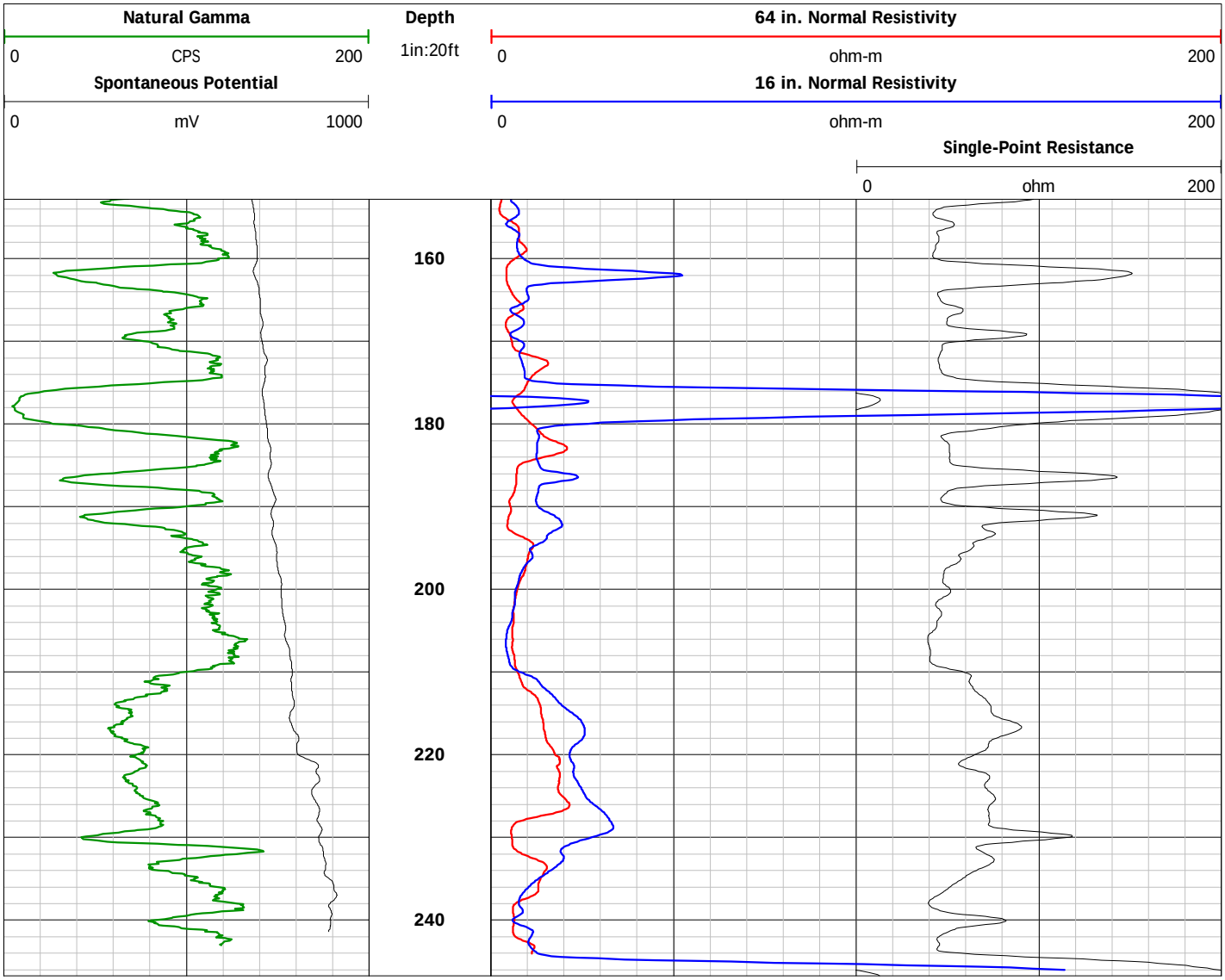
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CPS
200
Spontaneous Potential
0
mV
1000
Depth
1in:20ft
64 in. Normal Resistivity
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ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
160
180
200
220
240

COLOG
borehole geophysics / hydrophysics

Geophysical Summary

COMPANY: Western Environment	PROJECT: Erie, CO
DATE LOGGED: 8 May 2024	WELL: EL-3

833 Hogback Drive
Golden, CO 80403
(303) 279-0171
www.colog.com

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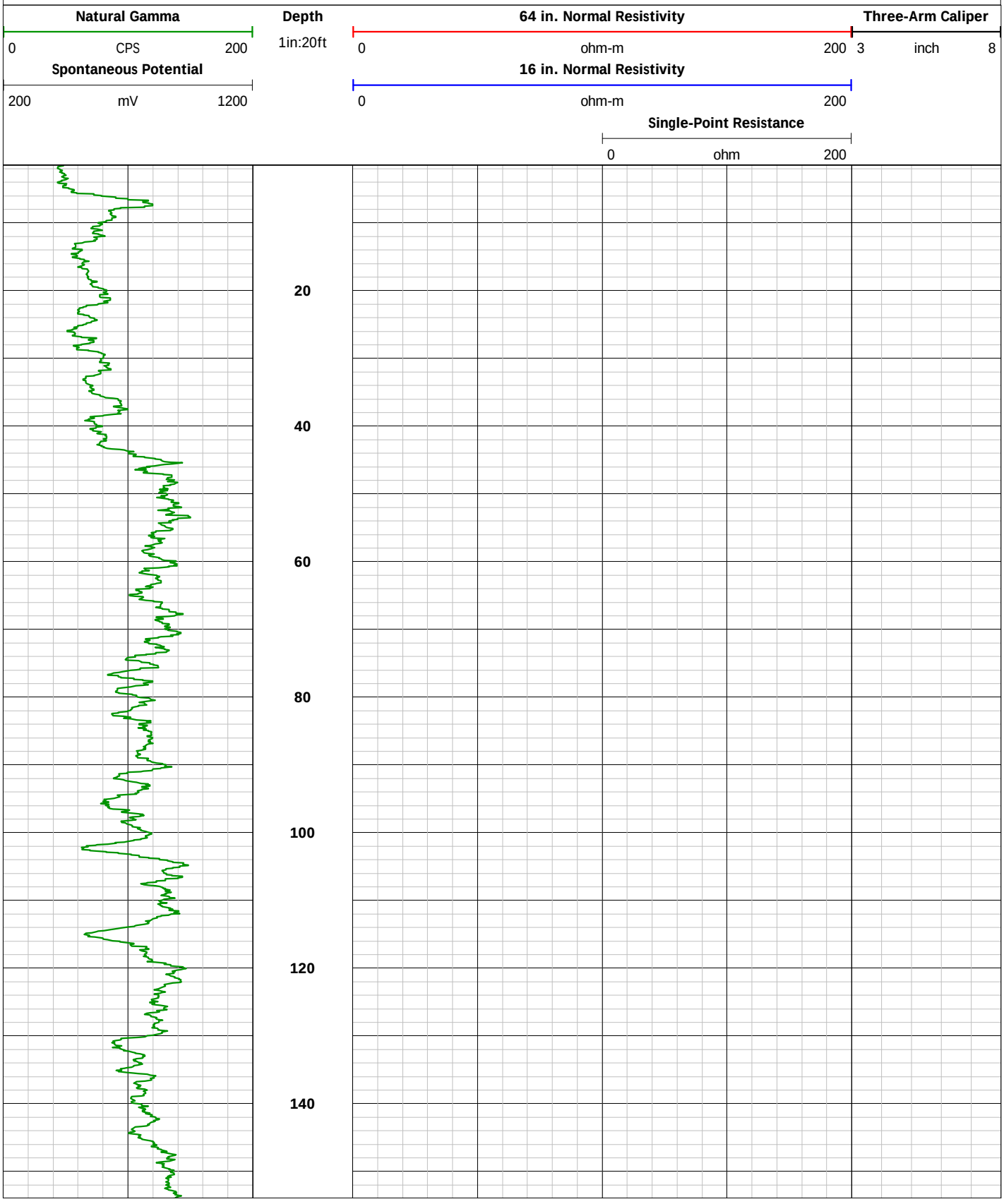

