March 13, 2024

Landon Hattan
Skyline Builders
1280 Fir Street S
Salem, Oregon 97302

RE: **SITE INFILTRATION TESTING**
415 MOYER LANE
SALEM, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 24-055

Branch Engineering Inc (BEI) visited the site, see Figure 1, on February 22, 2024 to set up three site infiltration tests and returned on February 24, 2024 to determine the rate of infiltration of the onsite soils for use in an onsite stormwater disposal system that will be designed by others. The results presented herein are for initial design and should be verified by the design engineer of record (EOR) at the time of construction. The following is a summary of our visit to the site and testing results.

SITE SOILS

Five test pits were excavated using a rubber-tracked excavator on the site in the approximate locations shown on the attached Figure-2. Three of the pits (1, 2 & 4) were set up for infiltration testing of the subsurface soils at 4- to 5-feet below surface grade (BSG). The observed soils were visually classified using the American Society of Testing and Materials (ASTM) Method D-2488. The soils observed in the test pits were generally consistent in composition with 1.5- to 2-feet of either soft fill or topsoil overlying a clayey silt alluvium that is moist and medium stiff, a more detail description of the soils and logs of each test pits are presented in our *Geotechnical Investigation Report* for the site.

A nearby Oregon Water Resources Department (OWRD) well log, see attached, shows similar soil conditions as described above down to 27-feet BGS and transitioning to sandy silt down to 32-feet. The NRCS Web Soil Survey of Polk County maps the site soils as stream terrace deposits of Coburg and Malabon silty clay loam derived from mixed alluvium and are moderate to well drained.

GROUNDWATER

We did not encounter any groundwater during our onsite explorations to a depth of 11-feet BGS. One nearby well log indicates that the groundwater is at depth of approximately 29-feet BGS.

INFILTRATION TESTING

Site infiltration testing was conducted on February 24, 2024 in general accordance with the procedures set forth in the Salem Administrative Rules 109-004 Appendix C for the encased falling head method. The soil is assumed to be laterally homogeneous and that sidewall infiltration is negligible as a 6-inch diameter, open-ended, plastic standpipe was used for containment of the water column. Water was added to the pipe to pre-saturate the soil prior to testing. Infiltration testing commenced over three successive trials with water being added and the height of the water column being recorded over time. The measured infiltration rates are tabulated in the following Table and shown in the attached Field Data Sheet; no factor of safety has been applied to the rates.

Table 1: Infiltration Test Results

Test ID	*Soil Description*	*Test Depth (inches)*	*Infiltration Rate (in/hr)*
TP-1	Light Reddish Brown silt with clay (ML)	48	13
TP-2	Light Reddish Brown silt with clay (ML)	60	28
TP-4	Light Reddish Brown silt with clay (ML)	60	25

CONCLUSIONS

The infiltration rates measured in the field ranged from 13 to 28 inches per hour with no factor of safety applied to the results. The rates appear to increase between 4 and 5-feet BGS and rates of infiltration may vary across the site. The rates reported herein should be considered preliminary and be confirmed by the EOR once the stormwater facility has been completed as soil type and consistency may vary with distance from the test location.

Any areas proposed for infiltration shall not be subjected to compaction of the soil by vehicle traffic, storage of materials, or other means that can influence the rate of infiltration in those areas. It is the client/design professional's responsibility to determine that the stormwater facility meets these requirements for sizing, setbacks, and overflow routing.

LIMITATIONS

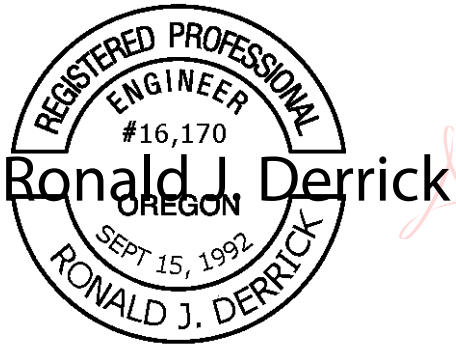
This report has been prepared for the exclusive use of the addressee and their designated representatives for use in design of the proposed development. The analysis and recommendations contained herein were prepared in general accordance with the standards of practice for the area at the time of this report's preparation, and may not be suitable for purposes other than those described in this report.

Subsurface explorations indicate soil conditions at specific locations and depths and do not necessarily reflect soil and groundwater variations that may exist at other locations at the site; however, site conditions were generally consistent in all our explorations. If design changes are made that may affect the results of our testing, development plans change, or at least a year passes between our investigation and the site development, we reserve the right to review the changes for applicability.

We assume no responsibility or liability for engineering, inspection, or testing performed by others and no warranty, expressed or implied, is given. Use of this report constitutes an agreement and consent by the addressee and their designated representatives to the limitations listed above.

If you have any questions regarding the test method, data analysis or design, please contact the undersigned.

