

Other



Geotechnical report

Pg. 116

September 26, 2024

Hayden Homes
c/o Mr. Jacob Clark – Land Development Manager
2464 SW Glacier Place
Redmond, OR 97756

Subject: Cover Letter for Geotechnical Feasibility Study
Early Bronco Residential Subdivision
21420 Highway 20, 21480 Highway 20,
62225 Hamby Road, 62385 Hamby Road, &
21483 Neff Road, 21495 Neff Road
Deschutes County, Oregon

Project No. 24178, Task 1

Dear Jacob:

Wallace Group is providing this cover letter for the subject geotechnical feasibility study, located on multiple adjoining parcels within Deschutes County, Oregon. The intent of this letter is to acknowledge that new parcels have been acquired by the Client since the initial fieldwork and feasibility study were completed.

BACKGROUND

Wallace Group previously completed an initial geotechnical feasibility study, including air-track borings for the subject sites at 21480 Highway 20, 62225 Hamby Road, and 62385 Hamby Road and published results in a letter, dated October 27, 2021. Total acreage for the study included approximately 103.4-acres of agricultural and undeveloped property. Since the study was completed, we understand the Client has acquired three (3) additional properties which adjoin the originally investigated parcels. The newly acquired parcels include 21420 Highway 20, 21483 Neff Road, and 21495 Neff Road. Each of the new parcels are approximately 10-acres in size. In total, all adjoining parcels have a combined area of approximately 133.4-acres.

CONCLUSIONS

To date, Wallace Group has completed preliminary geotechnical explorations at the original three (3) parcels, having a combined area of approximately 103.4-acres. Once the master plans are developed, we recommend that geotechnical subsurface explorations are performed at the newly acquired parcels, including air-track borings, in addition to the design level exploration for the entire contiguous site. Based on our initial fieldwork, we did not identify any obvious visual signs of undocumented fill placement. The presence or absence of undocumented fill should be explored during the design-level geotechnical study.

Subsurface explorations did encounter numerous voids in the basalt bedrock; however, we will need to evaluate the potential influence on design after the topographic survey and the proposed design elevations at the site are available. The influence of lava tubes will be a function of the lava tube depth, continuity, and thickness of the bedrock and soil mantle. The lava tubes encountered to date were not significant; however, we recommend a design-level exploration is performed once the design plans are available. Based on our experience in the area, we anticipate that newly acquired parcels will have similar subgrade conditions to those which were initially investigated.

LIMITATIONS

The opinions presented in this letter are based on our review of the initial feasibility letter, understanding of the acquired property locations, and our professional experience; no warranty is expressed or implied.

If you have questions concerning the conclusions or recommendations presented in this letter, please call our office at (541) 382-4707.



Adam Larson, P.E.
Project Geotechnical Engineer

Figures:

Figure 1: Vicinity Map

Figure 2: Exploration Location & Parcel Map

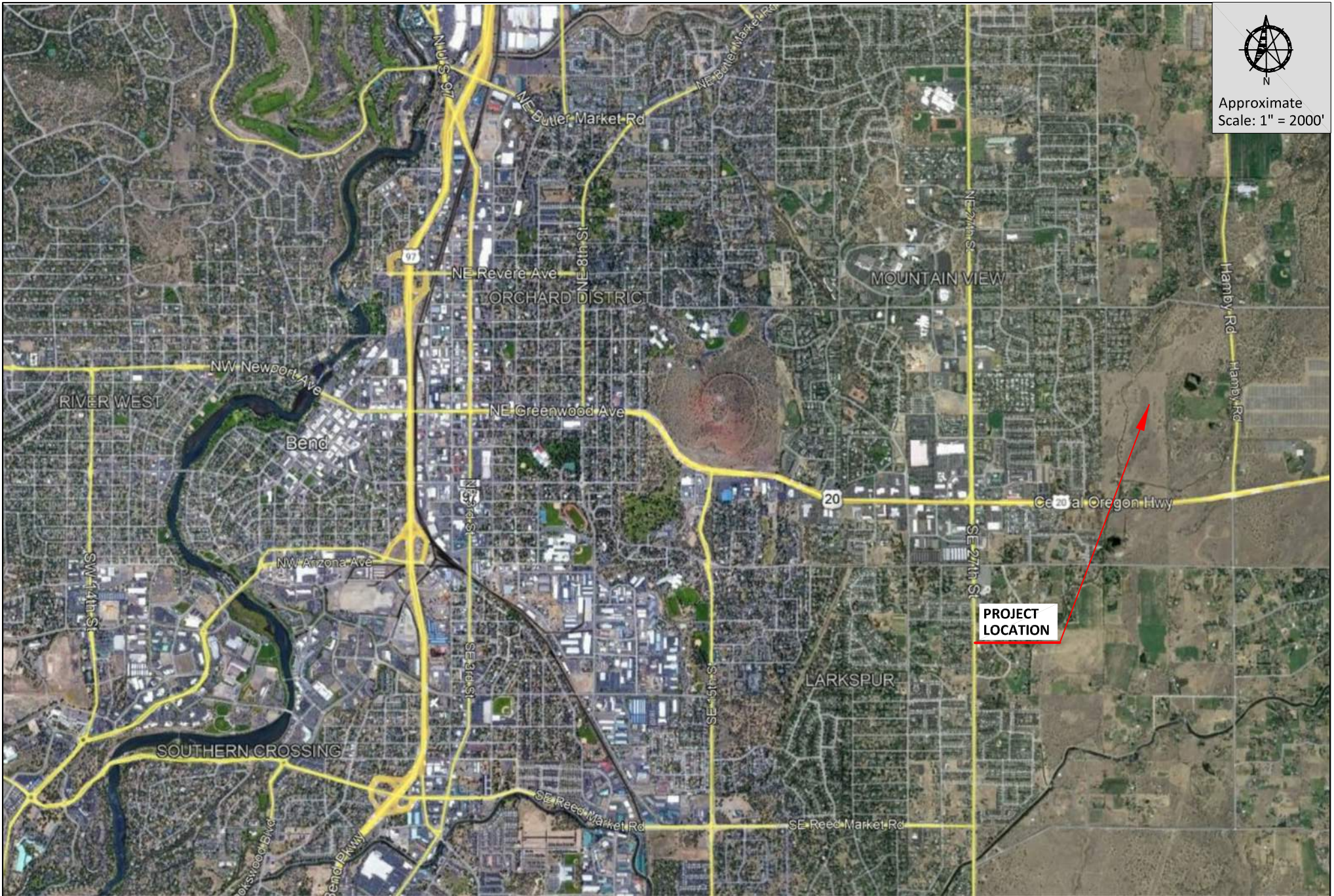
Attachments:

Wallace Group Exploration Summary Letter, dated October 27, 2021

FIGURES



Approximate
Scale: 1" = 2000'



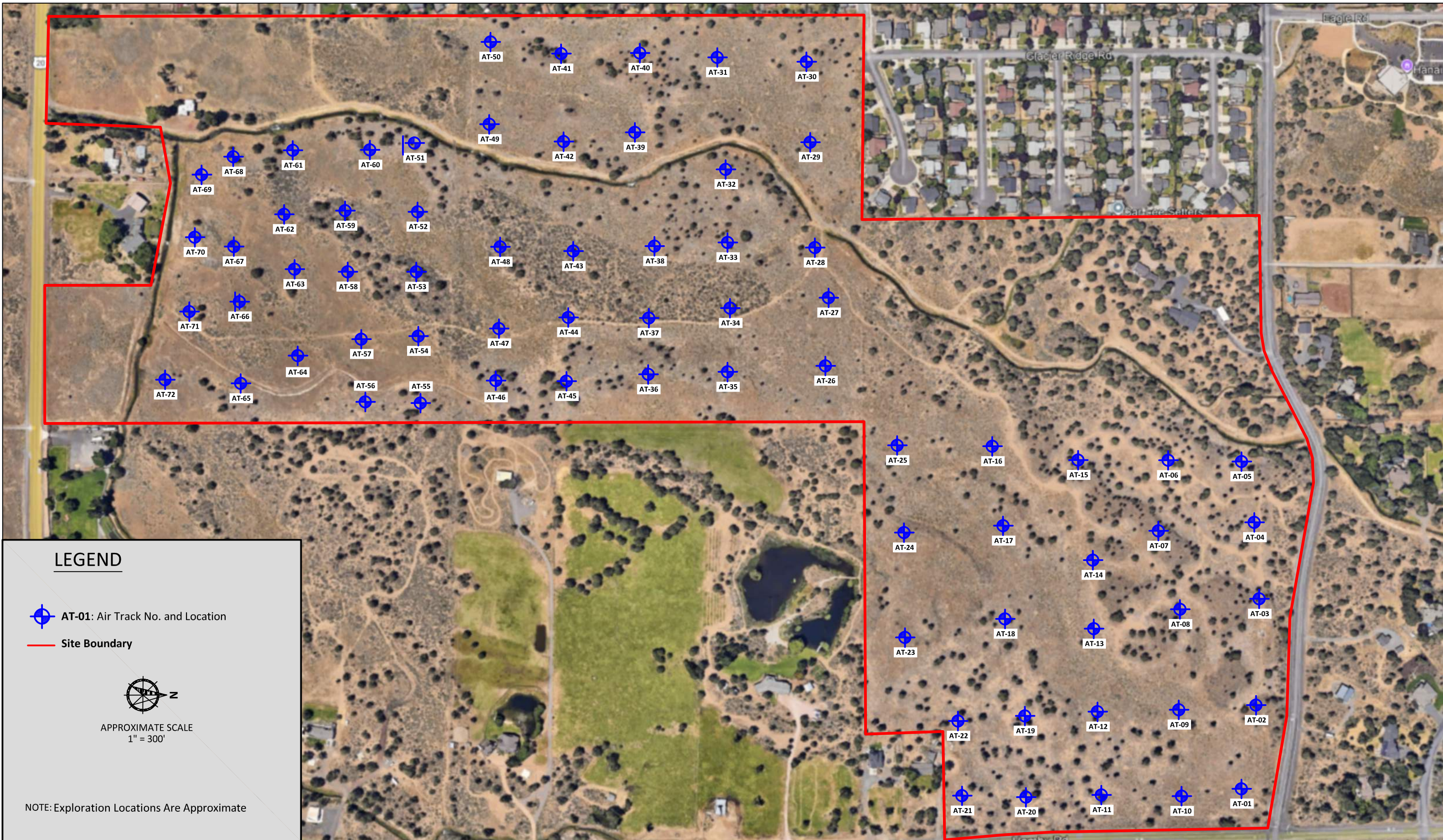
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**VICINITY MAP
EARLY BRONCO - 2024 UPDATE
DESCHUTES COUNTY, OREGON**

PROJECT No:	24178 (1)
DRAWN:	September 18, 2024
DRAWN BY:	AML
CHECKED BY:	LMS
FILE NAME:	120
24178 (1) Figure 1	

FIGURE
1



LEGEND

AT-01: Air Track No. and Location

Site Boundary



APPROXIMATE SCALE
1" = 300'

NOTE: Exploration Locations Are Approximate

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**EXPLORATION LOCATION MAP
EARLY BRONCO - 2024 UPDATE
DESCHUTES COUNTY, OREGON**

PROJECT No:	24178 (1)
DRAWN:	September 18, 2024
DRAWN BY:	AML
CHECKED BY:	LMS
FILE NAME:	121
24178 (1) Figure 2	

ATTACHMENT

October 27, 2021

Ms. Heather DeWolf
Hayden Homes
2464 SW Glacier Place, STE 110
Redmond, OR 97756
hdewolf@hayden-homes.com

**Subject: EXPLORATION SUMMARY
EARLY BRONCO
21480 HWY 20; 62385 AND 62225 HAMBY RD
DESCHUTES COUNTY, OREGON
PROJECT NO. 21182 (1)**

Dear Heather:

This letter summarizes the subsurface exploration for the proposed Early Bronco development located at three subject properties including 21480 US HWY 20, 62385 and 62225 Hamby Road 67205 near Bend, Oregon. Air-Track explorations were performed to provide preliminary subsurface information to the design team for the feasibility of development. The scope of services provided was detailed in an email to the Client, dated August 19, 2021.

Subsurface Explorations

Subsurface conditions were explored on September 28 and 29, 2021. Seventy-two (72) air-track were drilled to 21.5-feet below ground surface (bgs). The air-track borings were performed with an Atlas Copco PowerRoc (T-45) drill rig operated by Quality Drilling and Blasting of Bend, Oregon. A Wallace Group geotechnical professional logged the borings and visually classified the materials encountered. The boring logs, located in **Appendix A**, describe the materials encountered at each location explored. The soil and bedrock types between explorations are anticipated to be similar; however, variation should be expected. The stratigraphic contacts indicated at each point of exploration represent the approximate boundaries between soil and bedrock types. The approximate locations of the borings are

shown on **Figure 2**. A more complete description of the sampling techniques and soil-classification terminology is presented in **Appendix A**.

Geologic Setting

The site is located at the western margin of the High Lava Plains Physiographic Province of Central Oregon. This region is characterized by semi-arid high desert vegetation along the eastern foothills of the High Cascade Mountain Range. Annual precipitation in the Bend area is approximately ten inches, most of which falls in the form of snow during the winter months. The site is located approximately three miles east of the Deschutes River. The site is underlain by Pleistocene age basalt flows from Newberry volcano located approximately 23 miles south of the site (Sherrod et al, 2004). The site undulates with basalt pressure ridges and/or tumuli.

Subsurface Conditions

Subsurface explorations generally encountered native silty-sand soil underlain by cinder, or basalt bedrock. Where explored, the native soil typically extended from the surface up to depths that ranged from 1- to 12-feet below ground surface (bgs). In several locations, basalt pressure ridges were encountered where basalt bedrock extended from the surface to the bottom of the boring. At the time this preliminary exploration was performed, a topographic map was not yet completed.

The silty-sand contains trace gravel and scattered basalt cobbles, generally increasing in size and quantity near the basalt bedrock contact. The silty-sand extended to depths up to 12-feet bgs in the areas explored and was underlain by cinder or basaltic bedrock. The silty-sand was dry to slightly moist, tan to brown, fine- to coarse-grained, and sub-rounded to sub-angular. Typically, surface soil visual classifications indicate the native soil generally classifies as silty-sand (SM), according to the Unified Soil Classification System (USCS).

Basalt bedrock was typically encountered beneath the native silty-sand in all exploration locations, except where encountered on the surface. Based on our air-track exploration, the basalt bedrock was generally variable in quality and contained numerous cinder interbeds and minor open voids. Cinder consisted of red to orange seams and/or layers in between basalt flows. Lava tubes are common within Central Oregon and were encountered in multiple locations on-site (**Table 1**). The lava tubes exhibit diagnostic drilling parameters and are recognized by the dropping motion of the drill string and loss of air returns to surface. The complex and layered subsurface geology is due to the site's location on the flanks of the Newberry Volcano.

Groundwater was not encountered in the explorations and should not influence site development. Localized perched water may occur at the soil and/or bedrock interface during wet periods. A review of well logs obtained from the Oregon Water Resource Department indicates groundwater is approximately 700 feet bgs in the project area.

The exploration summary table below identifies the depth to bedrock from the surface in feet, and the bedrock material that was encountered. For exploration locations see **Figure 2, Exploration Locations Map**.