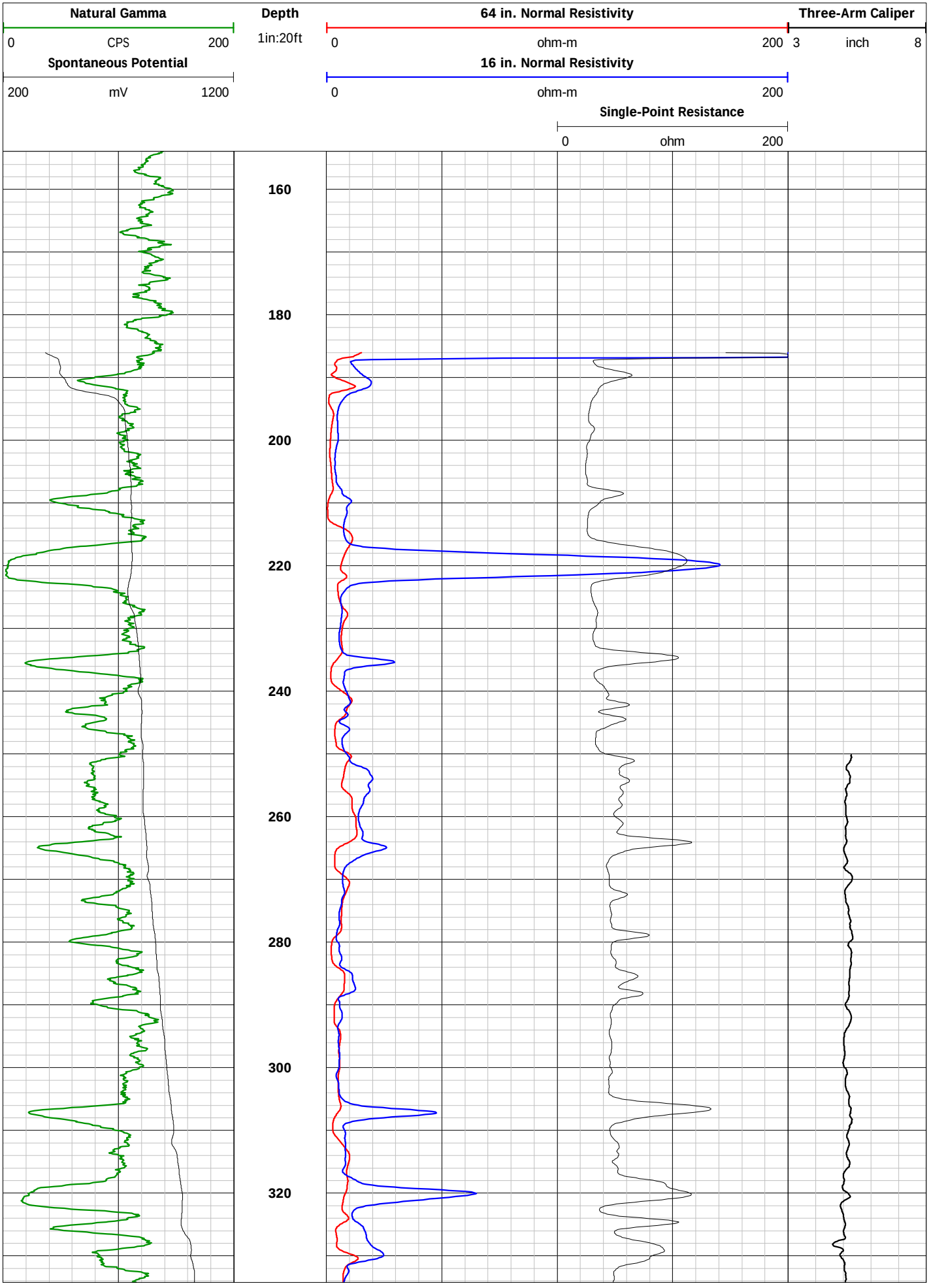
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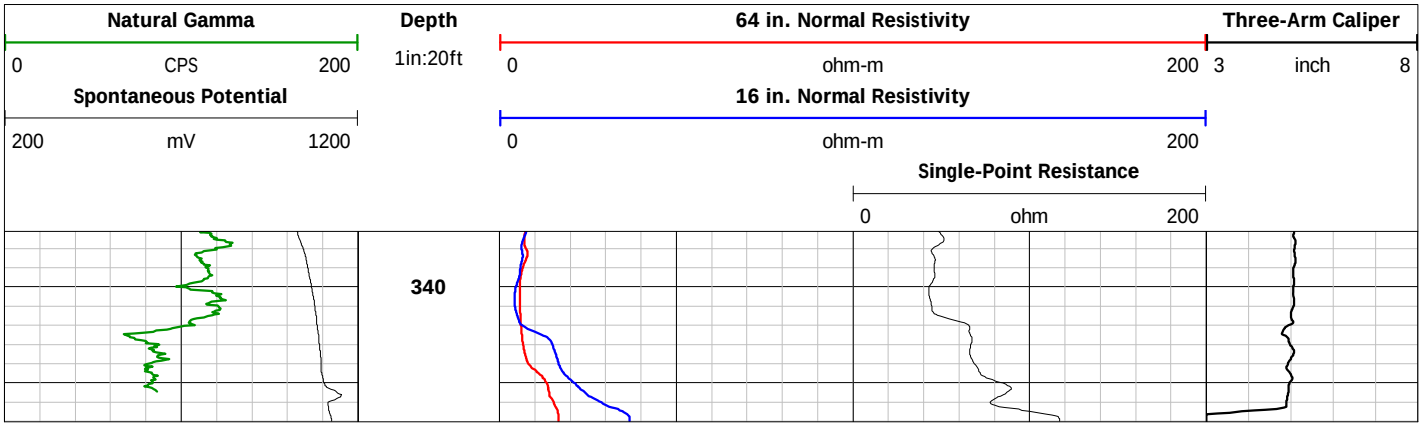
CPS
200
Spontaneous Potential
200
mV
1200
Depth
1in:20ft
64 in. Normal Resistivity
0
ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
Three-Arm Caliper
3
inch
8
160
180
200
220
240
260
280
300
320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Spontaneous Potential
200
mV
1200
Depth
1in:20ft
340
64 in. Normal Resistivity
0
ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
Three-Arm Caliper
3
inch
8

COLOG
borehole geophysics / hydrophysics

Geophysical Summary

COMPANY: Western Environment | PROJECT: Erie, CO

DATE LOGGED: 11 May 2024 | WELL: EL-4

833 Hogback Drive
Golden, CO 80403
(303) 279-0171
www.colog.com

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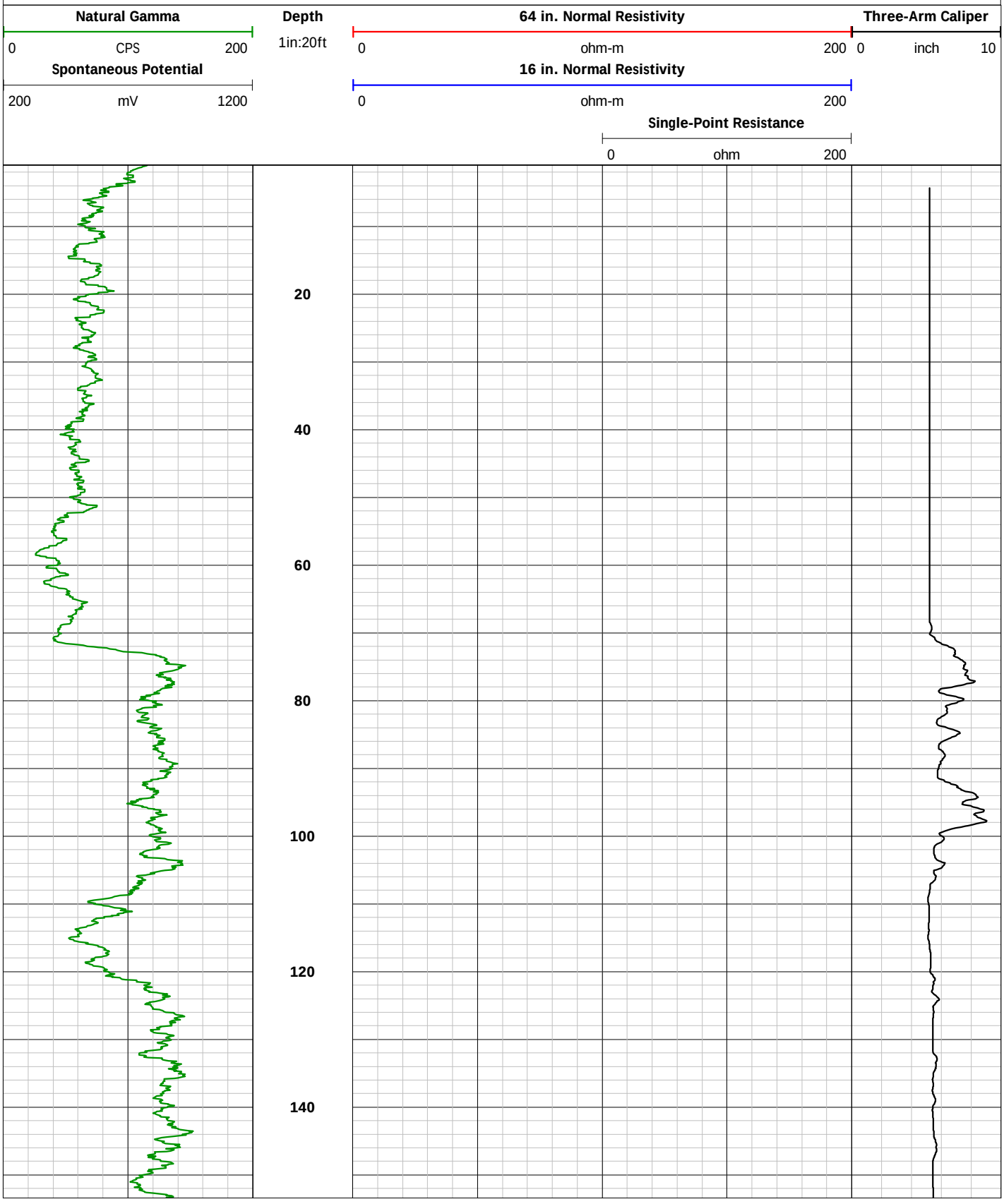