Sincerely,
Branch Engineering Inc,



Ronald J. Derrick

Digitally signed by Ronald J. Derrick
Date: 2024.03.13 14:15:18 -07'00'

EXPIRES: 12/31/25

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

ATTACHED:

Figure-1, Site Vicinity Map
Figure-2, Site Exploration Map
Infiltration Test Results
ORWD Well Log (1)
USDA NRCS Site Soil Mapping and Soil Descriptions

Branch ENGINEERING Inc
Since 1977

N

NOTE: MAP COURTESY OF DOGAMI ONLINE HAZARD VIEWER, 2024

SCALE: NOT TO SCALE

SITE VICINITY MAP - MOYER LANE MIXED USE

FIGURE-1

415 MOYER LANE NW SALEM, OREGON

02-22-2024

PROJECT NO. 24-055

Branch ENGINEERING Inc
Since 1977

LEGEND:

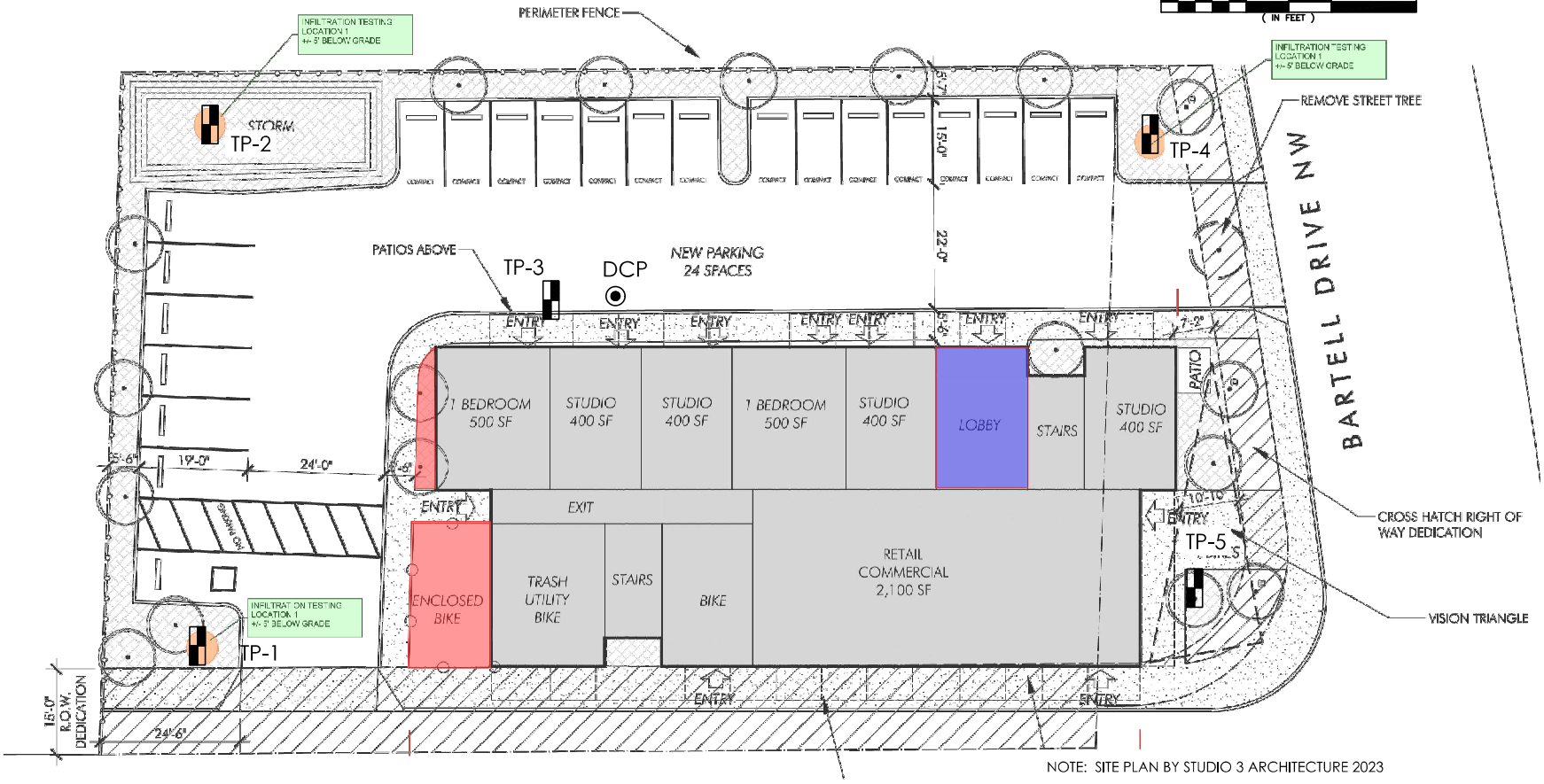
TP-1 APPROXIMATE TEST PIT LOCATION

IT-1 INFILTRATION TEST LOCATION

DCP DYNAMIC CONE PENETROMETER TEST

N

GRAPHIC SCALE
15 0 15 30
(IN FEET)