Table 1
Subsurface Conditions Summary

Exploration Location	Bedrock Depth (ft)	Comments
AT-01	1	Basalt / Cinder
AT-02	1	Basalt / Soil
AT-03	2	Basalt
AT-04	7	Basalt
AT-05	1.5	Basalt
AT-06	3.5	Basalt
AT-07	7	1' Void at 11' bgs
AT-08	0	Basalt
AT-09	7.5	1' Void at 20' bgs
AT-10	1.5	Basalt / Cinder
AT-11	12	Basalt / Soil
AT-12	8.5	1' Void at 6' & 12' bgs
AT-13	2	Basalt / Cinder
AT-14	10	Basalt / Cinder
AT-15	9	1' Void at 11.5' bgs
AT-16	1	Basalt / Cinder
AT-17	7	Basalt / Cinder

Exploration Location	Bedrock Depth (ft)	Comments
AT-18	0	1' Void at 7.5' bgs
AT-19	3	Basalt / Cinder
AT-20	0	Basalt / Cinder
AT-21	2	Basalt / Cinder
AT-22	3	2' Void at 10' bgs
AT-23	5	Basalt / Cinder
AT-24	0	~6' Void at 11' bgs
AT-25	3.5	Basalt / Soil
AT-26	1	Basalt / Cinder
AT-27	10	Basalt / Cinder
AT-28	1.5	Basalt / Cinder
AT-29	1	Basalt
AT-30	1	Basalt
AT-31	3	Basalt
AT-32	1	Basalt
AT-33	3	Basalt
AT-34	0	Basalt/Cinder/Soil
AT-35	5.5	0.5' Void at 20' bgs
AT-36	0	Basalt / Cinder
AT-37	2	Basalt / Cinder
AT-38	5	Basalt
AT-39	11	1' Void at 20' bgs
AT-40	0	Basalt
AT-41	5	0.5' Void at 18' bgs
AT-42	6	1' Void at 14' bgs
AT-43	7	Basalt
AT-44	6.5	Basalt
AT-45	1	Basalt / Cinder
AT-46	1.5	Basalt / Cinder
AT-47	1	Basalt / Cinder

Exploration Location	Bedrock Depth (ft)	Comments
AT-48	2.5	Basalt / Soil
AT-49	0	Basalt / Cinder
AT-50	3.5	Basalt
AT-51	5	Basalt / Cinder
AT-52	4	1' Void at 18' bgs
AT-53	0	Basalt
AT-54	3	2' Void at 19' bgs
AT-55	8	Basalt / Cinder
AT-56	5	Basalt / Cinder
AT-57	1	Basalt / Cinder
AT-58	5	Basalt / Soil
AT-59	4	Basalt / Cinder
AT-60	1.5	Basalt/Cinder/Soil
AT-61	4	Basalt / Cinder
AT-62	1	Basalt / Cinder
AT-63	4.5	Basalt
AT-64	3	Basalt / Cinder
AT-65	2.5	Basalt/Cinder/Soil
AT-66	3	Basalt / Cinder
AT-67	3	Basalt / Cinder
AT-68	2	Basalt/Cinder/Soil
AT-69	2.5	Basalt / Cinder
AT-70	4	Basalt / Cinder
AT-71	0.5	Basalt
AT-72	3	Basalt/Cinder/Soil

FINDINGS

Based on this preliminary geotechnical reconnaissance, we anticipate that the subject site is suitable for development. Based on our fieldwork, we did not identify any obvious visual signs of undocumented fill placement. Subsurface explorations did encounter numerous voids in the basalt bedrock; however, we will need to evaluate the potential influence on

design after the topographic survey and the proposed design elevations at the site are available. The influence of lava tubes will be a function of the lava tube depth, continuity, and thickness of the bedrock and soil mantle. The lava tubes encountered to date were not significant; however, we recommend supplemental exploration after the design plans are available. If we find that the lava tubes are shallow, we may recommend remediation, including collapsing and backfilling or backfilling using lean mix concrete. We recommend that an additional design-level geotechnical investigation is performed once preliminary grading plans are completed.

LIMITATIONS

The services provided, as described in this summary letter, have been performed according to generally accepted engineering and design practices that exist in Bend, Oregon at the time the work was performed. No warranty, express or implied, is provided.

We sincerely appreciate the opportunity to provide our professional services and trust this work meets the project design team requirements. If any questions arise concerning this letter, please contact our Bend office at (541) 382-4707.

Respectfully submitted,

Wallace Group, Inc.



Lisa M. Splitter, P.E., G.E.
Senior Geotechnical Engineer



Adam Larson, P.E.
Project Geotechnical Engineer

Attachments:

Figure 1: Site Vicinity Map

Figure 2: Exploration Locations Map

Appendix A: Boring Logs

Appendix B: Photos

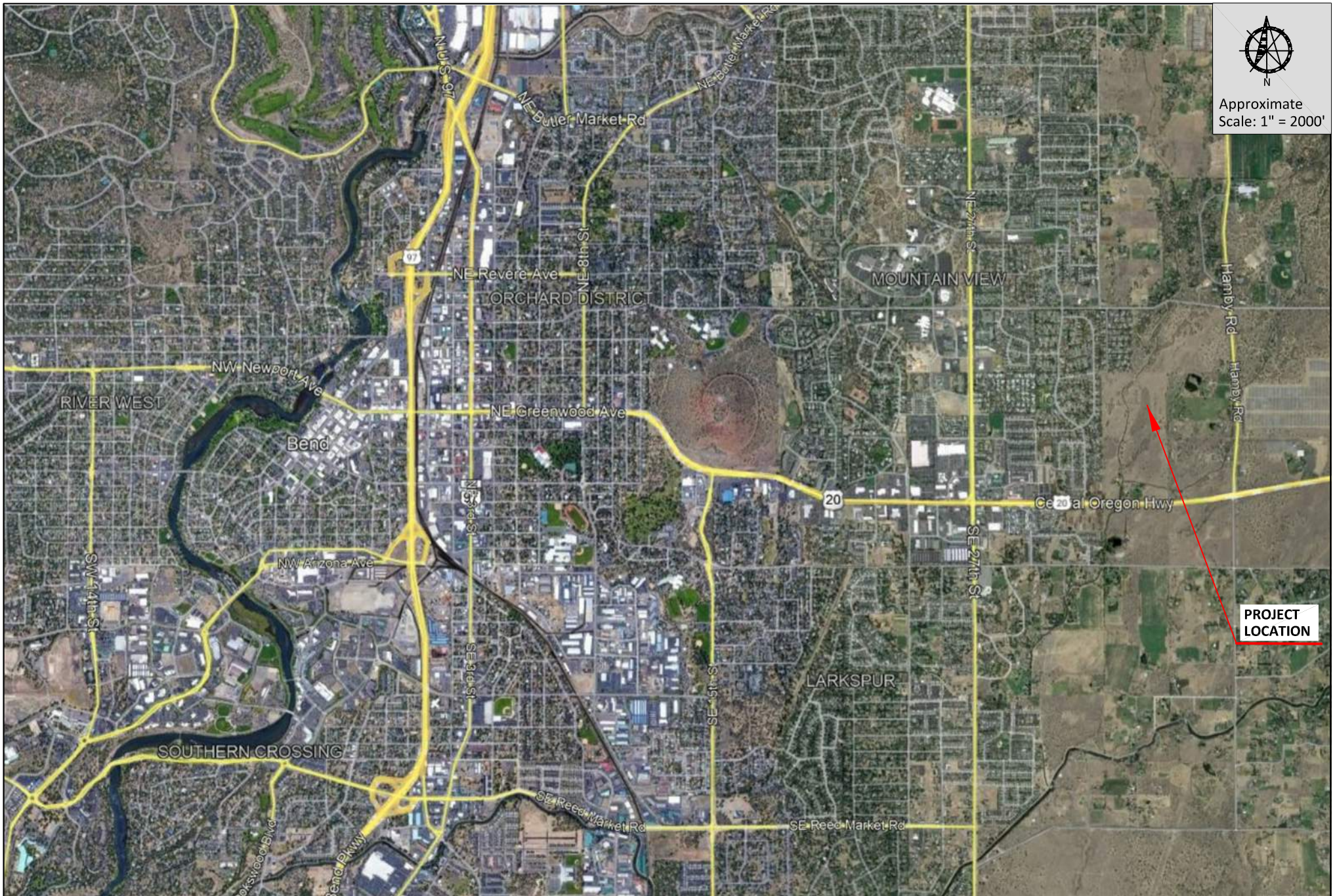
REFERENCES

- Sherrod, David R., Taylor, Edward M., Ferns, Mark L., Scott, William E., Conrey, Richard M., and Smith, Gary A., 2004, *Geologic Map of the Bend 30- x 60-Minute Quadrangle, Central Oregon*. United States Geological Survey.
- Taylor, E.M., 1981, Central High Cascade roadside geology, in Johnston, D.A., and Donnelly-Nolan, J.M., eds., *Guides to some volcanic terranes in Washington, Idaho, Oregon, and northern California*: U.S. Geological Survey Circular 838, p. 55-83.

FIGURES



Approximate
Scale: 1" = 2000'



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**VICINITY MAP
EARLY BRONCO
DESCHUTES COUNTY, OREGON**

PROJECT No:	21182 (1)
DRAWN:	October 4, 2021
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	132
21182 (1) Figure 1	

FIGURE
1

UAR10 ZONE

10 ACRES

REFUTR3 ZONE
93 ACRES

LEGEND

AT-01: Air Track No. and Location



APPROXIMATE SCALE
1" = 275'

NOTE: Exploration Locations Are Approximate

Central Oregon Hwy

20

Glacier Ridge Rd

NE Manchester Ct

NE Palmer Dr

NE Hoona Dr

Neil Rd

Hamby Rd



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EXPLORATION LOCATION MAP
EARLY BRONCO
DESCHUTES COUNTY, OREGON

PROJECT No:	21182 (1)
DRAWN:	October 4, 2021
DRAWN BY:	KAK
CHECKED BY:	LMS
FILE NAME:	133
21182 (1) Figure 2	

FIGURE:
2

APPENDIX A

APPENDIX A FIELD EXPLORATION SUMMARY

GENERAL

Subsurface conditions for the Early Bronco project, located in Deschutes County, Oregon, were explored by drilling 72 air-track borings (designated AT-01 through AT-72), at locations shown on **Figure 2**, *Exploration Location Map*. Geotechnical boring logs are included in this appendix. The exploration program was completed on September 28 and 29, 2021. The procedures used to drill the borings and other field techniques are described in detail in this appendix. Unless otherwise noted, all soil sampling and classification procedures followed local engineering practices, which are in general conformance with relevant ASTM procedures and the Unified Soil Classification System (USCS). “General conformance” means that certain local and common drilling and descriptive practices and methodologies have been followed.

AIR-TRACK BORINGS

Seventy-two (72) borings were drilled on the subject property by Quality Drilling and Blasting of Bend, Oregon. The borings were drilled to depths of approximately 21.5-feet bgs with an Atlas Copco PowerRoc (T-45) drilling rig. Borings were advanced using a three-inch outer diameter bit.

MATERIAL DESCRIPTIONS

Soil samples were visually classified in the field as they were drilled. Consistency, color, and other distinguishing characteristics of the samples were noted. The terminology used in the rock descriptions are defined in the following sections.

BORING LOGS

Figure A-1 is a Legend explaining the information and symbols presented on the boring logs. The logs of the borings are presented on Figures A-2 through A-73. The logs describe the materials encountered and the depths where materials and/or characteristics of these materials changed, although the changes may be gradual. Where material types and descriptions changed between samples, the contacts were interpreted.

GROUNDWATER

Groundwater was not encountered during subsurface exploration for this project.

TERMINOLOGY USED TO DESCRIBE SOIL AND ROCK

Soils exist in mixtures with varying proportions of components. The predominant soil, i.e., greater than 50 percent based upon total dry weight, is the primary soil type and is capitalized in our log descriptions, e.g., SAND, GRAVEL, SILT or CLAY. Lesser percentages of other constituents in the soil mixture are indicated by use of modifier words in general accordance with the Visual-Manual Procedure (ASTM D2488-93). “General Accordance” means that certain local and common descriptive practices have been followed. In accordance with ASTM D2488, group symbols (such as GP or CH) are applied on that portion of the soil passing the 3-inch (75mm) sieve based upon visual examination. The following describes the use of soil names and modifying terms used to describe fine- and coarse-grained soils.

Fine - Grained SOILS (More than 50% fines passing 0.074 mm, #200 sieve)

The primary soil type i.e. SILT or CLAY is designated through visual – manual procedures to evaluate soil toughness, dilatancy, dry strength, and plasticity. The following describes the terminology used to describe fine - grained soils and varies from ASTM 2488 terminology in the use of some common terms.

Primary soil NAME, adjective and symbols			Plasticity Description	Plasticity Index (PI)
SILT	CLAY	ORGANIC SILT & CLAY		
ML & MH	CL & CH	OL & OH		
SILT		Organic SILT	Non-plastic	0 - 3
SILT		Organic SILT	Low plasticity	4 - 10
Clayey SILT	Silty CLAY	Organic clayey SILT	Medium Plasticity	>10 – 20
Clayey SILT	CLAY	Organic silty CLAY	High Plasticity	>20 – 40
Clayey SILT	CLAY	Organic CLAY	Very Plastic	>40

Modifying terms describing secondary constituents, estimated to 5 percent increments, are applied as follows:

Description	% Composition
Trace sand, trace gravel	5% - 10%
With sand; with gravel	15% - 25%
Sandy, or gravelly	30% - 45%

Borderline Symbols, for example CH/MH, are used where soils are not distinctly in one category or where variable soil units contain more than one soil type. **Dual Symbols**, for example CL-ML, are used where two symbols are required in accordance with ASTM D2488.

Soil Consistency. Consistency terms are applied to fine-grained, plastic soils (i.e., $PI > 4$). Descriptive terms are based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586-84, as follows.

Consistency Term	SPT N-value	Unconfined Compressive Strength	
		Tons/sq.ft.	kPa
Very soft	Less than 2	Less than 0.25	Less than 24
Soft	2 - 4	0.25 - 0.5	24 - 48
Medium stiff	5 - 8	0.5 - 1.0	48 - 96
Stiff	9 - 15	1.0 - 2.0	96 - 192
Very stiff	16 - 30	2.0 - 4.0	192 - 383
Hard	Over 30	Over 4.0	Over 383

Note: For SILT with low to non-plastic behavior, (i.e., $PI < 4$) a relative density description is applied.

Coarse-Grained Soils (less than 50% fines)

Coarse-grained soil descriptions, i.e., SAND or GRAVEL, are based on that portion of materials passing a 3-inch (75mm) sieve. Coarse-grained soil group symbols are applied in accordance with ASTM D2488 based upon the degree of grading, or distribution of grain sizes of the soil. For example, well graded sand containing a wide range of grain sizes is designated SW; poorly graded gravel, GP, contains high percentages of only certain grain sizes. Terms applied to grain sizes follow.