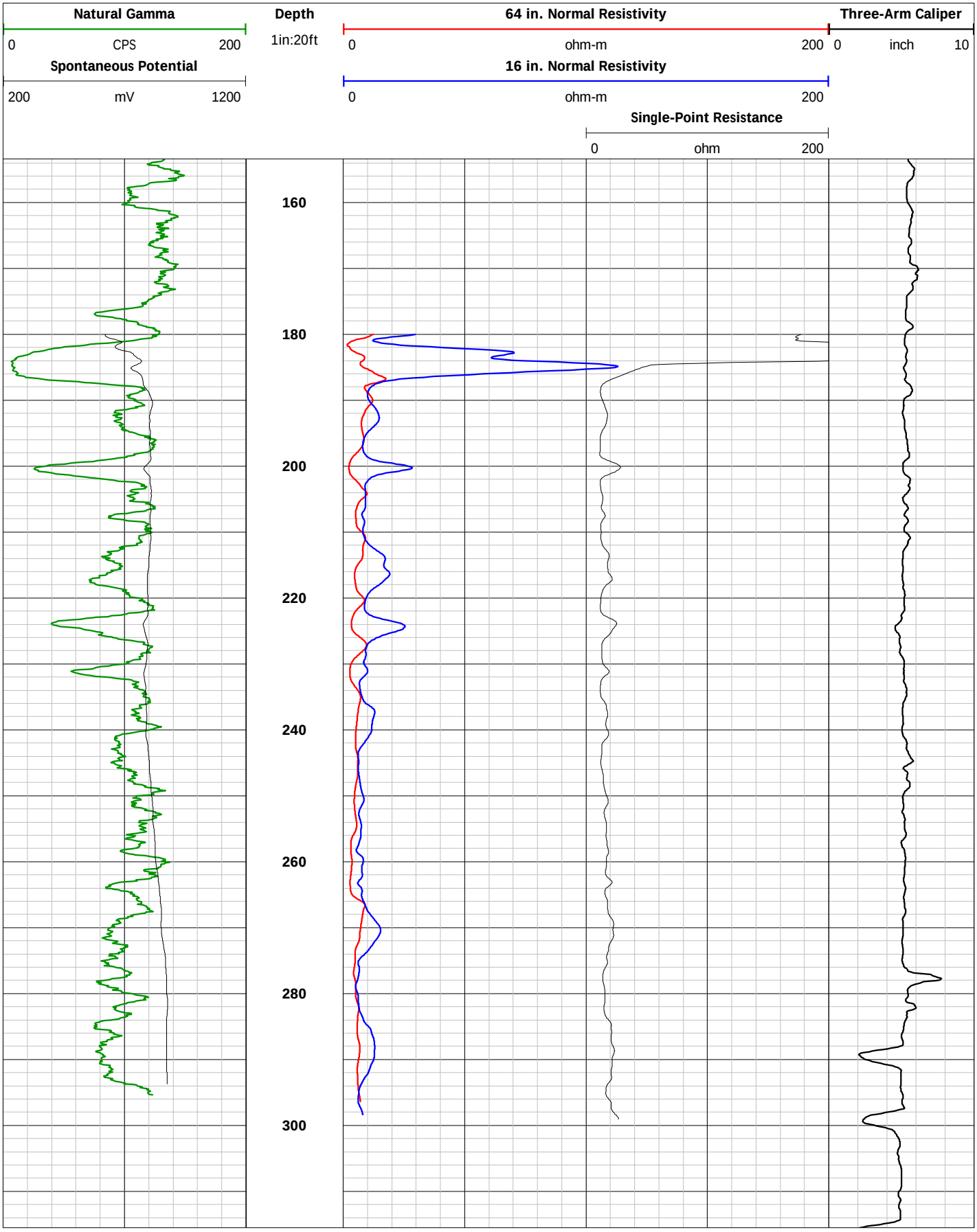
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CPS
200
Spontaneous Potential
200
mV
1200
Depth
1in:20ft
64 in. Normal Resistivity
0
ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
Three-Arm Caliper
0
inch
10
160
180
200
220
240
260
280
300

COLOG
borehole geophysics / hydrophysics

Geophysical Summary

COMPANY: Western Environment | PROJECT: Erie, CO

DATE LOGGED: 14 May 2024 | WELL: EL-6

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Golden, CO 80403
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www.colog.com

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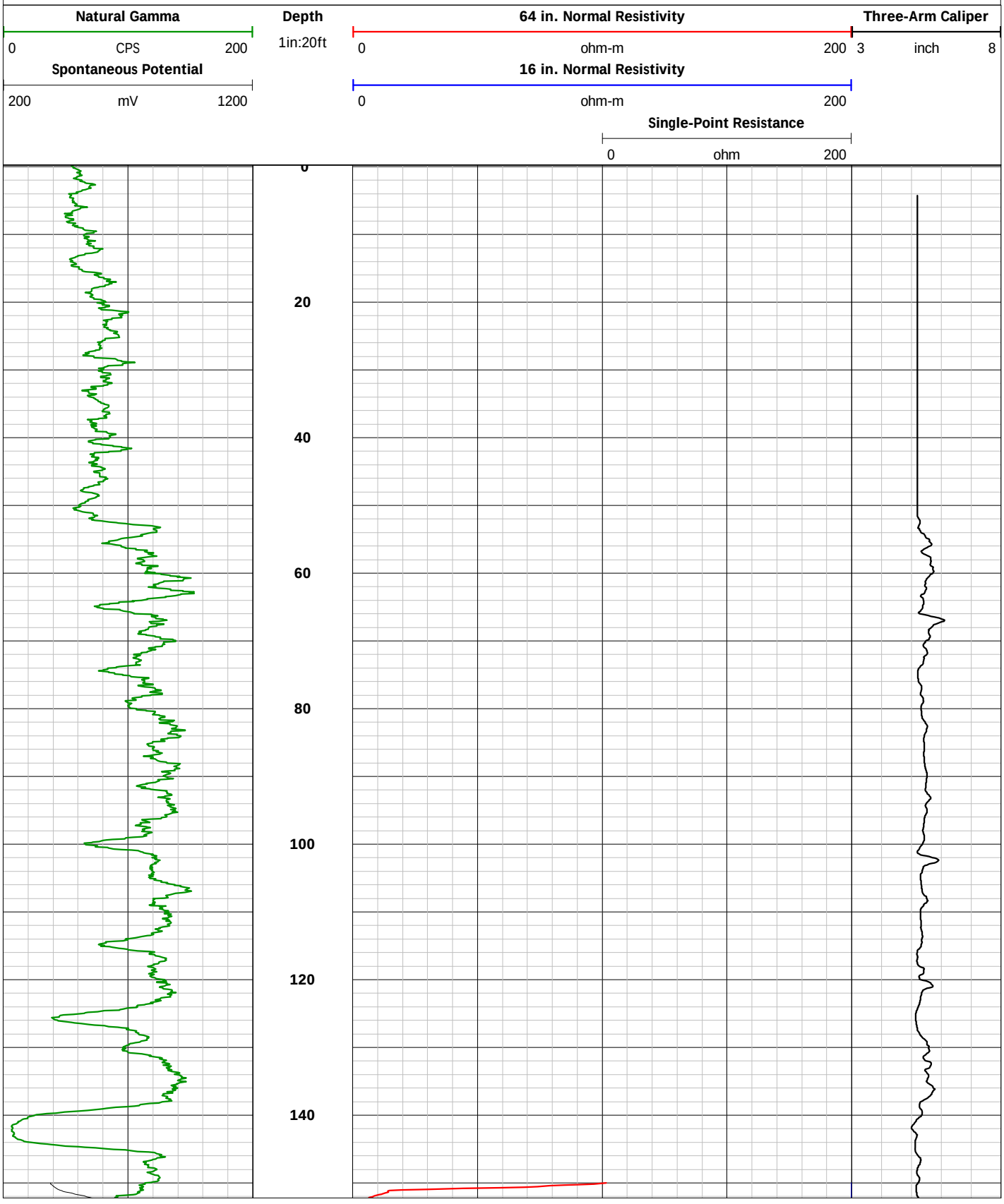