NOTE: SITE PLAN BY STUDIO 3 ARCHITECTURE 2023

SCALE: 1:30 (8.5 x 11)

SITE EXPLORATION MAP - MOYER LANE MIXED USE

FIGURE-2

415 MOYER LANE NW SALEM, OREGON

02-27-2024

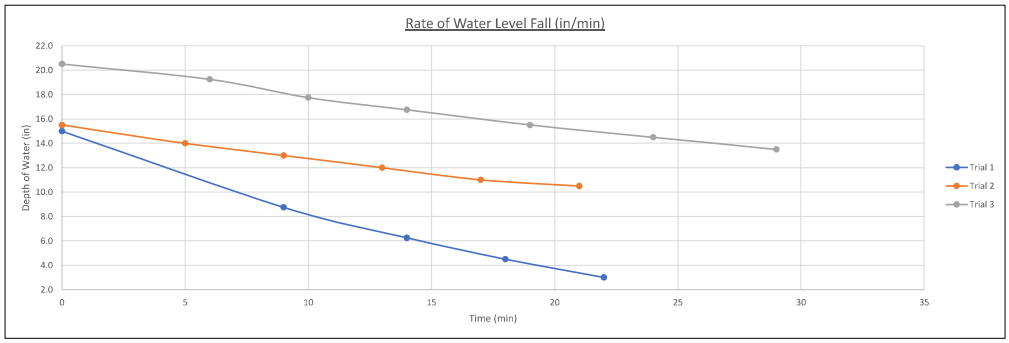
PROJECT NO. 24-039

Branch ENGINEERING Inc. Since 1977
civil · transportation
structural · geotechnical
SURVEYING

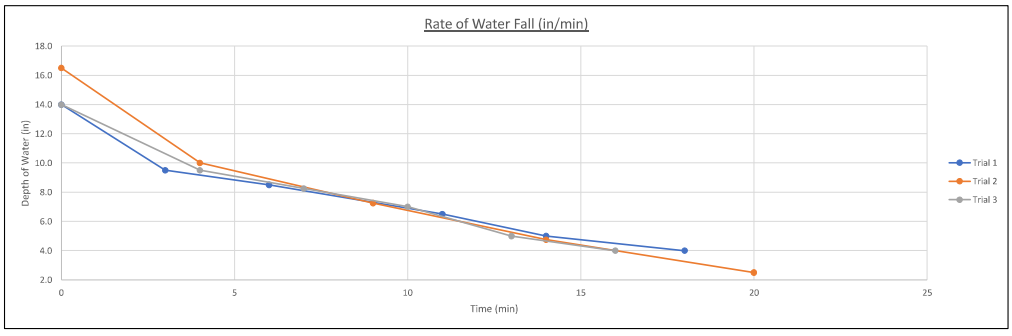
Infiltration Test Results

Project: 415 Moyer Lane, Salem
Testing Date: 02/24/2024
BEI Project Number: 24-055
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 1 Trial 1		Elapsed Time (min)	Depth to Water Surface (in)	Height of Water (in)	Rate of Fall (in/min)	Rate of Fall (in/hr)	Avg Rate of Fall T-1 (in/hr)
Standpipe Diameter (in)	6	0	31.5	15.0			
Standpipe Height AGS (in)	0	9	37.8	8.8	0.69	41.7	
Test Depth BGS (in)	46.5	14	40.3	6.3	0.50	30.0	
Volume of Water Added (gal)	1.5	18	42.0	4.5	0.44	26.3	
Clocktime at Start	13:02	22	43.5	3.0	0.38	22.5	24.4
ASTM Soil Type	(CL)						
Infiltration Test 1 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5	0	31.0	15.5			
Clocktime	14:01	5	32.5	14.0	0.30	18.0	
		9	33.5	13.0	0.25	15.0	
		13	34.5	12.0	0.25	15.0	
		17	35.5	11.00	0.25	15.0	
		21	36	10.5	0.13	7.5	13.1
Infiltration Test 1 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	1.5	0	26.0	20.5			
Clocktime	14:54	6	27.3	19.3	0.21	12.5	
		10	28.8	17.8	0.38	22.5	
		14	29.8	16.8	0.25	15.0	
		19	31.0	15.5	0.25	15.0	
		24	32	14.5	0.20	12.0	
		29	33	13.5	0.20	12.0	13.5