	Particle Diameter	
	Inches	Millimeters
Sand (S)	0.003 - 0.19	0.075 - 4.8
Gravel (G)	0.19 - 3.0	4.8 - 75
	<i>Additional Constituents</i>	
Cobble	3.0 - 12	75 - 300
Boulder	12 - 120	300 - 3050
Rock Block	>120	>3050

The primary soil type is capitalized, and the amount of ‘fines’ in the soil are described as indicated by the following examples. Other soil mixtures will provide similar descriptive names.

Example: Coarse-Grained Soil Descriptions with Fines

5% fines	10% fines (Dual Symbols)	15% to 45% fines
GRAVEL with trace silt: GW or GP	GRAVEL with silt, GW-GM	Silty GRAVEL: GM
SAND with trace clay: SW or SP	SAND with clay, SP-SC	Silty SAND: SM

Additional descriptive terminology applied to coarse-grained soils follow.

Coarse-Grained Soil Containing Secondary Constituents

Clean	< 5% fines
With sand or with gravel	15% - 25% sand or gravel
Sandy or gravelly	30% - 45% sand or gravel
With cobbles; with boulders	Any amount cobbles or boulders. Additional terms may be used to describe amount including abundant, scattered.

Cobble and boulder deposits may include a description of the matrix soils, as defined above.

Relative Density terms are applied to granular, non-plastic soils based on direct measure or correlation to the Standard Penetration Test N-value as determined by ASTM D1586.

Relative Density Term	SPT N-value
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	> 50

Terminology Used to Describe Rock

Scale of Rock Strength

Description	Designation	Unconfined Compressive Strength, psi	Unconfined Compressive Strength, MP	Field Identification
Very low strength	R1	100 – 1000	0.7 – 7	Crumbles under firm blows with point of geology pick; can be peeled by a pocketknife.
Low strength	R2	1,000 – 4,000	7 – 28	Can be peeled by a pocketknife with difficulty; shallow indentation made by firm blows of geology pick.
Moderate strength	R3	4,000 – 8,000	28 – 55	Cannot be scraped or peeled with a pocketknife; specimen can be fractured with a single firm blow of geology hammer.
Medium high strength	R4	8,000 – 16,000	55 – 110	Specimen requires more than one blow with a geology hammer to fracture it.
High strength	R5	16,000 – 32,000	110 – 120	Specimen requires many blows of geology hammer to fracture it.
Very high strength	R6	> 32,000	> 220	Specimen can only be chipped with geology pick.

Descriptive Terminology for Joint Spacing or Bedding

<i>Descriptive Term</i>	<i>Spacing of Joints</i>	
Very close	Less than 2 inches	< 50 mm
Close	2 inches - 1 foot	50 mm – 300 mm
Moderately close	1 foot - 3 feet	300 mm – 1 m
Wide	3 feet -10 feet	1 m – 3 m
Very wide	Greater than 10 feet	> 3 m

Descriptive Terminology for Vesicularity

<i>Descriptive Term</i>	<i>Percent voids by volume</i>
Dense	< 1%
Slightly vesicular	1 – 10%
Moderately vesicular	10 – 30%
Highly vesicular	30 – 50%
Scoriaceous	> 50%

Correlation of RQD and Rock Quality

Rock Quality Descriptor	RQD Value
Very poor	0 – 25
Poor	25 - 50
Fair	50 - 75
Good	75 - 90

SCALE OF ROCK WEATHERING

Stage	Description	Quality Distinction
Fresh	Rock is fresh, crystals are bright, a few joints may show slight staining because of ground water.	Discoloration
Very Slight	Rock is generally fresh, joints are stained, some joints may have thin clay coatings, crystals in broken faces show bright.	Discoloration only on major discontinuity surfaces ⁱ
Slight	Rock is generally fresh, joints are stained, and discoloration extends into rock up to 1 in. Joints may contain clay. In granitoid rocks some feldspar crystals are dull and discolored. Rocks ring under hammer if crystalline.	Discoloration on all discontinuity surfaces and on rock
Moderate	Significant portions of rock show discoloration and weathering effects. In granitoid rocks, most feldspars are dull and discolored; some are clayey. Rock has dull sound under hammer and shows significant loss of strength as compared with fresh rock.	Decomposition and/or disintegration < 50% of rock ⁱⁱ
Moderately Severe	All rock, except quartz discolored or stained. In granitoid rocks, all feldspars dull and discolored and majority show kaolinization. Rock shows severe loss of strength and can be excavated with geologist's pick. Rock goes "clunk" when struck.	Decomposition and/or disintegration > 50%, but not complete
Severe	All rock, except quartz, discolored or stained. Rock "fabric" is clear and evident but reduced in strength to strong soil. In granitoid rocks, all feldspars kaolinized to some extent. Some fragments of harder rock usually left, such as corestones in basalt.	Decomposition and/or disintegration > 75%, nearly complete
Very Severe	All rock, except quartz, discolored or stained. Rock "fabric" is discernible, but mass effectively reduced to "soil" with only fragments of harder rock remaining.	Decomposition and/or disintegration 100% with structure/fabric intact
Complete	Rock is reduced to "soil". Rock "fabric" is not discernible, or only in small scattered locations. Quartz may be present as dikes or stringers.	Decomposition and/or disintegration 100% with structure/fabric destroyed

NOTES: ⁱ Discontinuities consist of any natural break (joint, fracture or fault) or plane of weakness (shear or gouge zone, bedding plane) in a rock mass

ⁱⁱ Decomposition refers to chemical alteration of mineral grains; disintegration refers to mechanical breakdown

ⁱⁱⁱ Stage and description from ASCE Manual No. 56 (1976), quality distinction from Murray (1981)

SYMBOL DESCRIPTIONS



Silty Sand



Basalt: Gray, hard, fresh



Void: Filled with loose soil or air as noted



FILL: compacted gravel material

NOTES

- 1) Air track borings were drilled on September 28 and 29, 2021.
- 2) Boring locations were selected by Wallace Group.
- 3) Logs shown are representative of the locations explored.

Subsurface conditions may vary between and away from borings.

- 4) Air track borings result in depth versus penetration rate data. Stratigraphic representations are based on this data, our knowledge of the local/regional geology, and our experience with similar conditions. No samples are recovered by air track drilling methods.
- 5) Logs shown are subject to the findings, conclusions, recommendations and limitations stated in the geotechnical exploration report.