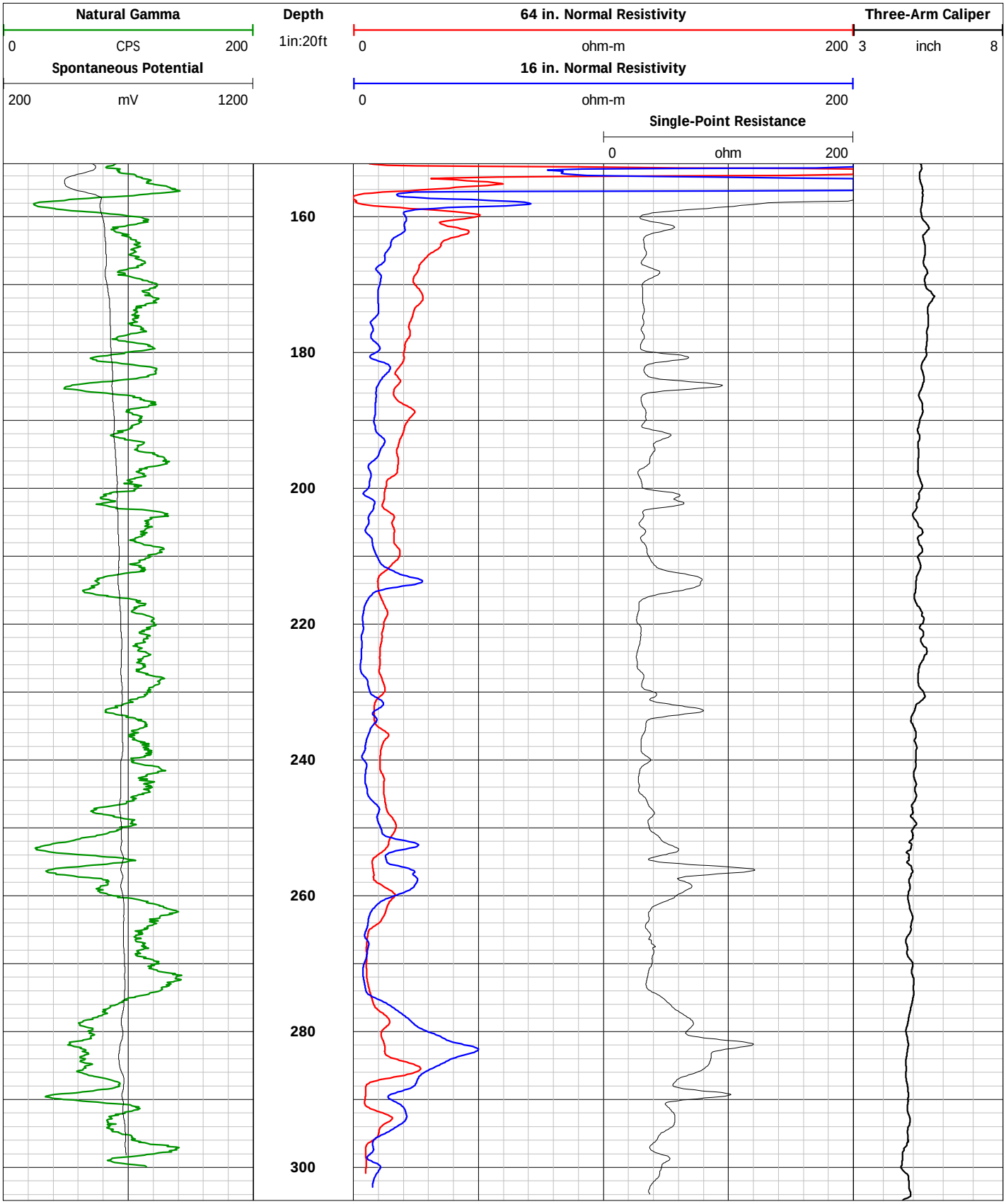
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mV
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Depth
1in:20ft
64 in. Normal Resistivity
0
ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
Three-Arm Caliper
3
inch
8
160
180
200
220
240
260
280
300

Geophysical Summary

COLOG
borehole geophysics / hydrophysics

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COMPANY: Western Environment | PROJECT: Erie, CO

DATE LOGGED: 16 May 2024 | WELL: EL-8

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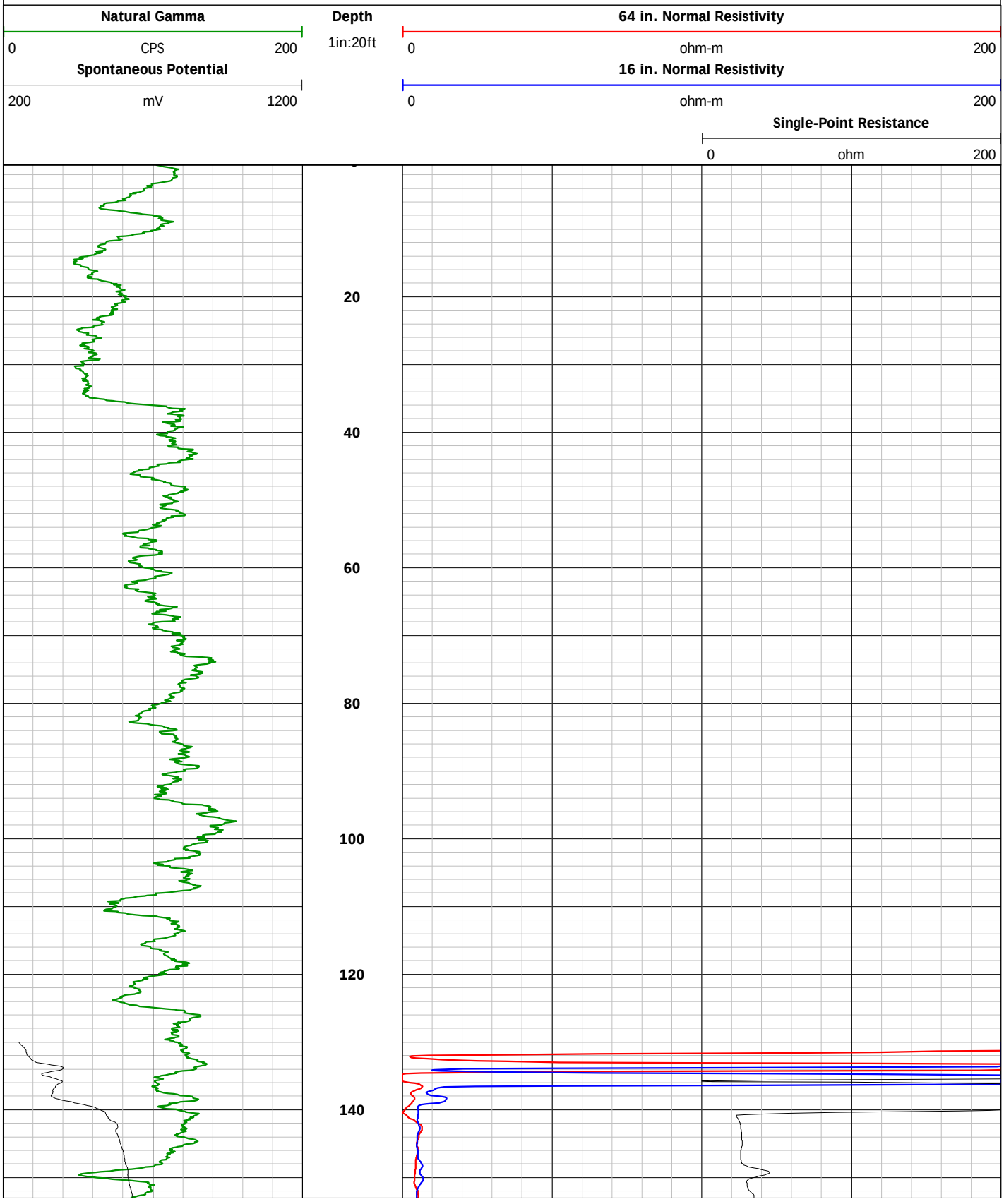