Infiltration Test 2 Trial 1		Elapsed Time (min)	Depth to Water Surface (in)	Height of Water (in)	Rate of Fall (in/min)	Rate of Fall (in/hr)	Avg Rate of Fall T-1 (in/hr)
Standpipe Diameter (in)	6	0	47.5	14.0			
Standpipe Height AGS (in)	0	3	52.0	9.5	1.50	90.0	
Test Depth BGS (in)	61.5	6	53.0	8.5	0.33	20.0	
Volume of Water Added (gal)	1.5	11	55.0	6.5	0.40	24.0	
Clocktime	14:05	14	56.5	5.0	0.50	30.0	
ASTM Soil Type	(CL)	18	57.5	4.0	0.25	15.0	23.0
Infiltration Test 2 Trial 2		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5	0	45.0	16.5			
Clocktime	14:30	4	51.5	10.0	1.63	97.5	
		9	54.3	7.3	0.55	33.0	
		14	56.8	4.8	0.50	30.0	
		20	59.0	2.5	0.38	22.5	28.5
Infiltration Test 2 Trial 3		**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**AVG Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5	0	47.5	14.0			
Clocktime	15:58	4	52.0	9.5	1.13	67.5	
		7	53.3	8.3	0.42	25.0	
		10	54.5	7.0	0.42	25.0	
		13	56.5	5.0	0.67	40.0	
		16	57.5	4.0	0.33	20.0	28.3

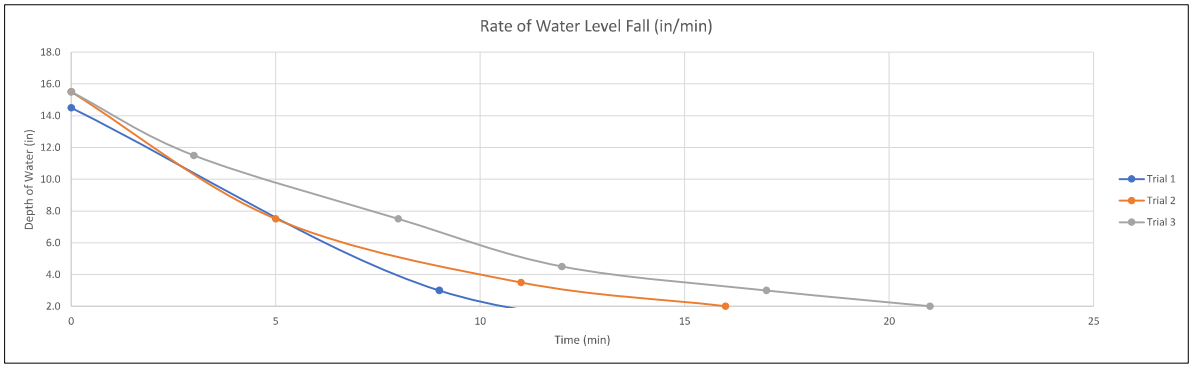


Branch ENGINEERING Since 1977 civil · transportation structural · geotechnical SURVEYING

Infiltration Test Results

Project: 415 Moyer Lane, Salem
Testing Date: 02/23/2024
BEI Project Number: 24-055
Test Type: Encased Falling Head Infiltration
Time = 0 at addition of H2O

Infiltration Test 4 Trial 1			Elapsed Time (min)	Depth to Water Surface (in)	Height of Water (in)	Rate of Fall (in/min)	Rate of Fall (in/hr)	Avg Rate of Fall T-1 (in/hr)
Standpipe Diameter (in)	6		0	31.0	14.5			
Standpipe Height AGS (in)	0		9	42.5	3.0	1.28	76.7	
Test Depth BGS (in)	45.5		17	45.0	0.5	0.31	18.8	18.8
Volume of Water Added (gal)	1.5							
Clocktime at Start	12:48							
ASTM Soil Type	(CL)							
Infiltration Test 3 Trial 2			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-2 (in/hr)**
Volume of Water Added (gal)	1.5		0	30.0	15.5			
Clocktime	14:26		5	38.0	7.5	1.60	96.0	
			11	42.0	3.5	0.67	40.0	
			16	43.5	2.0	0.30	18.0	
			21	45.0	0.50	0.30	18.0	25.3
Infiltration Test 3 Trial 3			**Elapsed Time (min)**	**Depth to Water Surface (in)**	**Height of Water (in)**	**Rate of Fall (in/min)**	**Rate of Fall (in/hr)**	**Avg Rate of Fall T-3 (in/hr)**
Volume of Water Added (gal)	1.5		0	30.0	15.5			
Clocktime	14:58		3	34.0	11.5	1.33	80.0	
			8	38.0	7.5	0.80	48.0	
			12	41.0	4.5	0.75	45.0	
			17	42.5	3.0	0.30	18.0	
			21	43.5	2.0	0.25	15.0	26.0



STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OAR 690-240-095)

Instructions for completing this report are on the last page of this form.