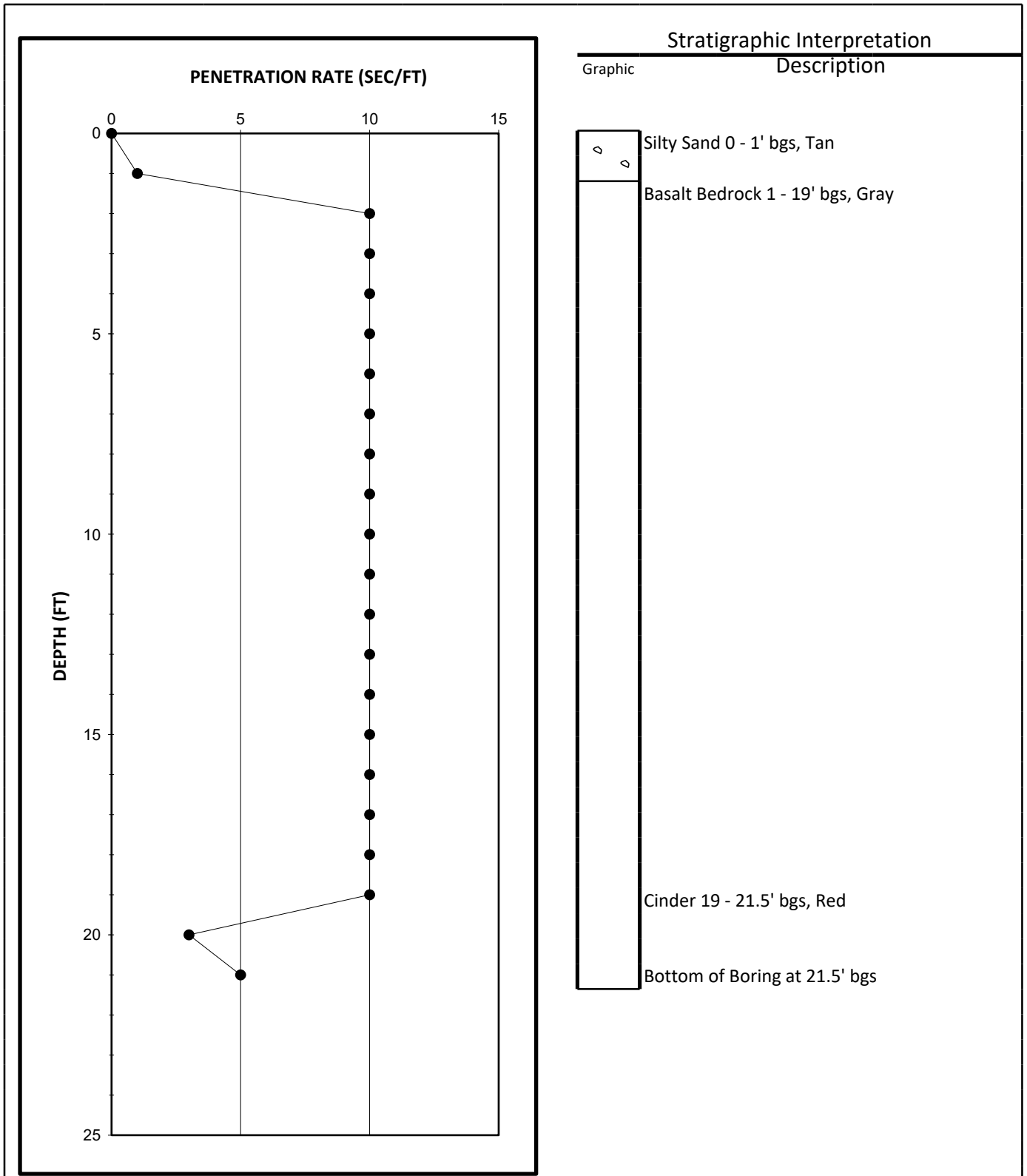


**Air-Track Boring Log Legend
Early Bronco
Deschutes County, OR**

PROJECT NO. 21182 - 1

FIGURE A - 1

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

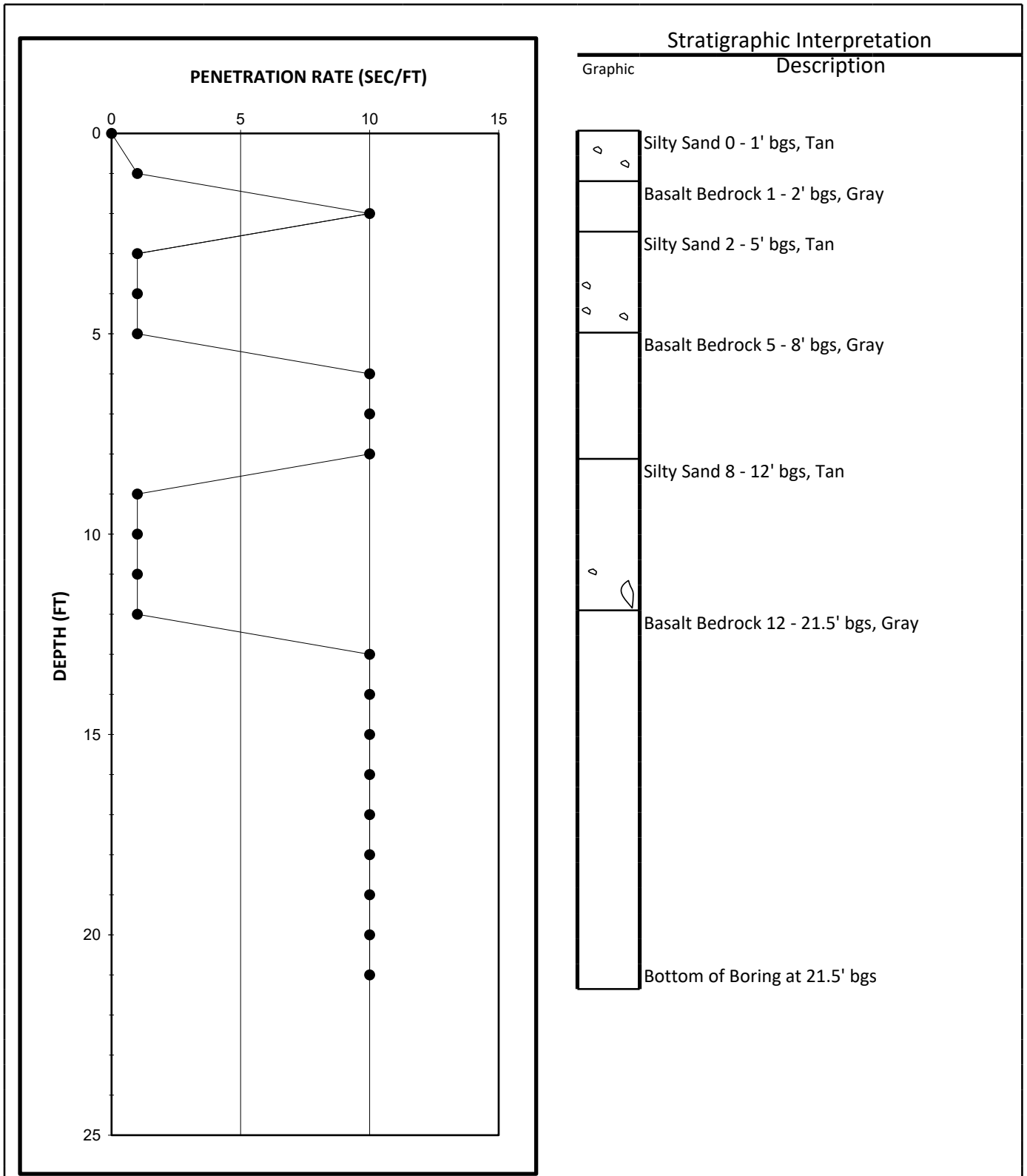


Air-Track Boring AT-01
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 2

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

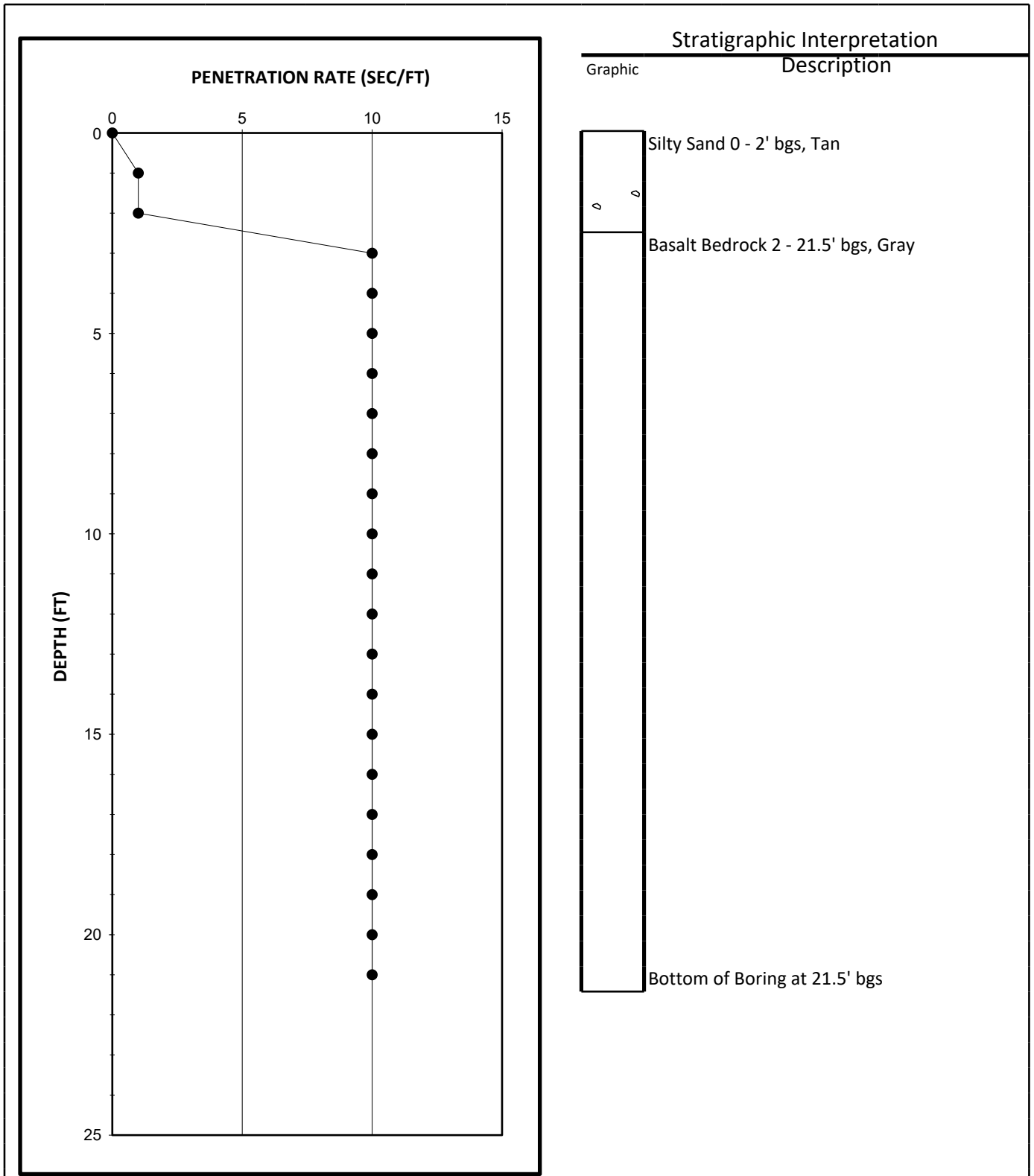


Air-Track Boring AT-02
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 3

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

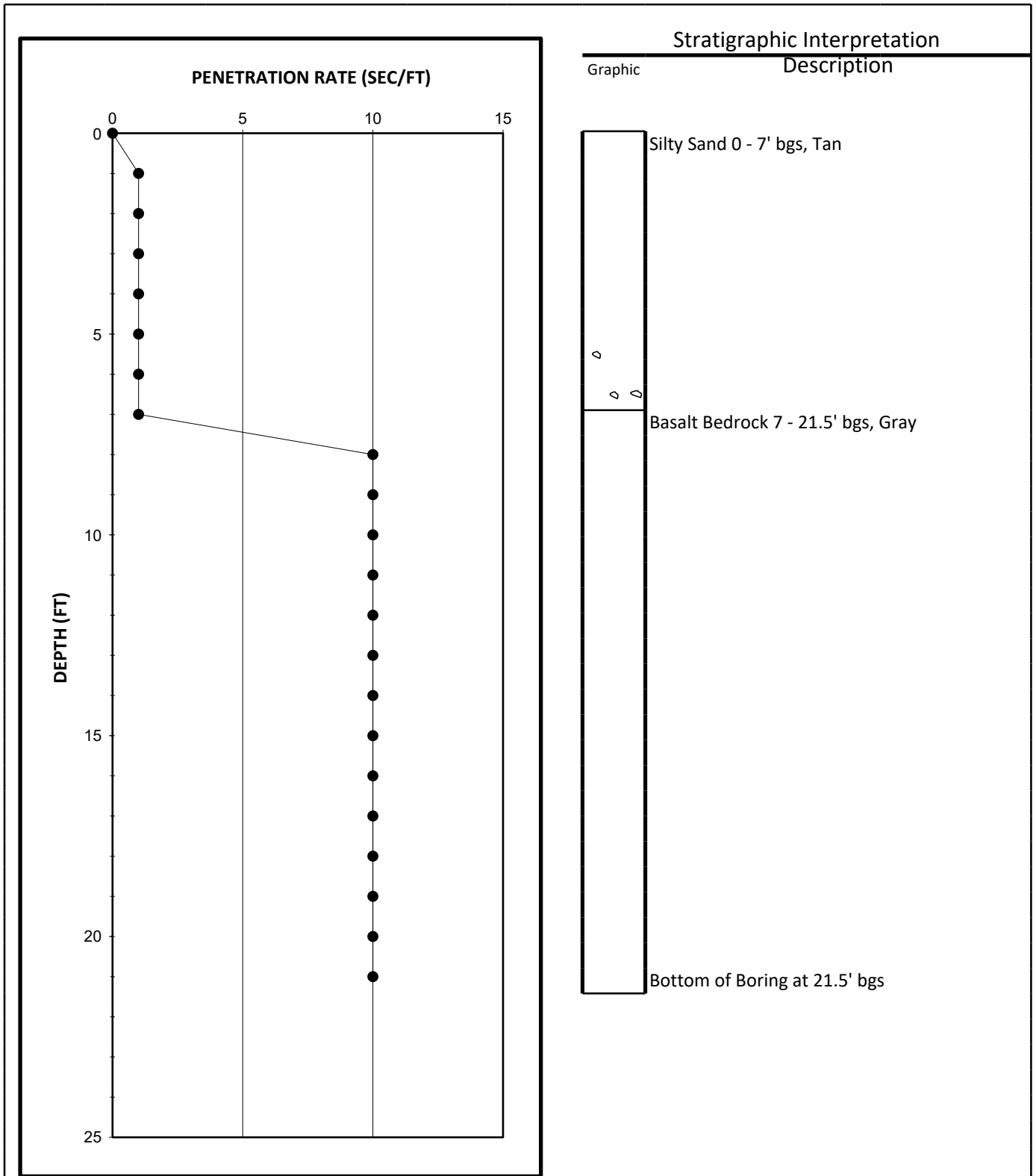


Air-Track Boring AT-03
Early Bronco
Deschutes County, OR


PROJECT NO. 21182 - 1

FIGURE A - 4

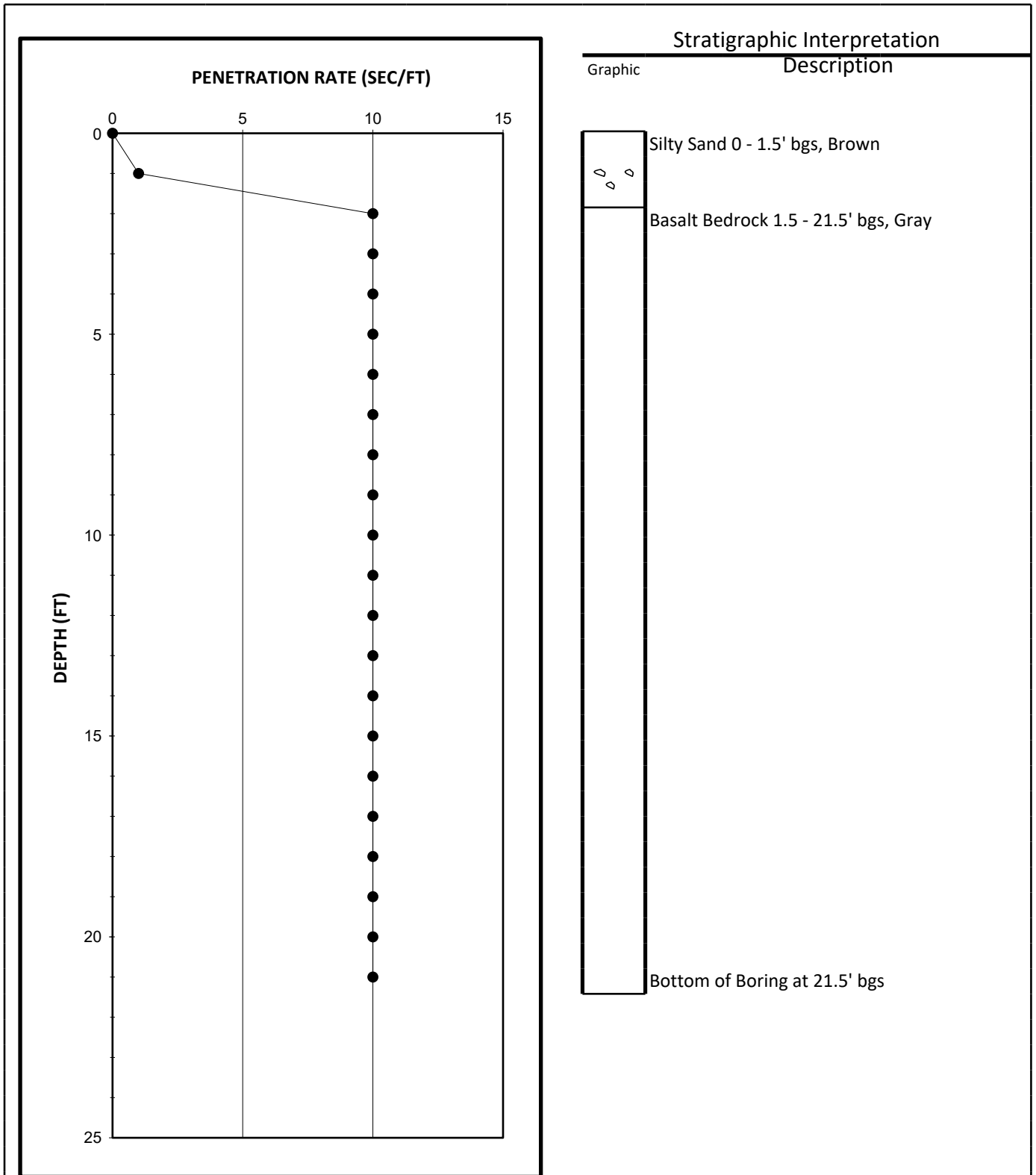
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

 <p>WALLACE GROUP NORTHWEST GEOSYSTEM EXPERTS</p>	<p>Air-Track Boring AT-04 Early Bronco Deschutes County, OR</p>	
	<p>PROJECT NO. 21182 - 1</p>	<p>FIGURE A - 5</p>