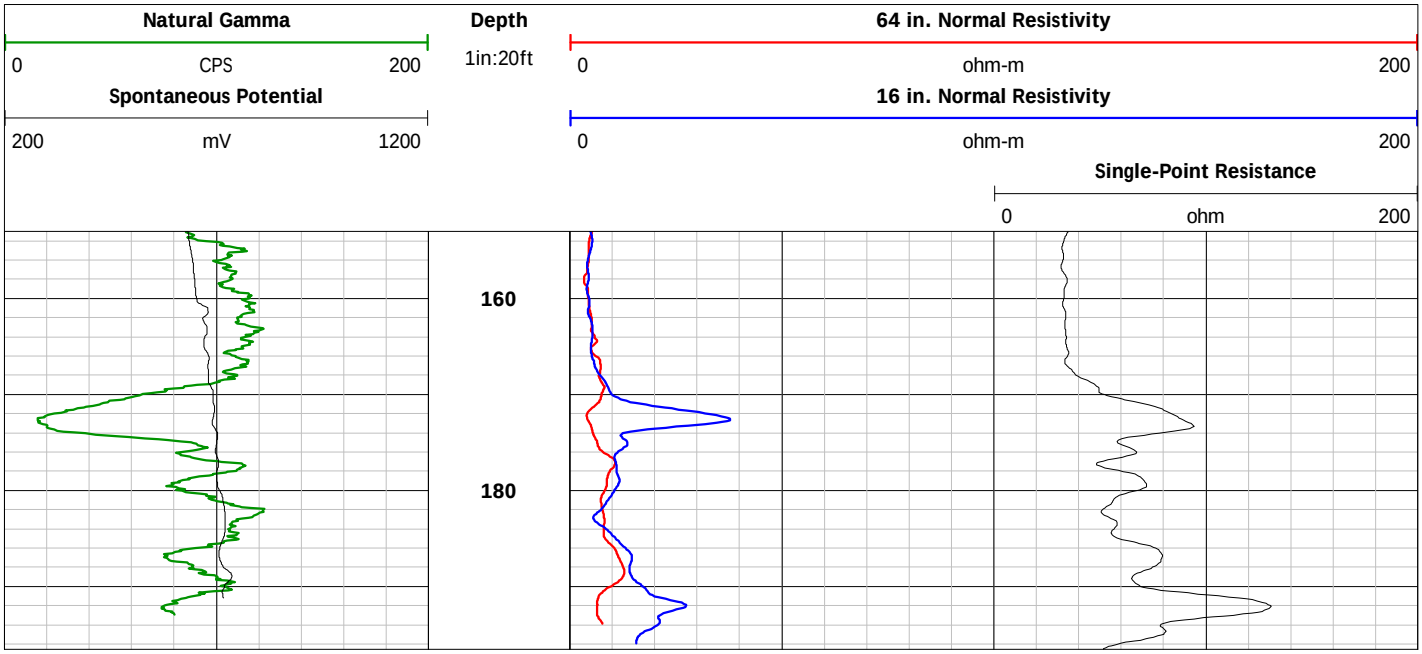
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0
CPS
200
Spontaneous Potential
200
mV
1200
Depth
1in:20ft
64 in. Normal Resistivity
0
ohm-m
200
16 in. Normal Resistivity
0
ohm-m
200
Single-Point Resistance
0
ohm
200
160
180

Enter the depth of the mine workings: 302

Enter the width of the mine workings: 150

Enter the total open thickness of the mine workings: 0.94

Have multiple seams been worked at this mine? (•) No ( ) Yes

Distance From Panel Center:	286	181	154	130	115	97	82	63
Strain (extension) X1000:	0.00	0.13	0.27	0.40	0.54	0.67	0.54	0.00

Distance From Panel Center:	63	54	48	36	24	6	0
Strain (compression) X1000:	0.00	0.23	0.45	0.68	0.90	1.13	0.90

Maximum Subsidence | Subsidence Profile | Strain Profile

Main Menu | Potential Damage | Print

Enter the depth of the mine workings: 302

Enter the width of the mine workings: 150

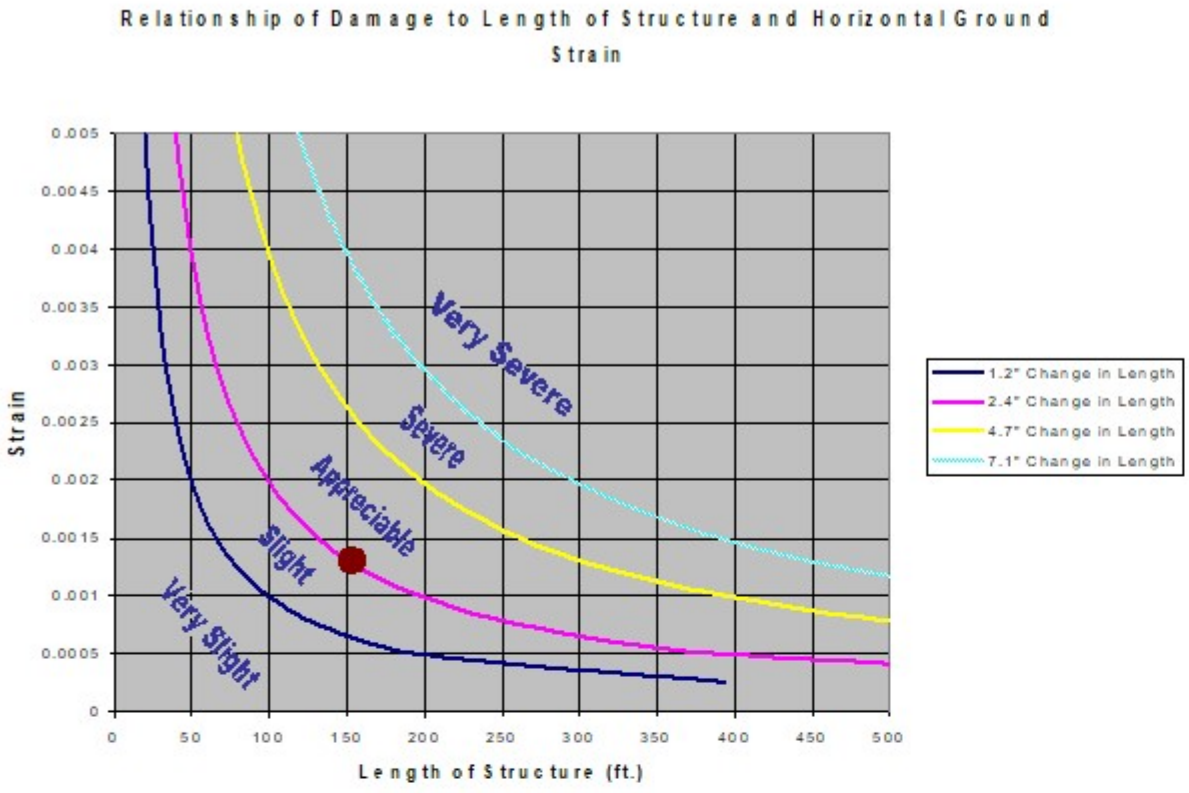
Enter the total open thickness of the mine workings: 0.94

Have multiple seams been worked at this mine? (•) No ( ) Yes

Distance From Panel Center:	286	142	103	85	72	63	51	45	36	24	0
Subsidence in Feet:	0.00	0.03	0.05	0.08	0.10	0.13	0.15	0.18	0.20	0.23	0.25

Maximum Subsidence | Subsidence Profile | Strain Profile

Main Menu | Potential Damage | Print



Strain: .0013

Building Length: 151

Plot

Damage will be appreciable. Typical damage includes a slight fracture showing on the outside of the building. Doors and windows sticking and service pipes fracturing.