POLK 51510

Well ID# L56354

Start Card # W127131

(1) OWNER/PROJECT

WELL NO. HG-4

Name Westgate shopping Center, attn: Richard Fisher

Address 3450 Cherry Ave. NE

City Salem State Ore Zip 97303

(2) TYPE OF WORK

☒ New construction ☐ Alteration (Repair/Recondition)

☐ Conversion ☐ Deepening ☐ Abandonment

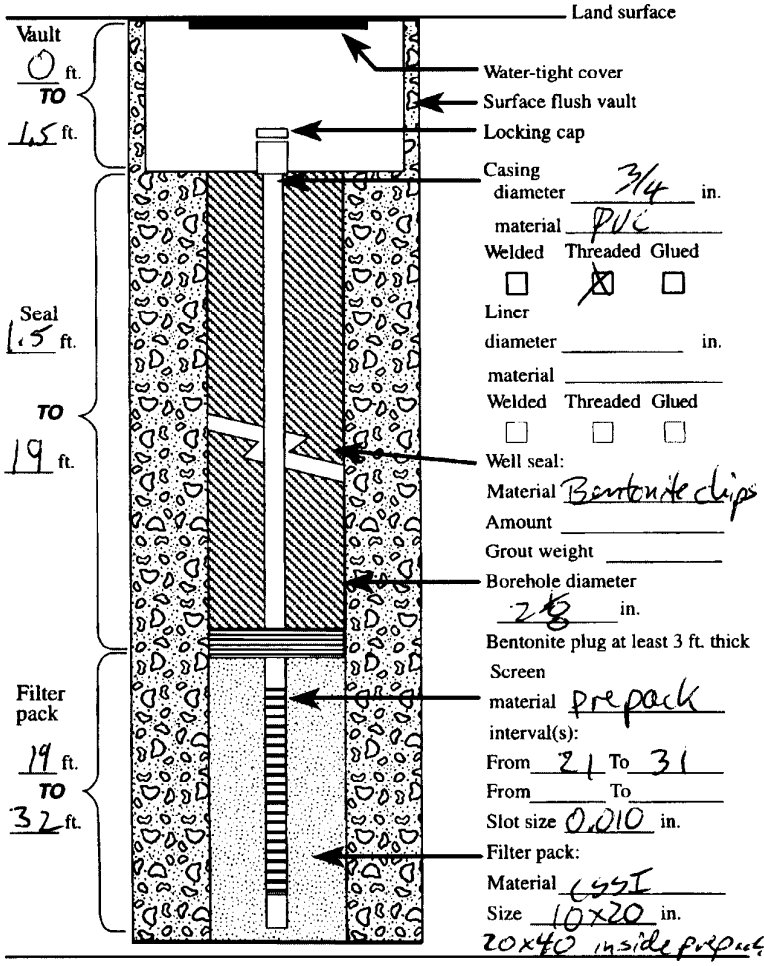
(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable

☐ Hollow Stem Auger ☒ Other Push Probe

(4) BORE HOLE CONSTRUCTION:

Special Standards Yes ☐ No ☒ Depth of Completed Well 32 ft.



Water-tight cover

Surface flush vault

Locking cap

Casing diameter 3/4 in.

material PVC

Welded ☐ Threaded ☒ Glued ☐

Liner

diameter ____ in.

material ____

Welded ☐ Threaded ☐ Glued ☐

Well seal:

Material Bentonite chips

Amount ____

Grout weight ____

Borehole diameter 2 1/8 in.

Bentonite plug at least 3 ft. thick

Screen

material prepack

interval(s):

From 21 To 31

From ____ To ____

Slot size 0.010 in.

Filter pack:

Material 655I

Size 10x20 in.

20x40 inside prepack

(5) WELL TESTS:

☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability — Yield < 1 GPM

Conductivity 331 µS PH 8.1

Temperature of water 14.0 °F/C Depth artesian flow found ____ ft.

Was water analysis done? ☒ Yes ☐ No

By whom? North Creek Analytical

Depth of strata to be analyzed. From 19 ft. to 32 ft.

Remarks: 8260 VOCs

Name of supervising Geologist/Engineer Julie LeGassick (Hart Crowser)

(6) LOCATION OF WELL By legal description:

County Polk Latitude 44° 50.87' Longitude 123° 3.131'

Township 7 (N or S) Range 3 (E or W) Section 21

NE 1/4 of SE 1/4 of above section.

Street address of well location Intersection of 7th St. NW and Wallace Rd. Salem

Tax lot number of well location 100

ATTACH MAP WITH LOCATION IDENTIFIED. Map shall include approximate scale and north arrow.

(7) STATIC WATER LEVEL:

16 Ft. below land surface. Date 2/27/02

Artesian Pressure ____ lb/sq. in. Date ____

(8) WATER BEARING ZONES:

Depth at which water was first found 29 ft.

From	To	Est. Flow Rate	SWL

(9) WELL LOG:

Ground Elevation 160'

Material	From	To	SWL
5" ASPHALT + GRAVEL	0	0.5	
SILT (ML)	0.5	27	
SANDY SILT (ML-SM)	27	32	