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

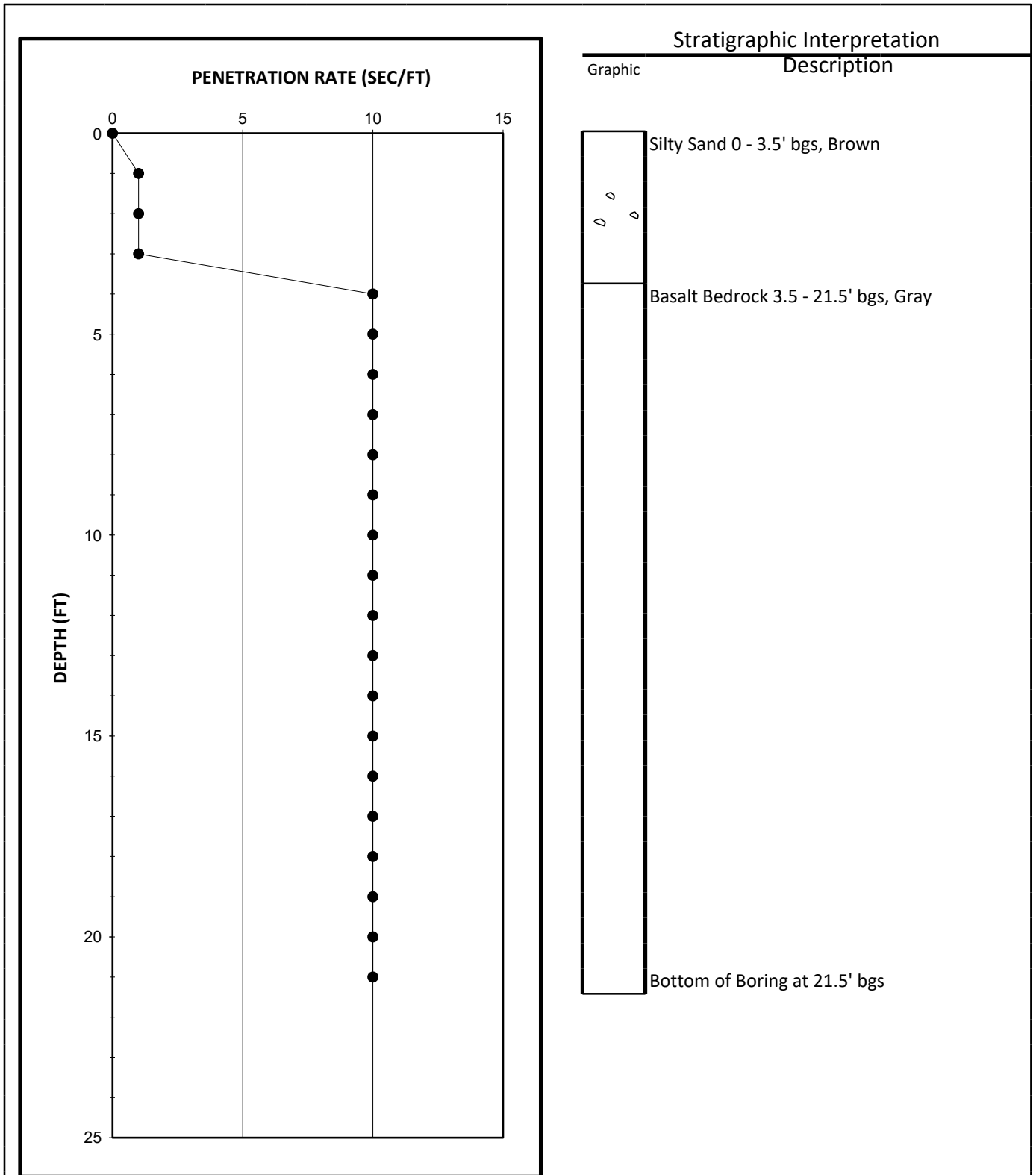


Air-Track Boring AT-05
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 6

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

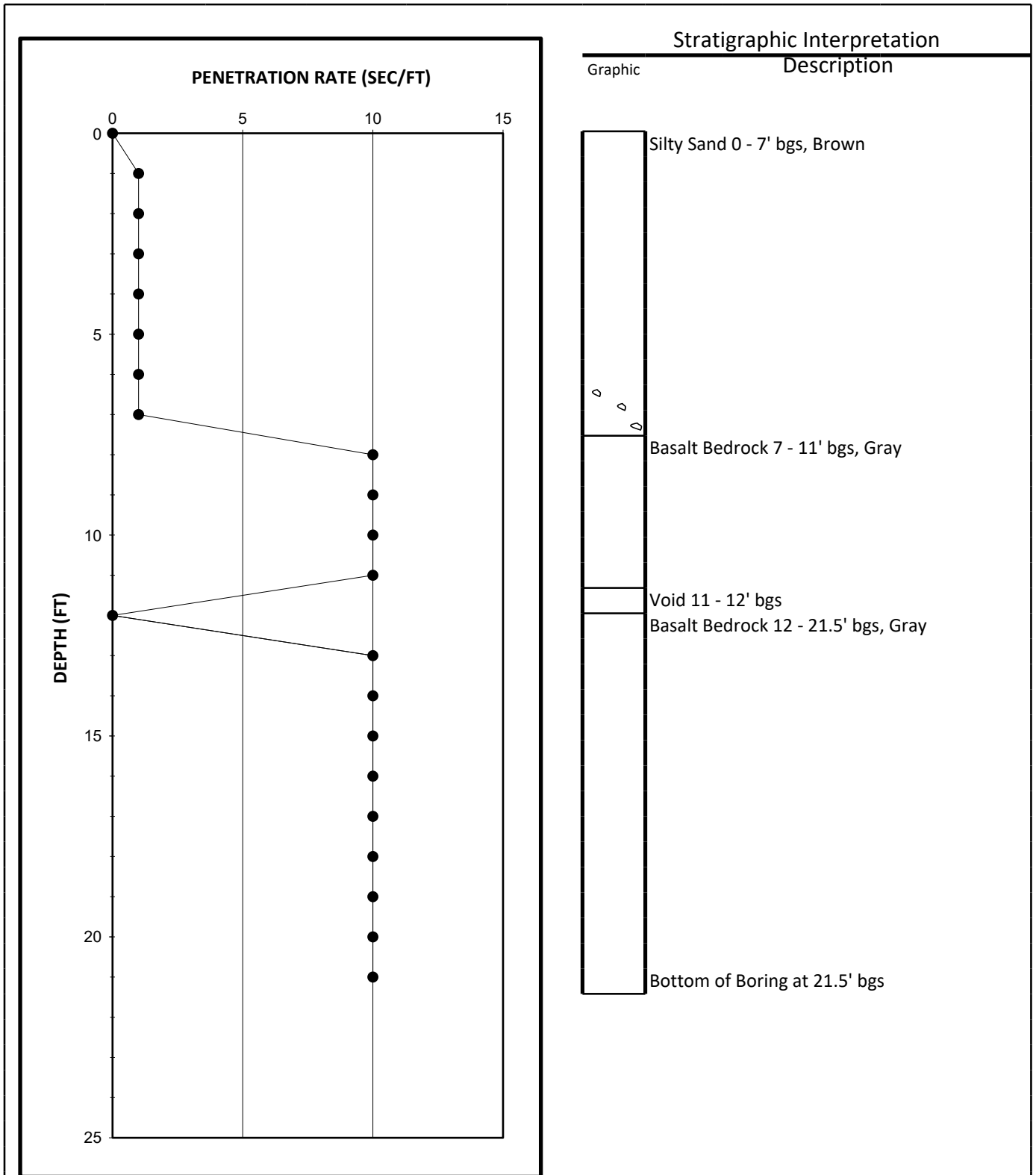


Air-Track Boring AT-06
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 7

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

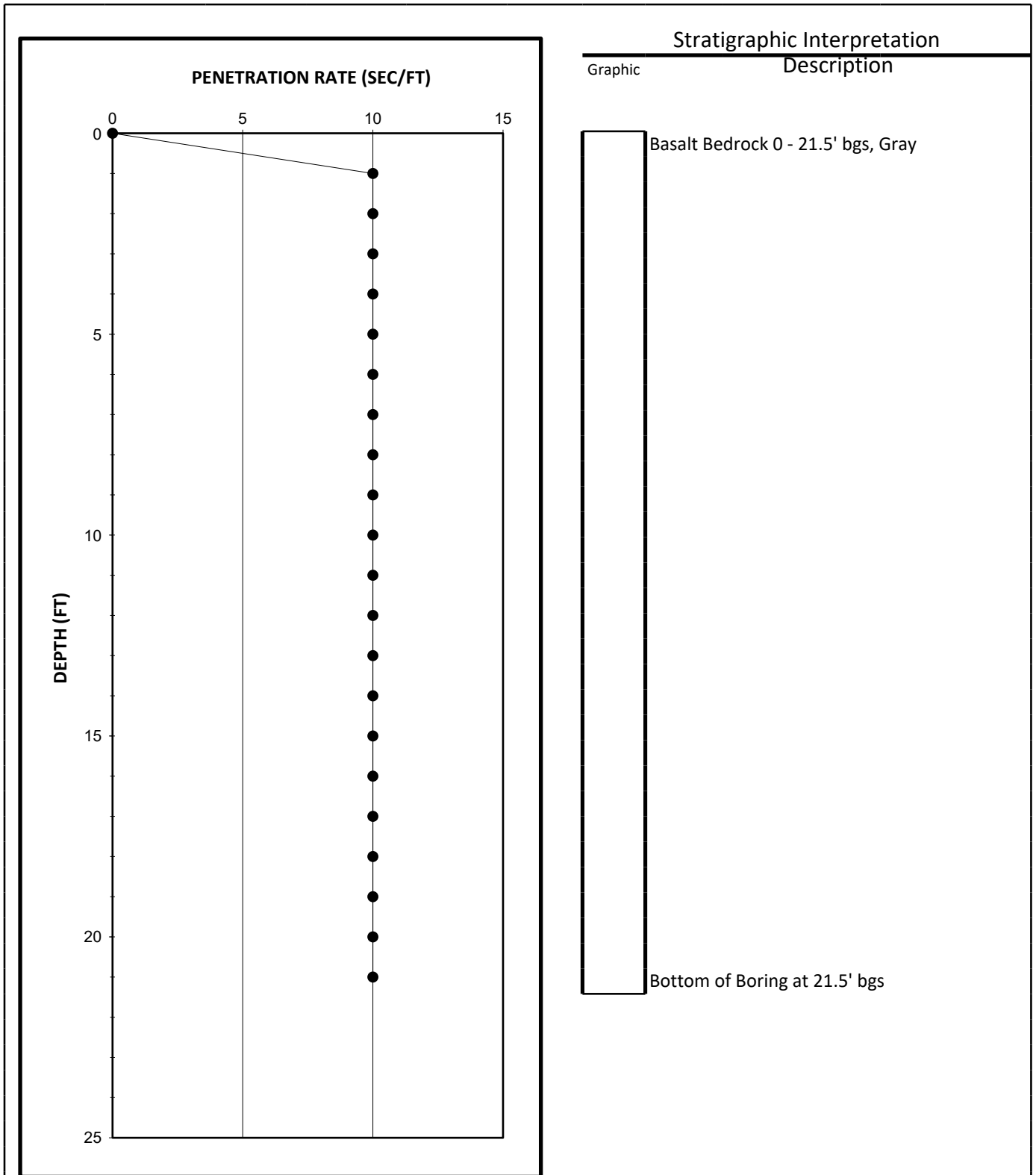


Air-Track Boring AT-07
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 8

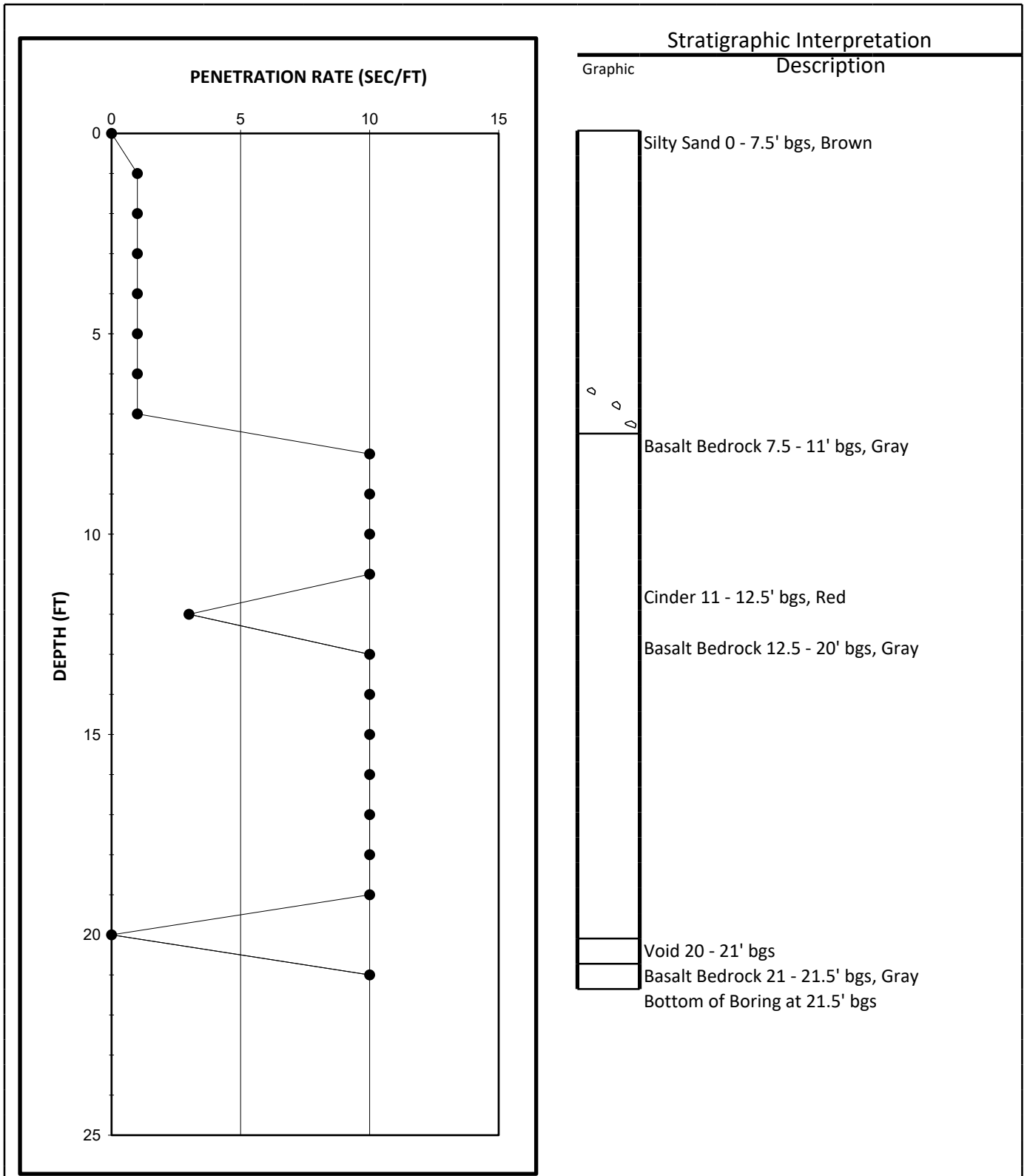
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