Main Menu

Subsidence and Strain

Print

Enter the depth of the mine workings: 188

Enter the width of the mine workings: 150

Enter the total open thickness of the mine workings: 0.94

Have multiple seams been worked at this mine? (•) No ( ) Yes

Distance From Panel Center:	207	130	109	99	90	79	69	54
Strain (extension) X1000:	0.00	0.37	0.73	1.10	1.46	1.83	1.46	0.00

Distance From Panel Center:	54	49	45	37	32	21	4	0
Strain (compression) X1000:	0.00	0.39	0.79	1.18	1.58	1.97	1.58	1.18

Maximum Subsidence | Subsidence Profile | Strain Profile

Main Menu | Potential Damage | Print

Enter the depth of the mine workings: 188

Enter the width of the mine workings: 150

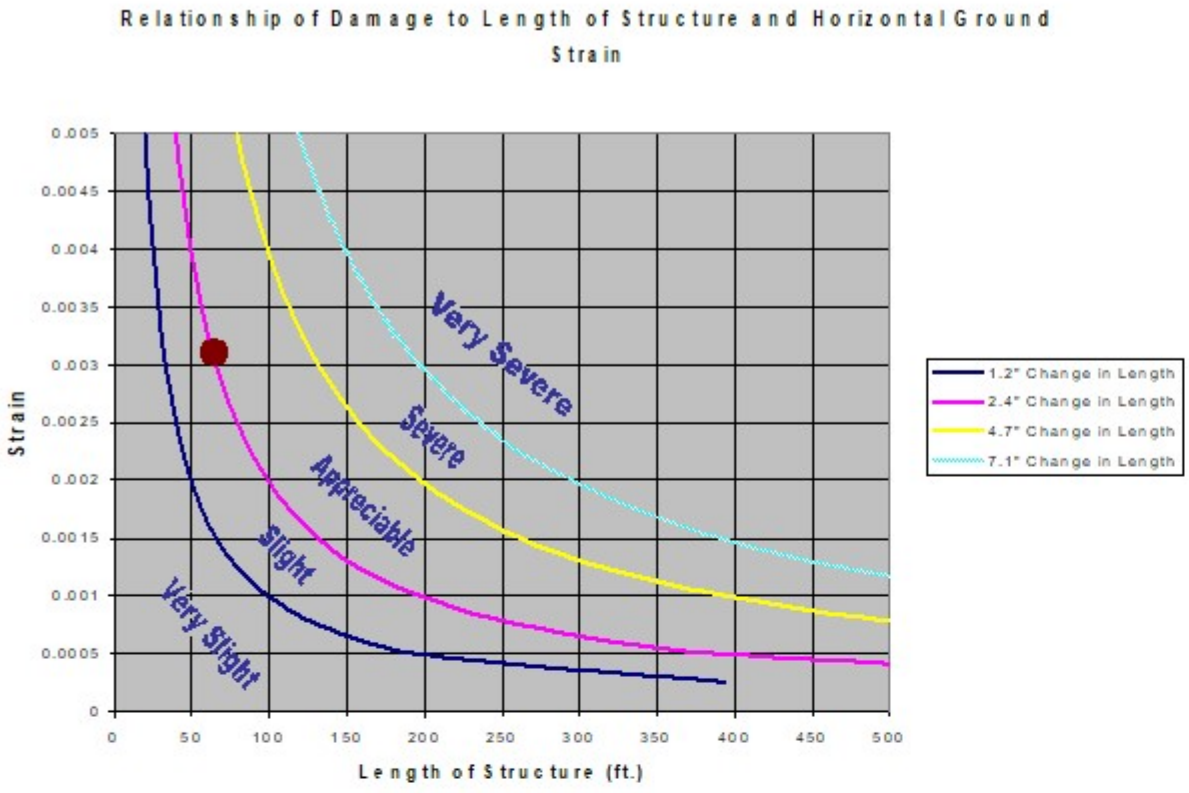
Enter the total open thickness of the mine workings: 0.94

Have multiple seams been worked at this mine? (•) No ( ) Yes

Distance From Panel Center:	207	98	79	68	60	53	47	39	32	21	0
Subsidence in Feet:	0.00	0.05	0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.48	0.53

Maximum Subsidence | Subsidence Profile | Strain Profile

Main Menu | Potential Damage | Print



Strain: .0031

Building Length: 63

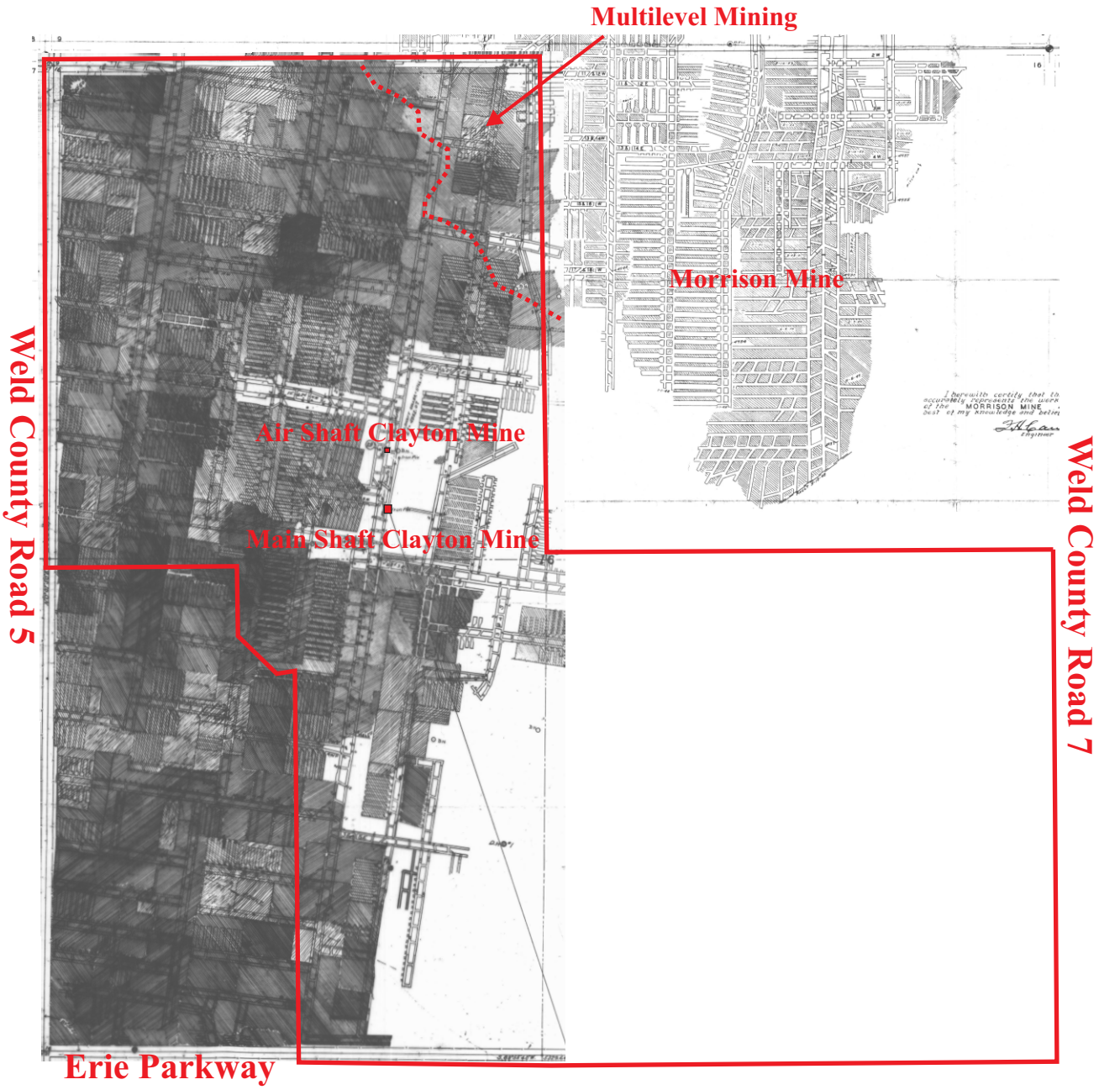
Plot

Damage will be slight. Typical damage includes several slight fractures showing inside the building. Doors and windows may stick slightly.