RECEIVED

APR 22 2002

WATER RESOURCES DEPT.
SALEM, OREGON

Date started 2/27/02 Completed 2/27/02

(unbonded) Monitor Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

MWC Number MWC 10363

Signed ____ Date 4/15/02

(bonded) Monitor Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

MWC Number ____

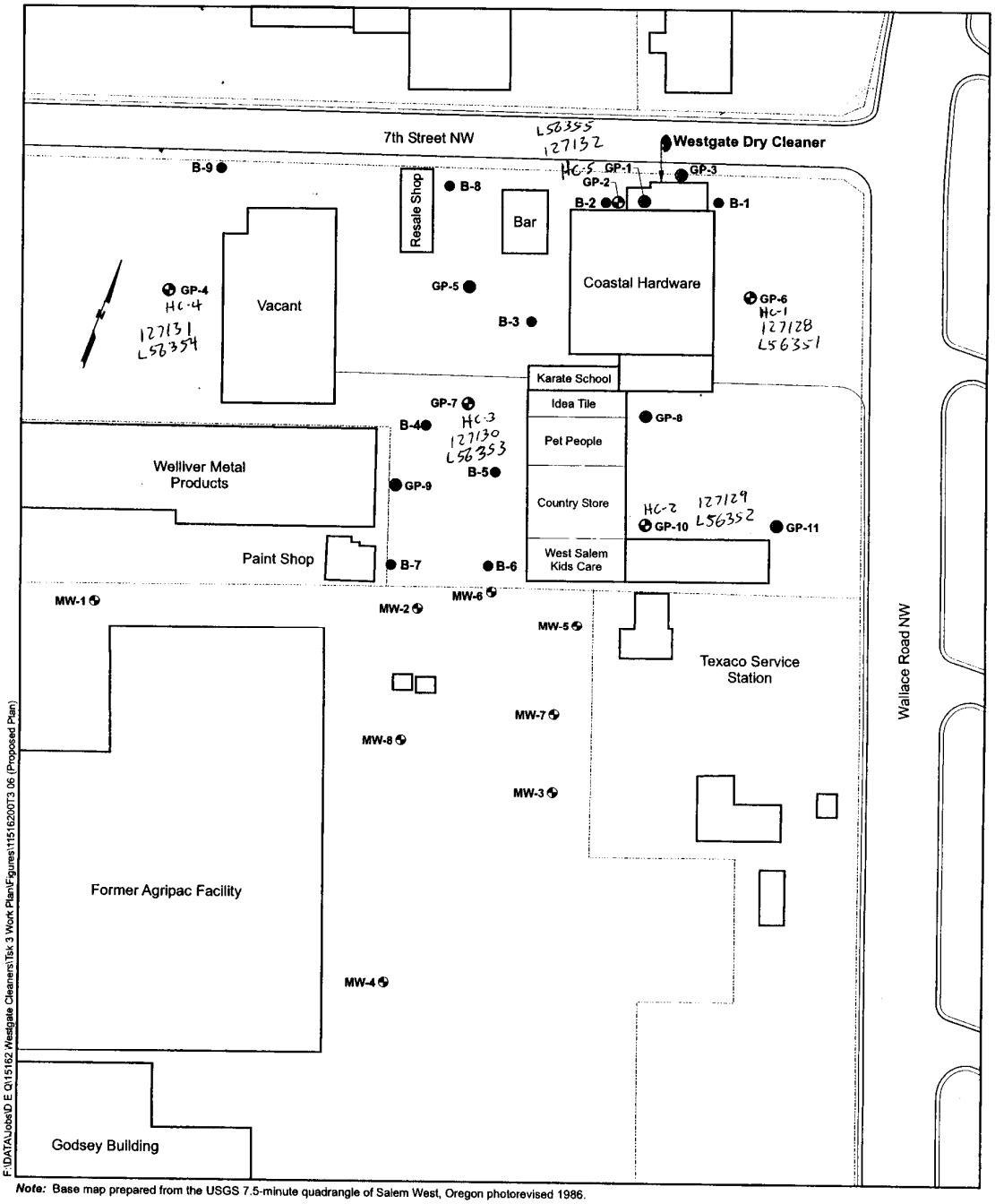
Signed ____ Date ____

ORIGINAL COPY – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

POLK 51510

RECEIVED
APR 2 2 2002
WATER RESOURCES DEPT.
SALEM, OREGON

Proposed Site Exploration Plan
Westgate Cleaners - 697 Wallace Road NW
Salem, Oregon



F:\DATA\Jobs\D E Q\15162 Westgate Cleaners\Tsk 3 Work Plan\Figures\115162007 3 06 (Proposed Plan)

Note: Base map prepared from the USGS 7.5-minute quadrangle of Salem West, Oregon photorevised 1986.