	Air-Track Boring AT-08 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 9

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

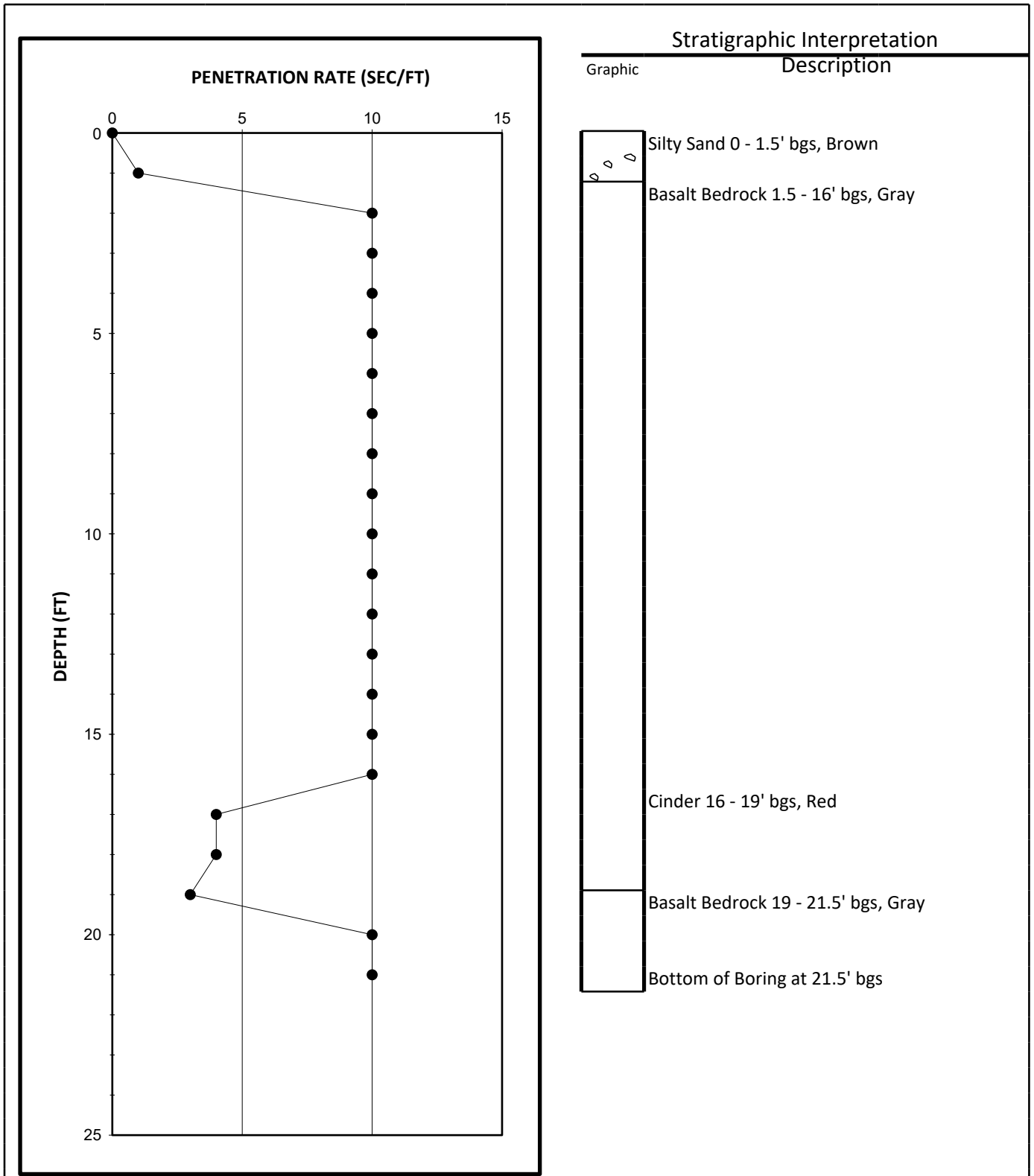


Air-Track Boring AT-09
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 10

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

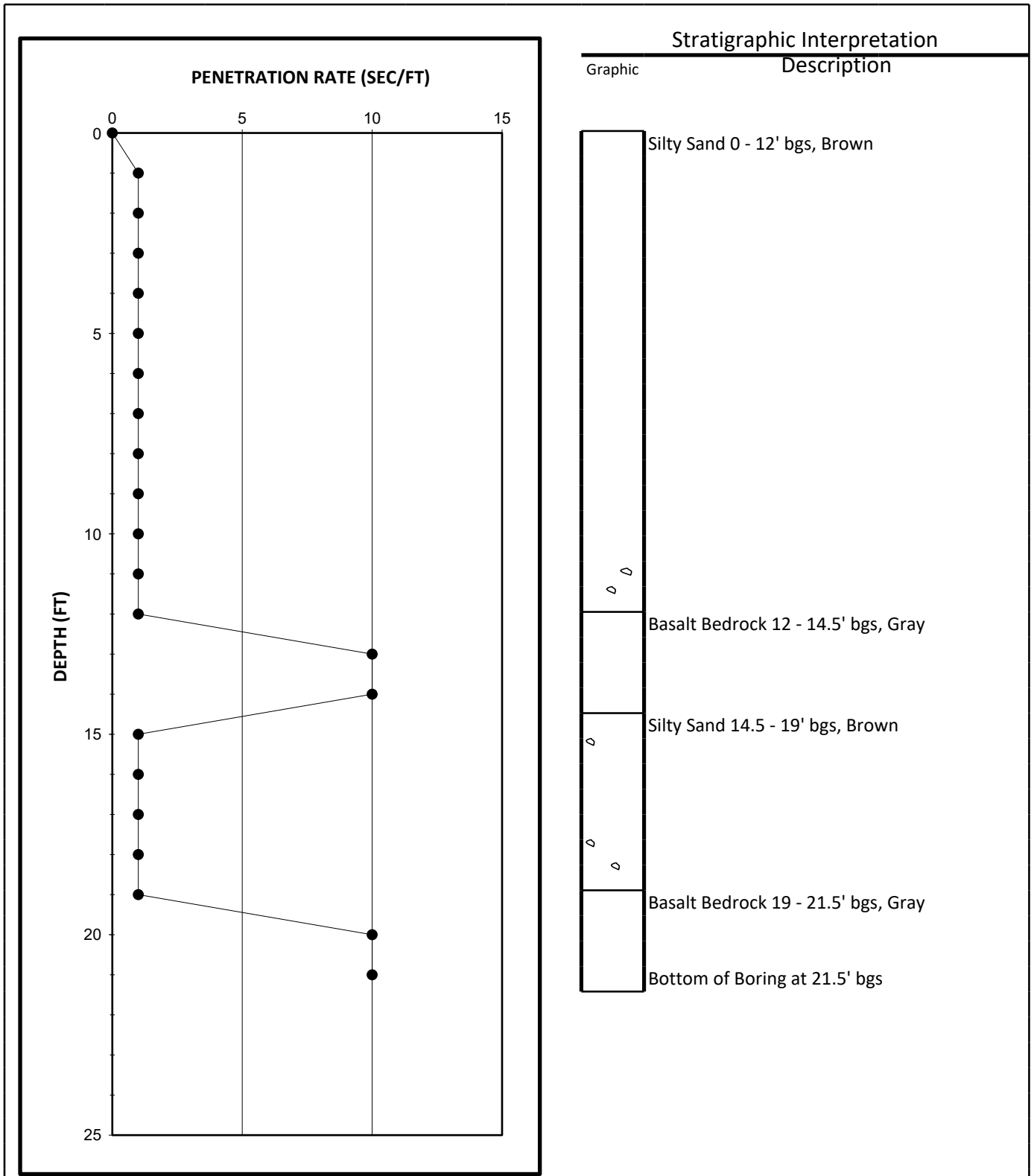


Air-Track Boring AT-10
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 11

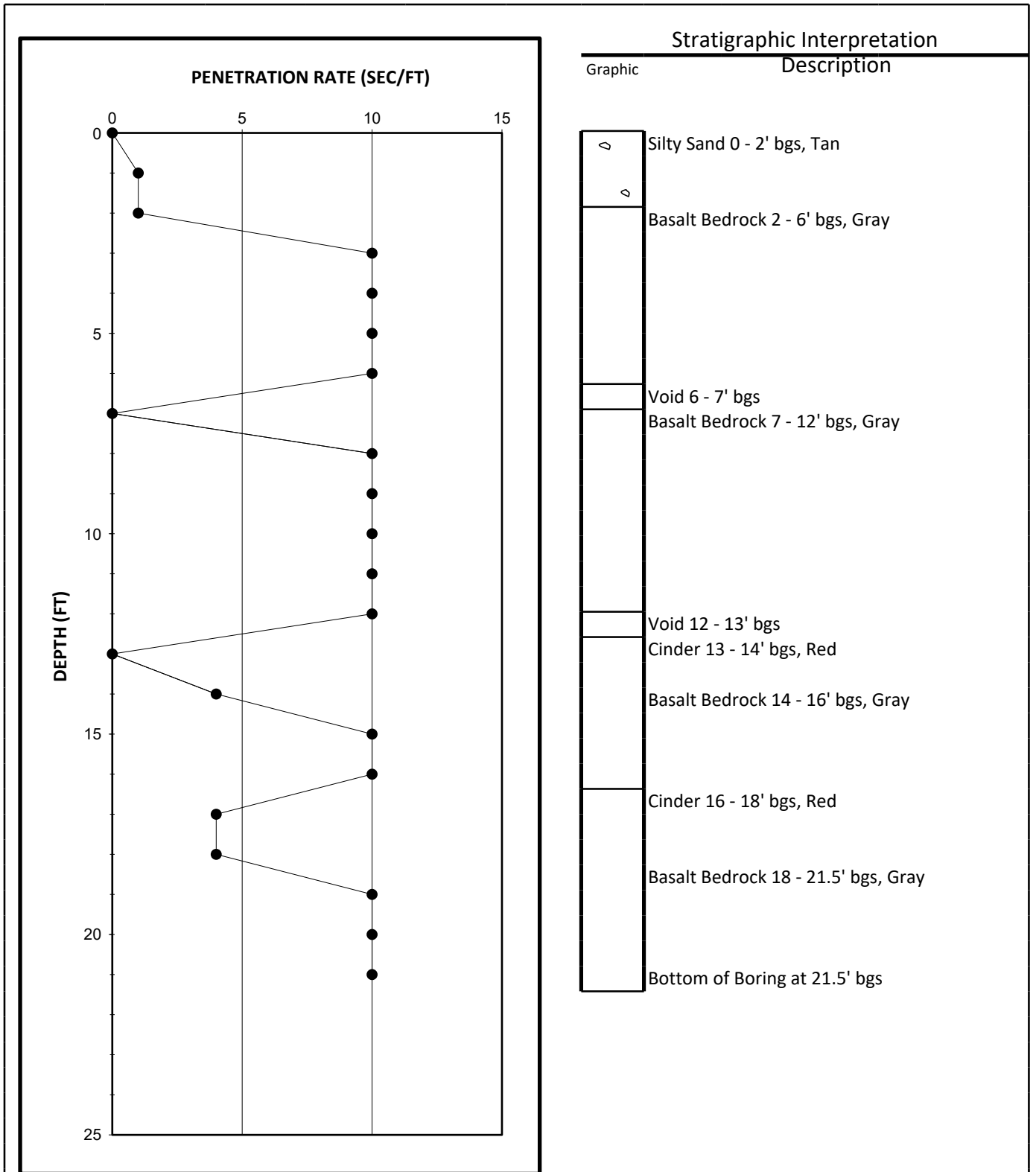
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-11 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 12

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method:

Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller:

Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

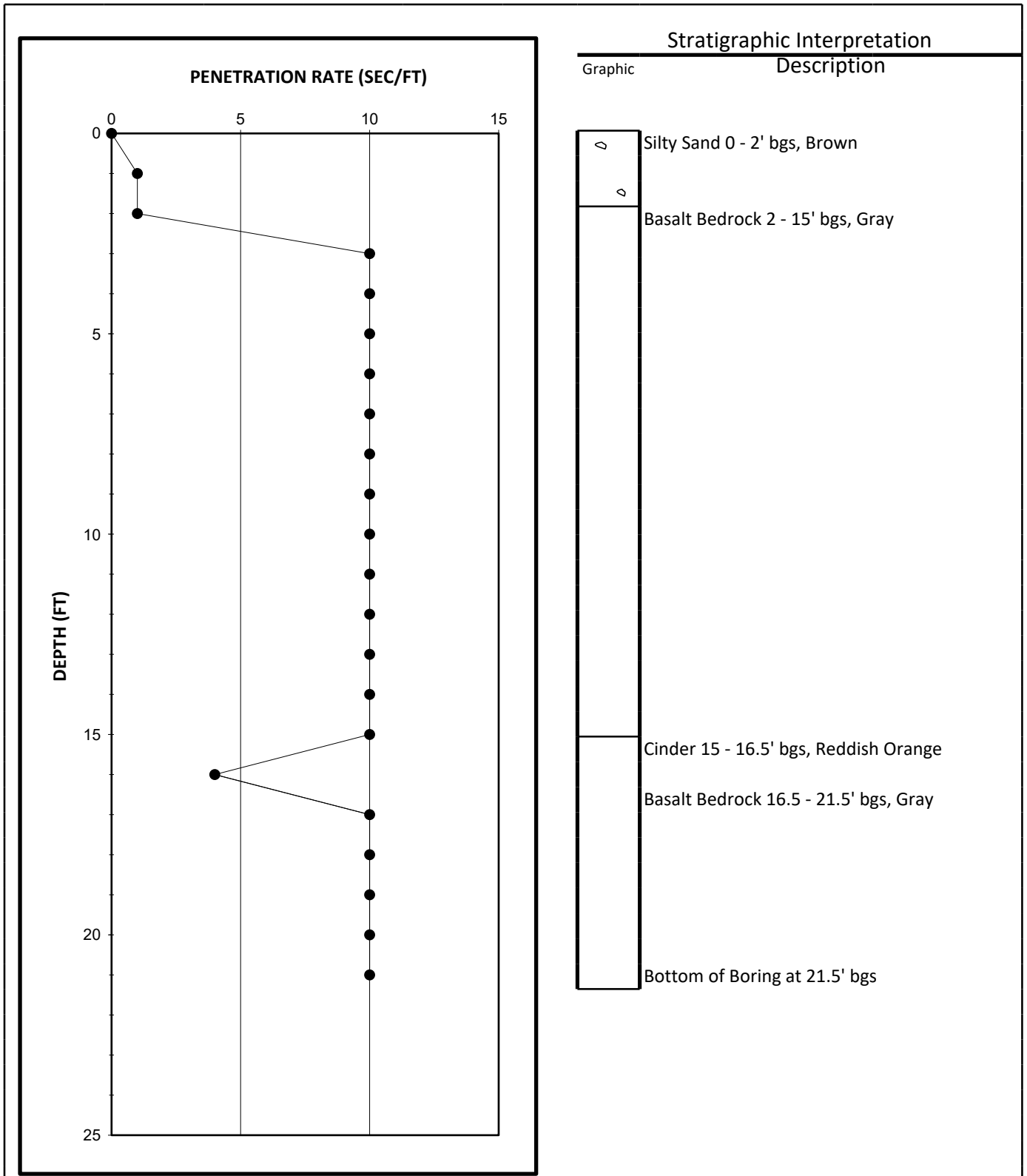


Air-Track Boring AT-12
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 13

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

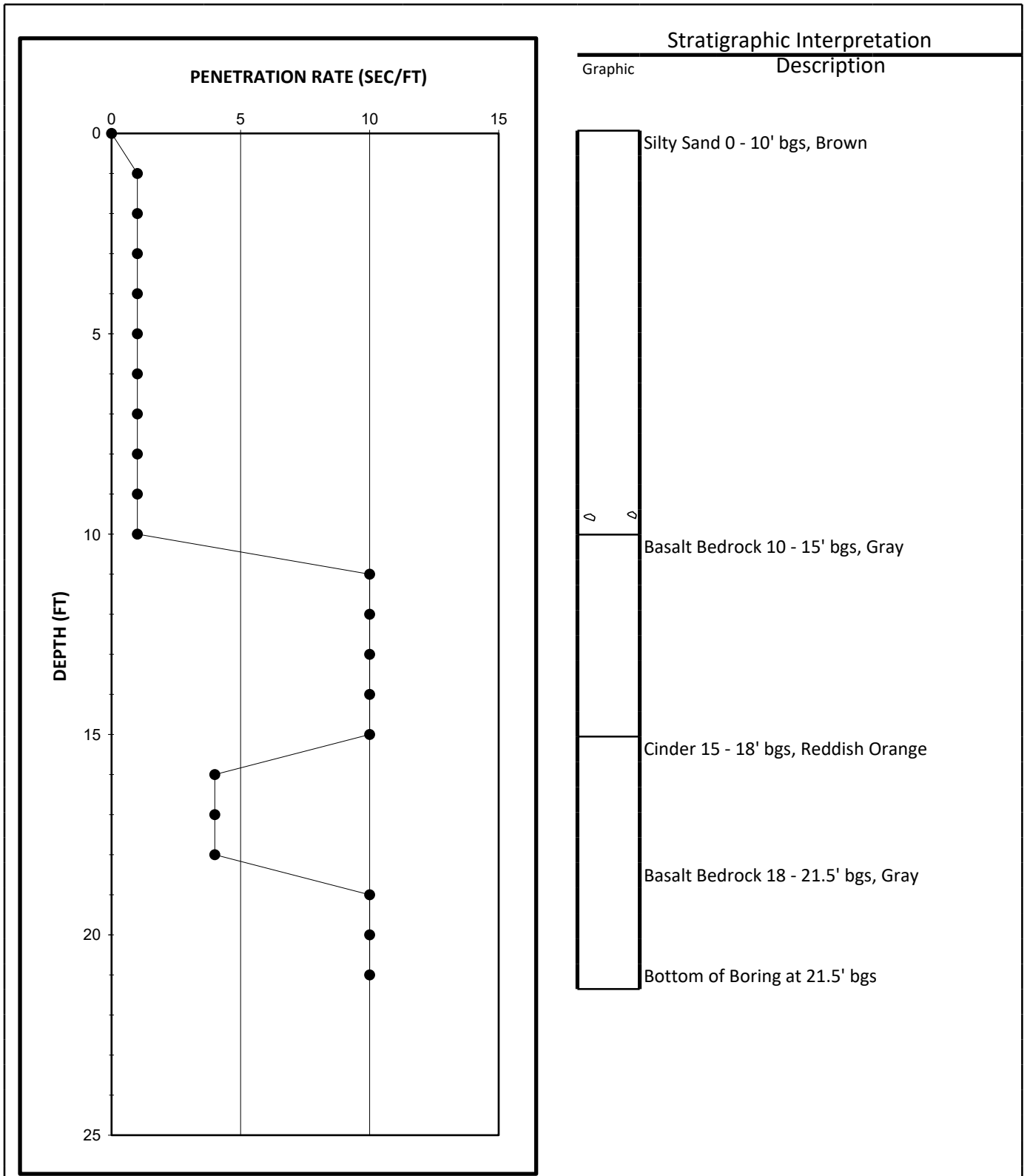


Air-Track Boring AT-13
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 14

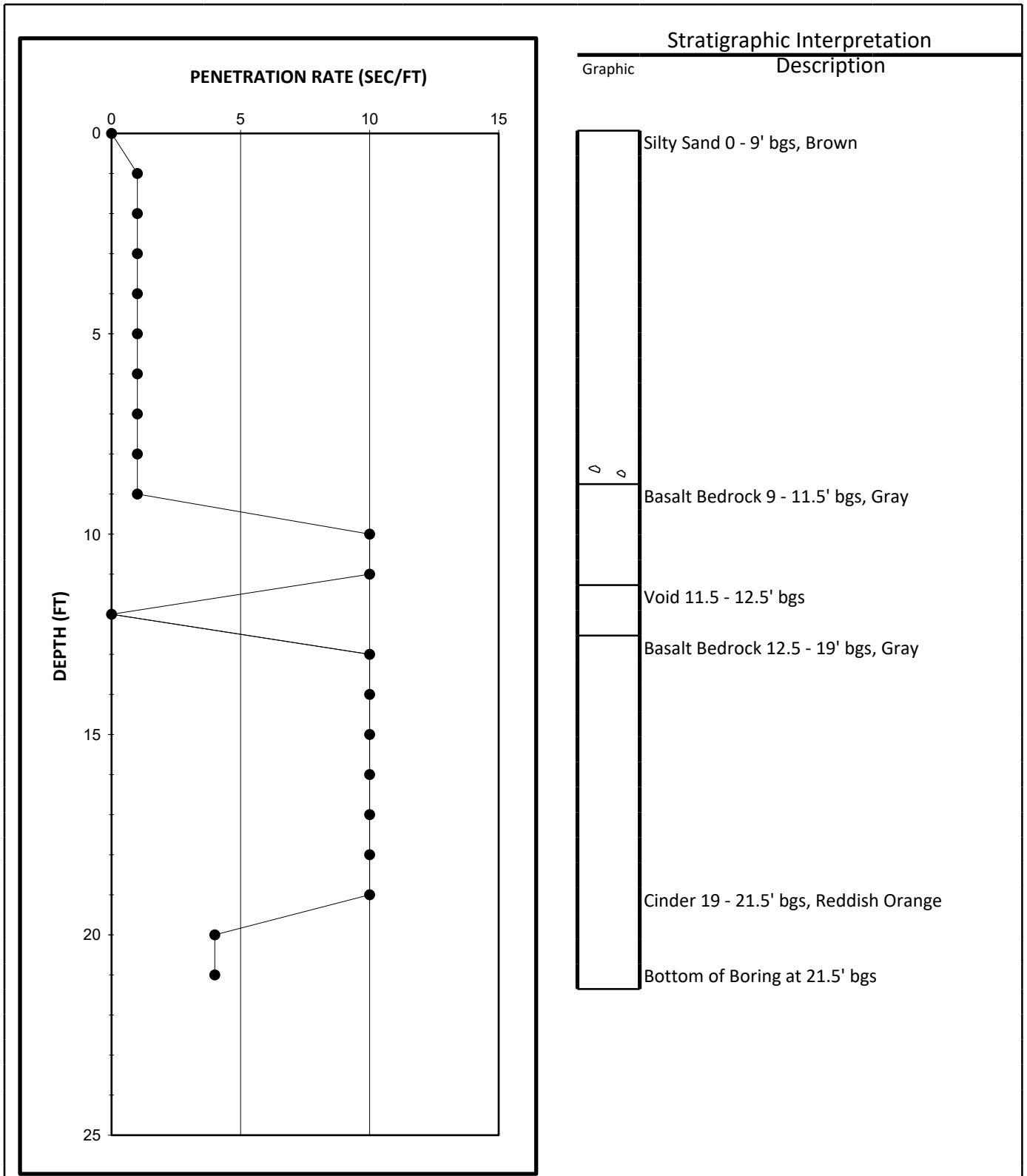
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

 <p>WALLACE GROUP NORTHWEST GEOSYSTEM EXPERTS</p>	<p>Air-Track Boring AT-14 Early Bronco Deschutes County, OR</p>	
	<p>PROJECT NO. 21182 - 1</p>	<p>FIGURE A - 15</p>

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

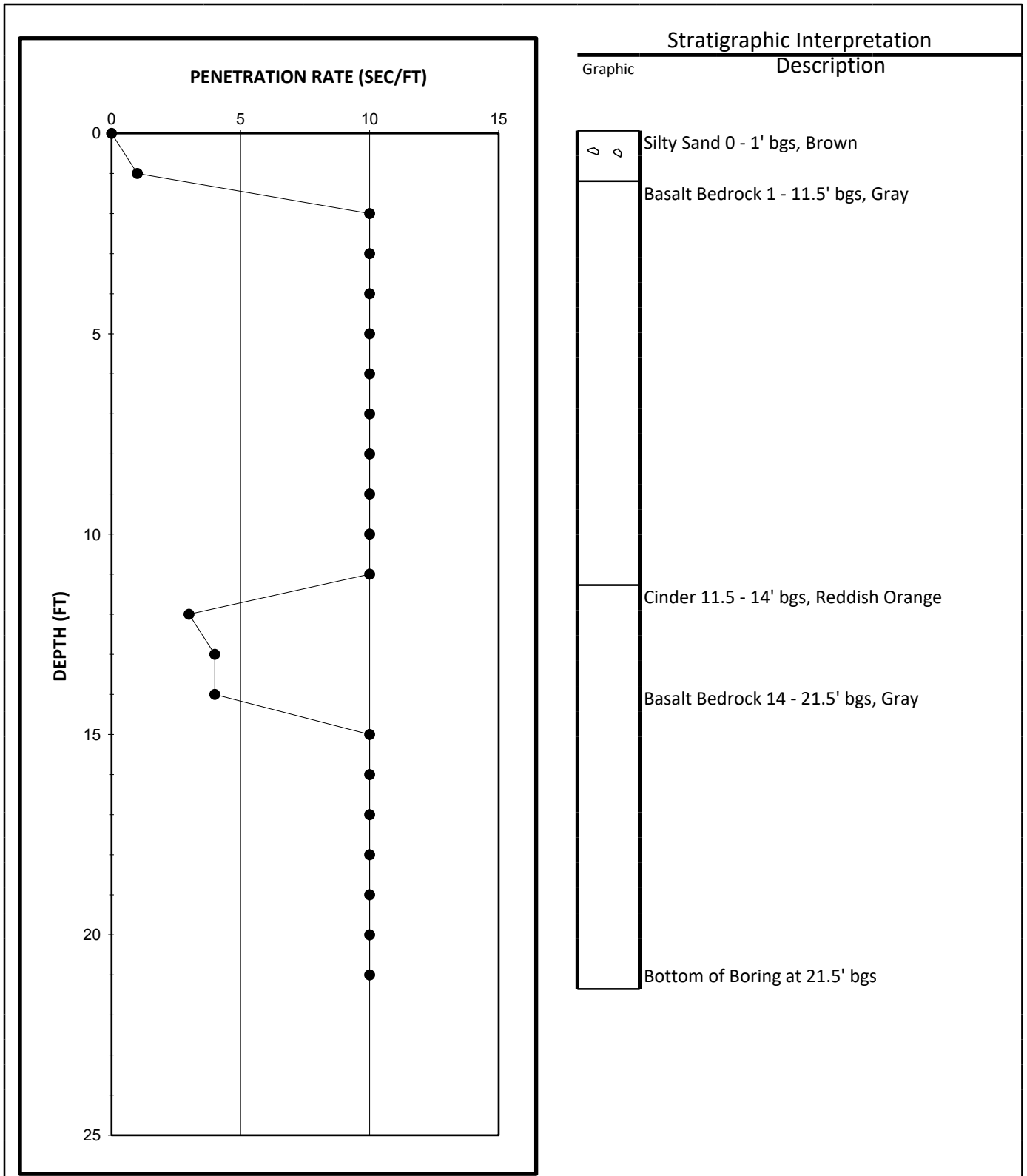


Air-Track Boring AT-15
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 16

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

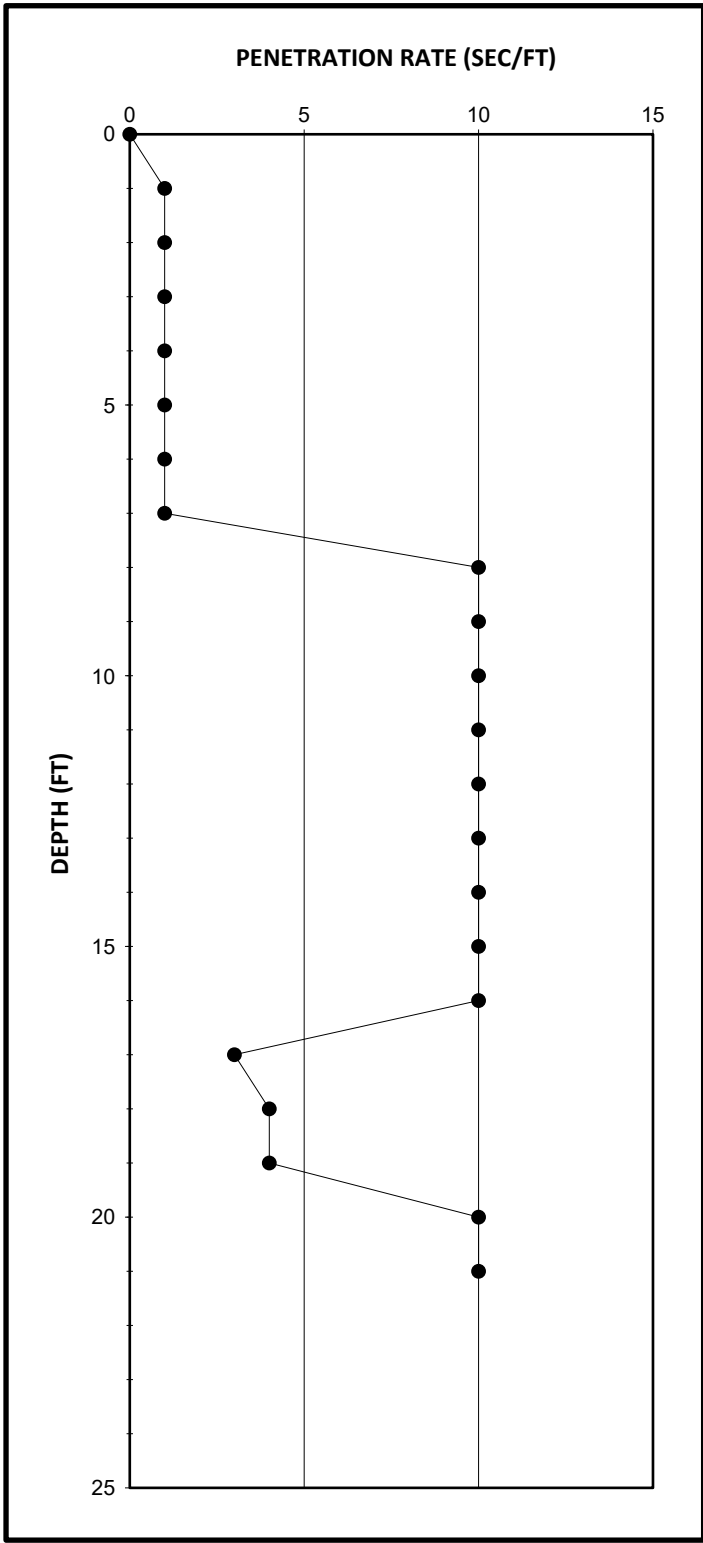
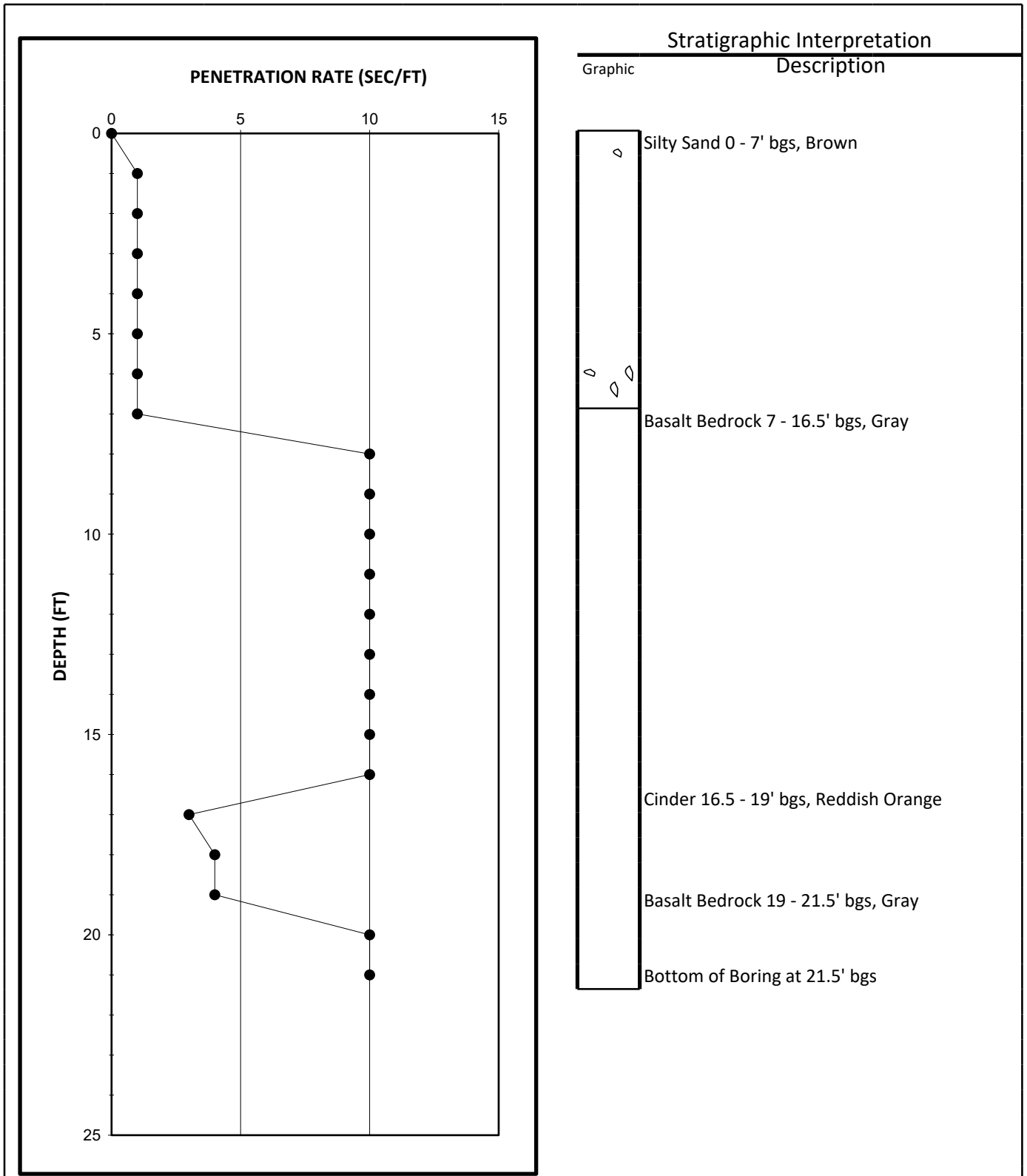