Main Menu

Subsidence and Strain

Print





Approximate Scale in Feet

0 1320 2640

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

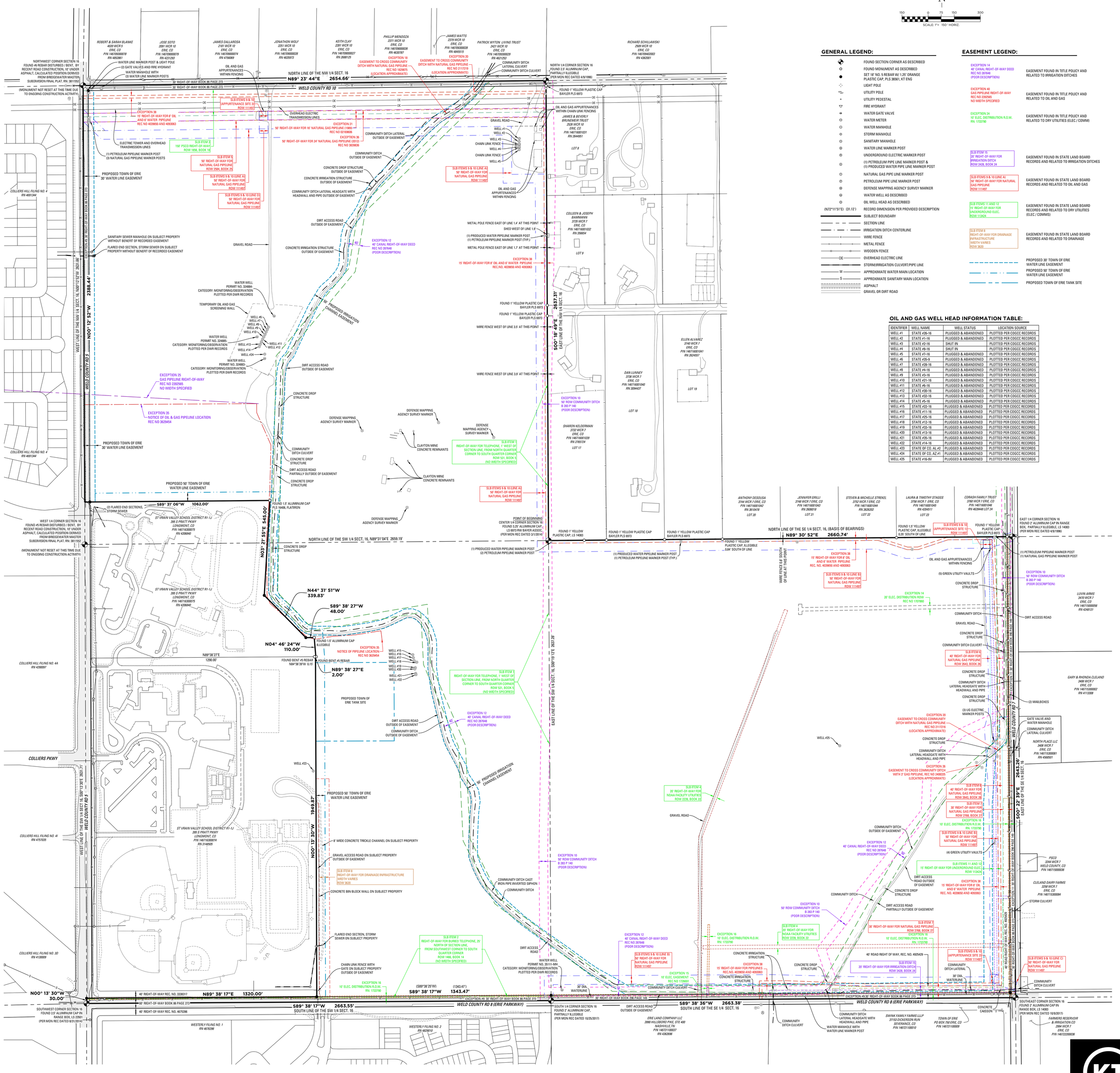
Figure 3 - Mine Location Map
414.38 Acres in Section 16
Township 1 North, Range 68 West,
Weld County, Colorado 80156

DIMENSIONAL STANDARDS SUMMARY TABLE - UDC COMPARISON

LOT TYPE	MINIMUM LOT STANDARDS: WIDTH (FT.)	MINIMUM LOT STANDARDS: AREA (S.F.)	MINIMUM LOT STANDARDS - UDC: LR MEDIUM	LR LARGE	HR SMALL	HR MEDIUM	HR LARGE	MR SMALL	MR MEDIUM	MR LARGE	MHU	CHU	MINIMUM LOT SETBACKS (FT.): FRONT ON STREET	MINIMUM LOT SETBACKS - UDC: LR MEDIUM	LR LARGE	HR SMALL	HR MEDIUM	HR LARGE	MR SMALL	MR MEDIUM	MR LARGE	MHU	CHU	FRONT ON GARDEN COURT	MINIMUM LOT SETBACKS - UDC: LR MEDIUM	LR LARGE	HR SMALL	HR MEDIUM	HR LARGE	MR SMALL	MR MEDIUM	MR LARGE	MHU	CHU	REAR (no Setback under 10ft)	MINIMUM LOT SETBACKS - UDC: LR MEDIUM	LR LARGE	HR SMALL	HR MEDIUM	HR LARGE	MR SMALL	MR MEDIUM	MR LARGE	MHU	CHU	REAR	MINIMUM LOT SETBACKS - UDC: LR MEDIUM	LR LARGE	HR SMALL	HR MEDIUM	HR LARGE	MR SMALL	MR MEDIUM	MR LARGE	MHU	CHU	HEIGHT	BUILDING SEPARATION	PORCH DEPTH + CLEAR AREA
SINGLE FAMILY FRONT LOAD	40'	4,000	30'	50'			50'			50'			20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.									FRONT GARAGE SETBACK OF 18ft.	20ft. to 25ft.	20ft. to 25ft.									10ft. to 15ft.	20ft. to 25ft.	20ft. to 25ft.									20ft. to 25ft.					
	2,500 - 3,999	90% 3,500					90% 3,500																																													
	40'	4,000	40' (CORNER LOTS)	50' (CORNER LOTS)			50' (CORNER LOTS)			50' (CORNER LOTS)																																													
	30'	3,000	30'	50'	25'	30'	50'	25'	30'	50'	25'		15ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		10'	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		10ft. to 15ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		15ft. - 20ft. (ROW) 40ft. (Alley) 5ft. (Garage) 30ft.(Cul-de-Sac)	35ft.	10' FOR ENCLOSED PORCH THAT FACES TRAIL OR OPEN SPACE. 5' FOR ALL OTHER PORCHES
SINGLE FAMILY ALLEY LOAD	30'	2,500	30' (CORNER LOTS)	50' (CORNER LOTS)	25' (CORNER LOTS)	30' (CORNER LOTS)	50' (CORNER LOTS)	25' (CORNER LOTS)	30' (CORNER LOTS)	50' (CORNER LOTS)	25' (CORNER LOTS)		0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		0	20ft. to 25ft.	20ft. to 25ft.	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	20ft.	0	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	20ft.	0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.	20ft. - 25ft. 40ft. (ROW) 5ft. (Garage) 30ft.(Cul-de-Sac)	35ft.	
DUPLEX ALLEY LOAD	24'	1,500	40' (CORNER LOTS)	50' (CORNER LOTS)	30' (CORNER LOTS)	40' (CORNER LOTS)	50' (CORNER LOTS)	30' (CORNER LOTS)	40' (CORNER LOTS)	50' (CORNER LOTS)	30' (CORNER LOTS)		15ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		10ft. to 15ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		20ft. - 25ft. 40ft. (ROW) 5ft. (Garage) 30ft.(Cul-de-Sac)	35ft.	10' FOR ENCLOSED PORCH THAT FACES TRAIL OR OPEN SPACE. 5' FOR ALL OTHER PORCHES
TOWNHOME ALLEY LOAD	18'	1,500											15ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.		0	20ft. to 25ft.	20ft. to 25ft.	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	20ft.	0	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	0 - 5ft. (ALLEY)	20ft.	0	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft. to 25ft.	20ft.	20ft. - 25ft. 40ft. (ROW) 5ft. (Garage) 30ft.(Cul-de-Sac)	35ft.	
	24' (CORNER LOTS)																		

NORTH WESTERLY

EXISTING EASEMENT EXHIBIT



GENERAL LEGEND:

- FOUND SECTION CORNER AS DESCRIBED
- FOUND MONUMENT AS DESCRIBED
- SET 18" NO. 5 REBAR W/ 1.25" ORANGE PLASTIC CAP, PLS 38561, KT ENG
- LIGHT POLE
- UTILITY POLE
- UTILITY PEDESTAL
- FIRE HYDRANT
- WATER GATE VALVE
- WATER METER
- WATER MANHOLE
- STORM MANHOLE
- SANITARY MANHOLE
- WATER LINE MARKER POST
- UNDERGROUND ELECTRIC MARKER POST
- (1) PETROLEUM PIPE LINE MARKER POST & (1) PRODUCED WATER PIPE LINE MARKER POST
- NATURAL GAS PIPE LINE MARKER POST
- PETROLEUM PIPE LINE MARKER POST
- DEFENSE MAPPING AGENCY SURVEY MARKER
- WATER WELL AS DESCRIBED
- OIL WELL HEAD AS DESCRIBED
- (N72°11'51"E) (31.12') RECORD DIMENSION PER PROVIDED DESCRIPTION
- SUBJECT BOUNDARY
- SECTION LINE
- IRRIGATION DITCH CENTERLINE
- WIRE FENCE
- METAL FENCE
- WOODEN FENCE
- OE OVERHEAD ELECTRIC LINE
- STORM/IRRIGATION CULVERT/PIPE LINE
- W APPROXIMATE WATER MAIN LOCATION
- S APPROXIMATE SANITARY MAIN LOCATION
- ASPHALT
- GRAVEL OR DIRT ROAD