Legend:

B-4 ●	Historical Geoprobe Location and Number per Evergreen Enviro, 1/01
MW-1 ⊕	Historical Monitoring Well Location and Number per PBS Environmental & LPG Associates
GP-1 ●	Proposed Soil Exploration Location and Number
GP-3 ⊕	Proposed Soil Exploration Location and Number (To Be Converted to a Monitoring Well)

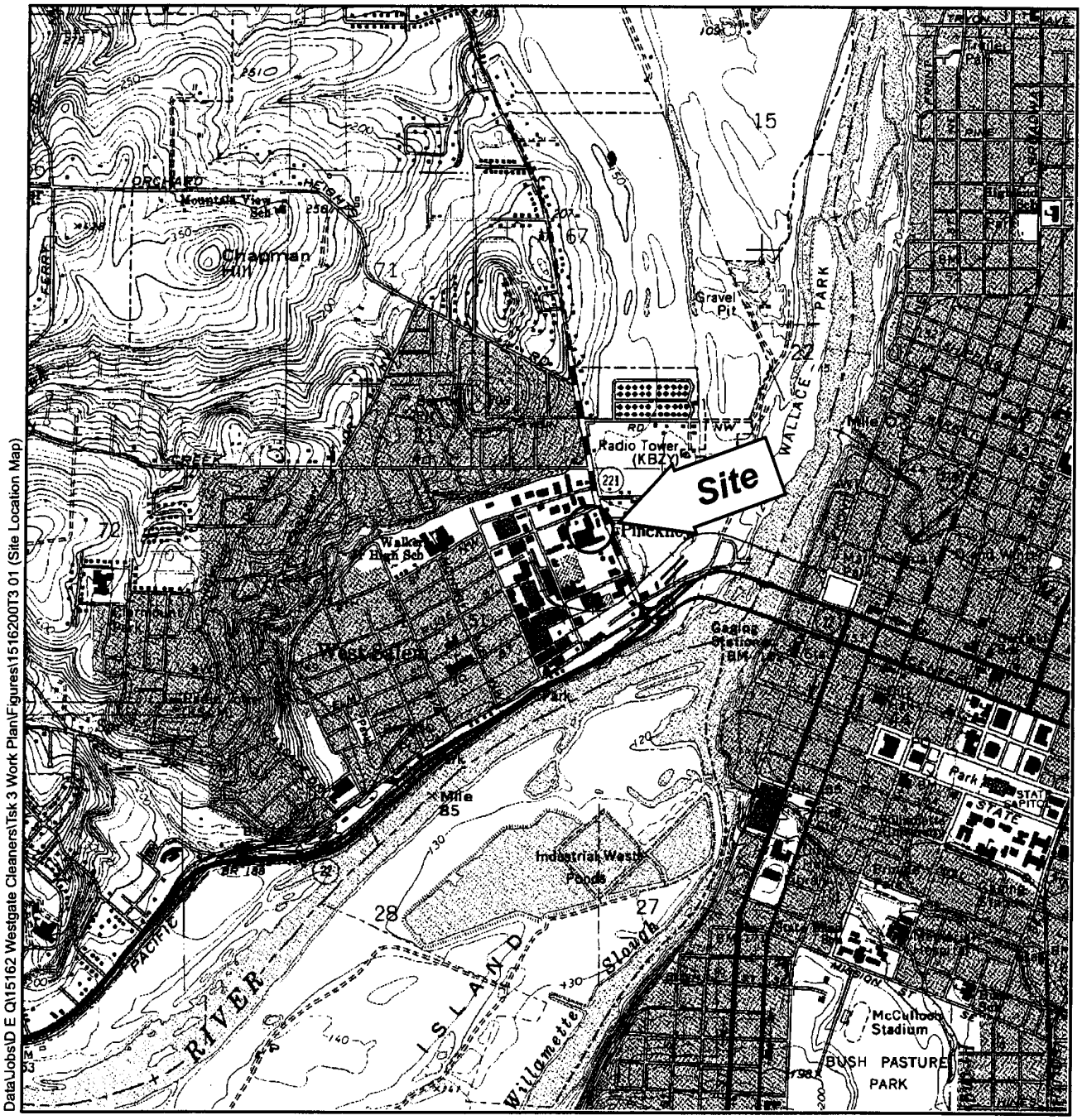
0 100 200
Approximate Scale in Feet

HARTCROWSER
15162-00/Task 3
Figure 6
12/01

POLK 51510

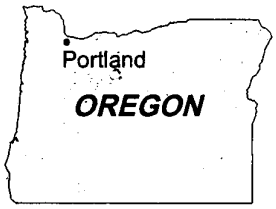
RECEIVED
APR 2 2 2002
WATER RESOURCES DEPT.
SALEM, OREGON

Site Location Map
Westgate Cleaners - 697 Wallace Road NW
Salem, Oregon



DataUobs\D E Q\15162 Westgate Cleaners\Tsk 3 Work Plan\Figures\151620013 01 (Site Location Map)

Note: Base map prepared from the USGS 7.5-minute quadrangle of Salem West, Oregon photorevised 1986.



0 2,000 4,000

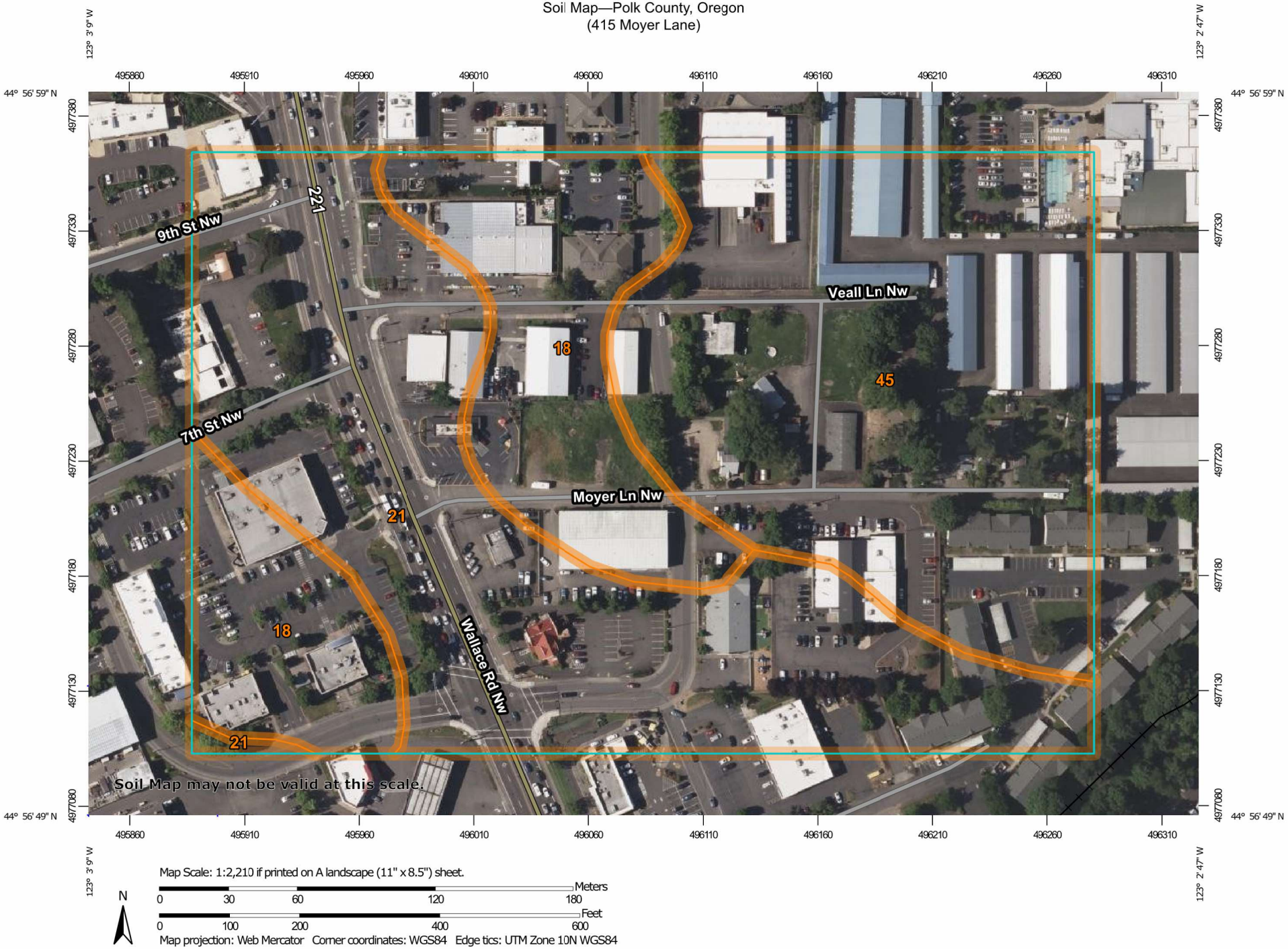
Scale in Feet
Contour Interval 10 Feet

HARTCROWSER

15162-00\Task3 *12/01*

Figure 1

Soil Map—Polk County, Oregon
(415 Moyer Lane)



Map Scale: 1:2,210 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N 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 1:20,000.

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: Polk County, Oregon
Survey Area Data: Version 22, Sep 7, 2023

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

Date(s) aerial images were photographed: May 17, 2023—Jun 3, 2023

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
18	Coburg silty clay loam	5.8	22.9%
21	Cove silty clay loam	10.3	40.2%
45	Malabon silty clay loam	9.4	37.0%
Totals for Area of Interest		**25.5**	**100.0%**

Polk County, Oregon

45—Malabon silty clay loam

Map Unit Setting

National map unit symbol: 22ww
Elevation: 200 to 300 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Malabon and similar soils: 95 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malabon

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed silty and clayey alluvium

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Well drained < 15% Slopes (G002XY002OR)
Other vegetative classification: Well drained < 15% Slopes (G002XY002OR)
Hydric soil rating: No

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Polk County, Oregon
Survey Area Data: Version 22, Sep 7, 2023

Polk County, Oregon

18—Coburg silty clay loam

Map Unit Setting

National map unit symbol: 22v1
Elevation: 180 to 200 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 165 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Coburg and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Coburg

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 15 inches: silty clay loam
H2 - 15 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: R002XC006OR - Stream Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)
Hydric soil rating: No

Minor Components

Aquolls

Percent of map unit: 1 percent
Landform: Flood plains
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Polk County, Oregon
Survey Area Data: Version 22, Sep 7, 2023