EASEMENT LEGEND:

- EXCEPTION 14 40' CANAL RIGHT-OF-WAY DEED REC NO 287648 (POOR DESCRIPTION) — EASEMENT FOUND IN TITLE POLICY AND RELATED TO IRRIGATION DITCHES
- EXCEPTION 40 GAS PIPELINE RIGHT-OF-WAY REC NO 2392565 NO WIDTH SPECIFIED — EASEMENT FOUND IN TITLE POLICY AND RELATED TO OIL AND GAS
- EXCEPTION 24 10' ELEC. DISTRIBUTION R.O.W. RN: 1733790 — EASEMENT FOUND IN TITLE POLICY AND RELATED TO DRY UTILITIES (ELEC / COMM)
- SLB ITEM 15 20' RIGHT-OF-WAY FOR IRRIGATION DITCH ROW 2428, BOOK 24 — EASEMENT FOUND IN STATE LAND BOARD RECORDS AND RELATED TO IRRIGATION DITCHES
- SLB ITEMS 9 & 10 (LINE A) 50' RIGHT-OF-WAY FOR NATURAL GAS PIPELINE ROW 111497 — EASEMENT FOUND IN STATE LAND BOARD RECORDS AND RELATED TO OIL AND GAS
- SLB ITEMS 11 AND 12 15' RIGHT-OF-WAY FOR UNDERGROUND ELEC. ROW 113424 — EASEMENT FOUND IN STATE LAND BOARD RECORDS AND RELATED TO DRY UTILITIES (ELEC / COMMS)
- SLB ITEM 8 RIGHT-OF-WAY FOR DRAINAGE INFRASTRUCTURE WIDTH VARIES ROW 3620 — EASEMENT FOUND IN STATE LAND BOARD RECORDS AND RELATED TO DRAINAGE
- PROPOSED 30' TOWN OF ERIE WATER LINE EASEMENT
- PROPOSED 50' TOWN OF ERIE WATER LINE EASEMENT
- PROPOSED TOWN OF ERIE TANK SITE

OIL AND GAS WELL HEAD INFORMATION TABLE:

IDENTIFIER	WELL NAME	WELL STATUS	LOCATION SOURCE
WELL #1	STATE #26-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #2	STATE #1-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #3	STATE #2-16	SHUT IN	PLOTTED PER COGCC RECORDS
WELL #4	STATE #8-16	SHUT IN	PLOTTED PER COGCC RECORDS
WELL #5	STATE #7-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #6	STATE #35-9	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #7	STATE #28-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #8	STATE #4-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #9	STATE #3-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #10	STATE #21-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #11	STATE #5-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #12	STATE #30-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #13	STATE #32-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #14	STATE #5-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #15	STATE #22-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #16	STATE #11-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #17	STATE #25-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #18	STATE #12-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #19	STATE #33-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #20	STATE #13-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #21	STATE #35-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #22	STATE #14-16	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #23	STATE OF CO, AL #2	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #24	STATE OF CO, AZ #1	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS
WELL #25	STATE #16-9V	PLUGGED & ABANDONED	PLOTTED PER COGCC RECORDS

KT ENGINEERING
ENGINEERS • SURVEYORS
12500 W. 58th AVE. #230
ARVADA, CO 80002
PH: 720.638.5190

DATE: 10/02/2024

NORTH WESTERLY

PROPOSED MAJOR EASEMENT EXHIBIT

N

150 0 75 150 300

SCALE: 1"= 150' HORIZ.

GENERAL LEGEND:

- FOUND SECTION CORNER AS DESCRIBED
- FOUND MONUMENT AS DESCRIBED
- SET 18" NO. 5 REBAR W/ 1.25" ORANGE PLASTIC CAP, PLS 38561, KT ENG
- LIGHT POLE
- UTILITY POLE
- UTILITY PEDESTAL
- FIRE HYDRANT
- WATER GATE VALVE
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- S APPROXIMATE SANITARY MAIN LOCATION
- ASPHALT
- GRAVEL OR DIRT ROAD

EASEMENT LEGEND:

- PROPOSED 50' IRRIGATION CANAL EASEMENT CENTERED ON CURRENT DITCH ALIGNMENT
- PROPOSED 30' TOWN OF ERIE WATER LINE EASEMENT
- PROPOSED 50' TOWN OF ERIE WATER LINE EASEMENT
- 150' PSCO RIGHT-OF-WAY ROW 1856, BOOK 18 STATE LAND BOARD AGREEMENT TO BE RECORDED AT WELD COUNTY
- PROPOSED TOWN OF ERIE TANK SITE
- 50' ROW COMMUNITY DITCH B 283 P 140 TO BE VACATED
- 40' CANAL RIGHT-OF-WAY REC NO 287648 TO BE VACATED

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DATE: 10/02/2024

VRANESH AND RAISCH, LLP
ATTORNEYS AT LAW
5303 Spine Road, Suite 202 Boulder, Colorado 80301
Telephone: 303.443.6151 www.vrlaw.com

January 14, 2025

Aly Burkhalter
Town of Erie Planning & Development
developmentreferral@erieco.gov

Sent Via E-Mail

Re: North Westerly PD – PD 001700-2024 – Third Referral Review

Dear Aly:

You requested our comments regarding the above-referenced planned development zoning application, third referral review, by today. We previously provided comments by letter dated March 19, 2024, and August 6, 2024. This letter provided our comments at this time, and we will likely have additional comments as the development process continues.

In response to our prior comments, the Applicant's combined response letter (titled "NW PD 2ND RESPONOSE TO COMMENTS LETTER") indicates that our comments "require a response" and directs us to the "Engineering Response Comment letter." The separate "NW-2ND PD ENGINEERING COMMENT RESPONSES" letter, however, does not include any information that is responsive to our prior comments. Accordingly, we reiterate our prior comments in full.

As noted in our previous comment letters, all parcels associated with the project must be included into both the Northern Colorado Water Conservancy District ("NCWCD") and its Municipal Subdistrict before receiving any water service from the Town. Based upon our review and discussions with NCWCD staff, only a portion of the subject property (the SE 1/4) has been included in the NCWCD boundaries (but not the Municipal Subdistrict), and the remainder of the property is not included in either the NCWCD or the Municipal Subdistrict boundaries. As previously noted, all parcels associated with the project must be included in both the NCWCD and its Municipal Subdistrict before the Town can provide water service.

Response: The applicant acknowledges the requirement that the property must be included into both NCWCD and its Municipal Subdistrict prior to final plat approval.

In the Applicant's prior responsive materials, it notes that the property is currently included in the Left Hand Water District ("Left Hand"), and will be excluded prior to the final plat. As described in our previous comment letter, the Applicant should provide written confirmation that the property will be excluded from Left Hand prior to approval of the final plat and before the Town provides any water service.

Response: The applicant acknowledges the requirement that the property must be excluded from LHWD prior to final plat approval.

The Applicant's prior responsive materials indicate that no surface and/or ground water rights were conveyed with the property. In our previous comment letter, we noted that the Applicant must complete the Town's Declaration of Water Rights form. That form must be completed even if no water rights were conveyed with the property. We note again that the Applicant's initial submittal materials suggest there "is 1 shut in well on the property and several plugged and abandoned wells." The Applicant's responsive materials acknowledge that such wells "shall be plugged and abandoned." The Applicant should provide confirmation that all wells on the property have been plugged and abandoned, when that work has been completed.

Response: Applicant will provide well reports when the work has been completed.

With respect to water use assumptions, our prior comment letters requested that Applicant provide additional explanation and support for those values, including the assumptions in the prior initial utility reports and the KT Engineering Conceptual Utility Report, dated September 2024. To date, that additional explanation and support has not been provided. Accordingly, we reiterate our earlier requests that Applicant provide the water use assumptions used to calculate all projected water demands (including the irrigation water demand, which is substantial).

Response: Please refer to the included utility report for the assumptions used to calculate projected water demands.

We appreciate the opportunity to provide these comments, and we anticipate providing additional comments as the project progresses. Please contact us with any questions or comments.

Sincerely,

VRANESH AND RAISCH, LLP

s/ Bradley N. Kershaw
Bradley N. Kershaw, Esq.
Andrea A. Kehrl, Esq.

cc: Todd Fessenden; Peter C. Johnson, Esq.