Air-Track Boring AT-16
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 17

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

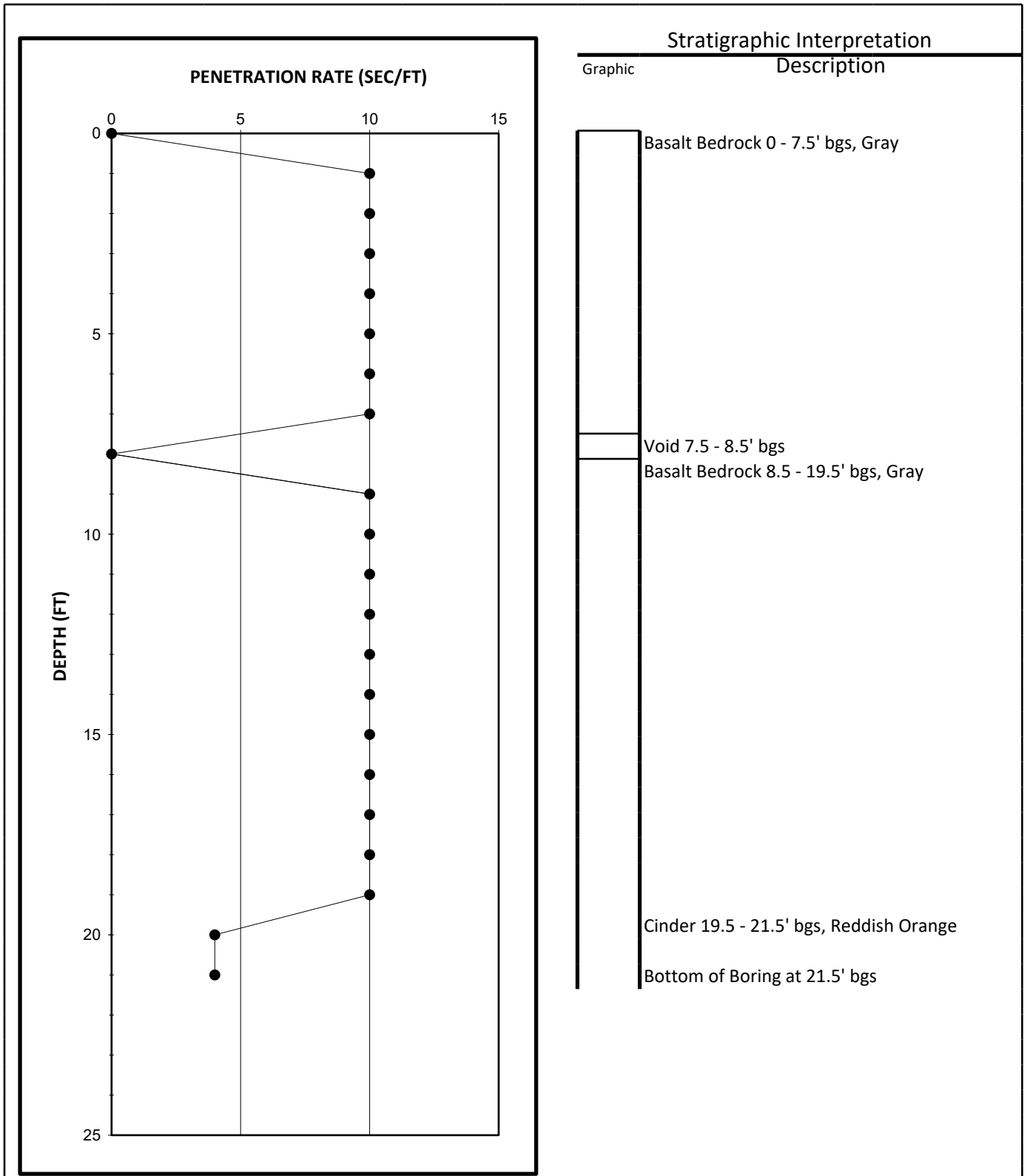


Air-Track Boring AT-17
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 18

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

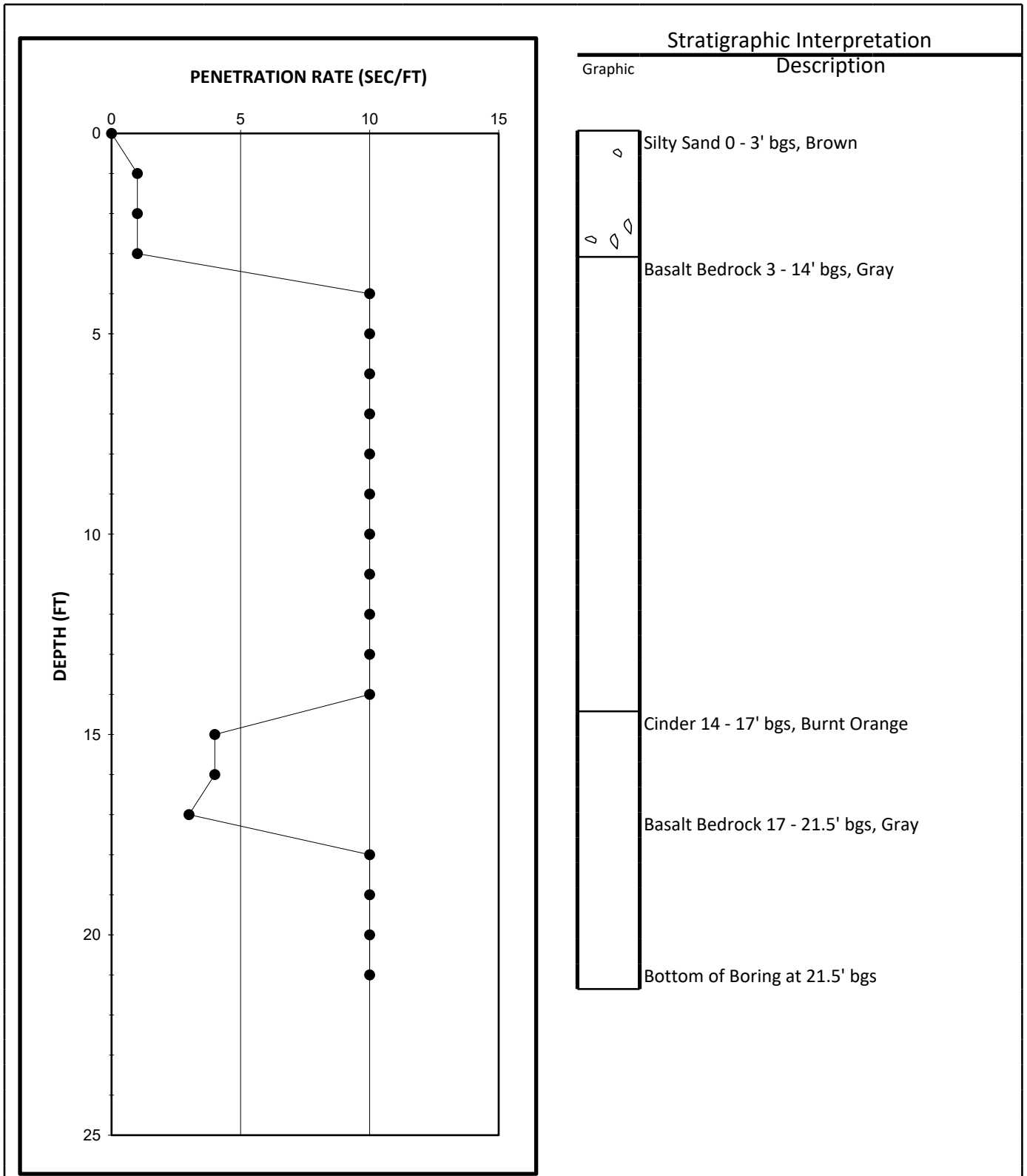


Air-Track Boring AT-18
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 19

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

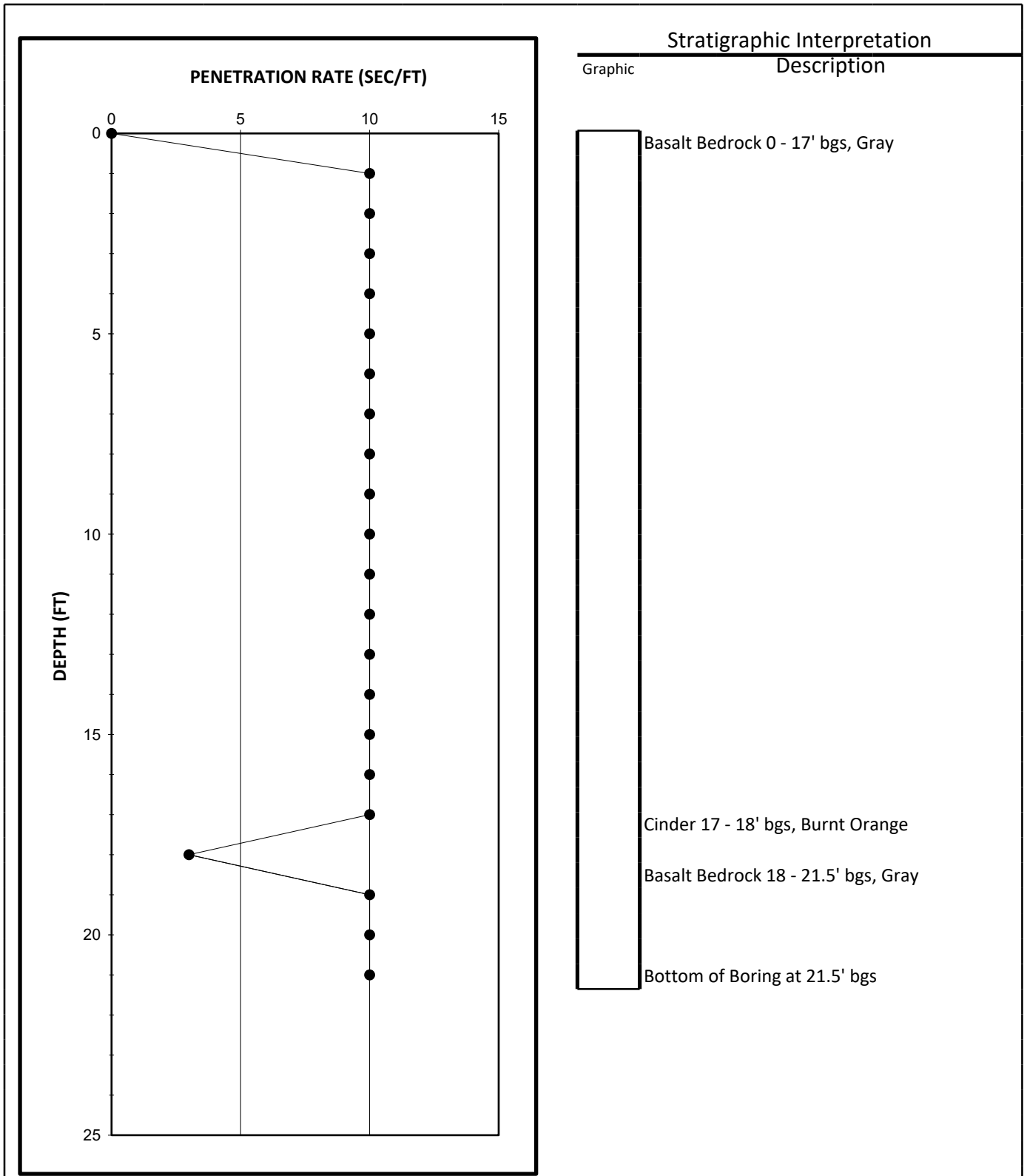


Air-Track Boring AT-19
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 20

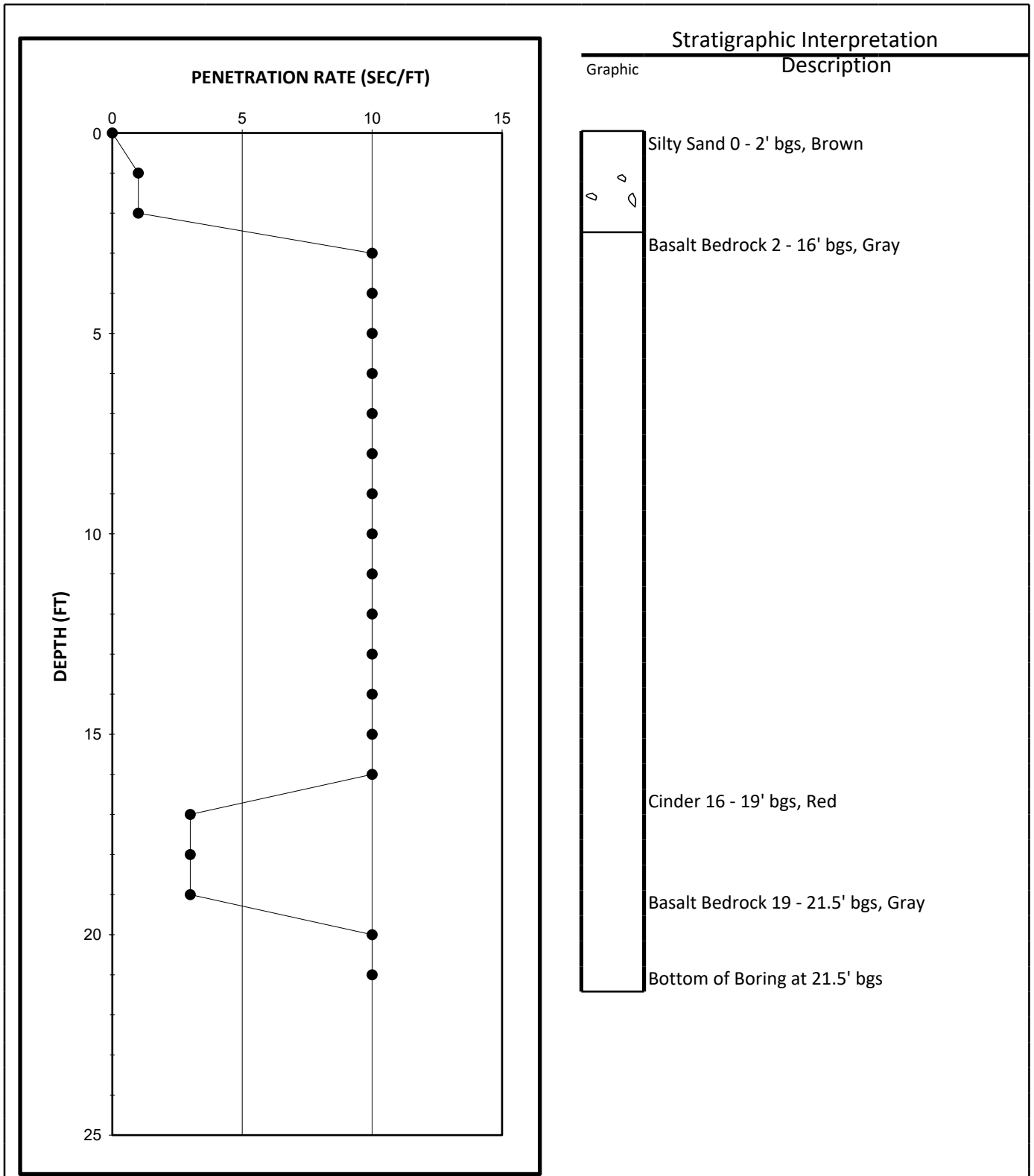
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-20 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 21

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

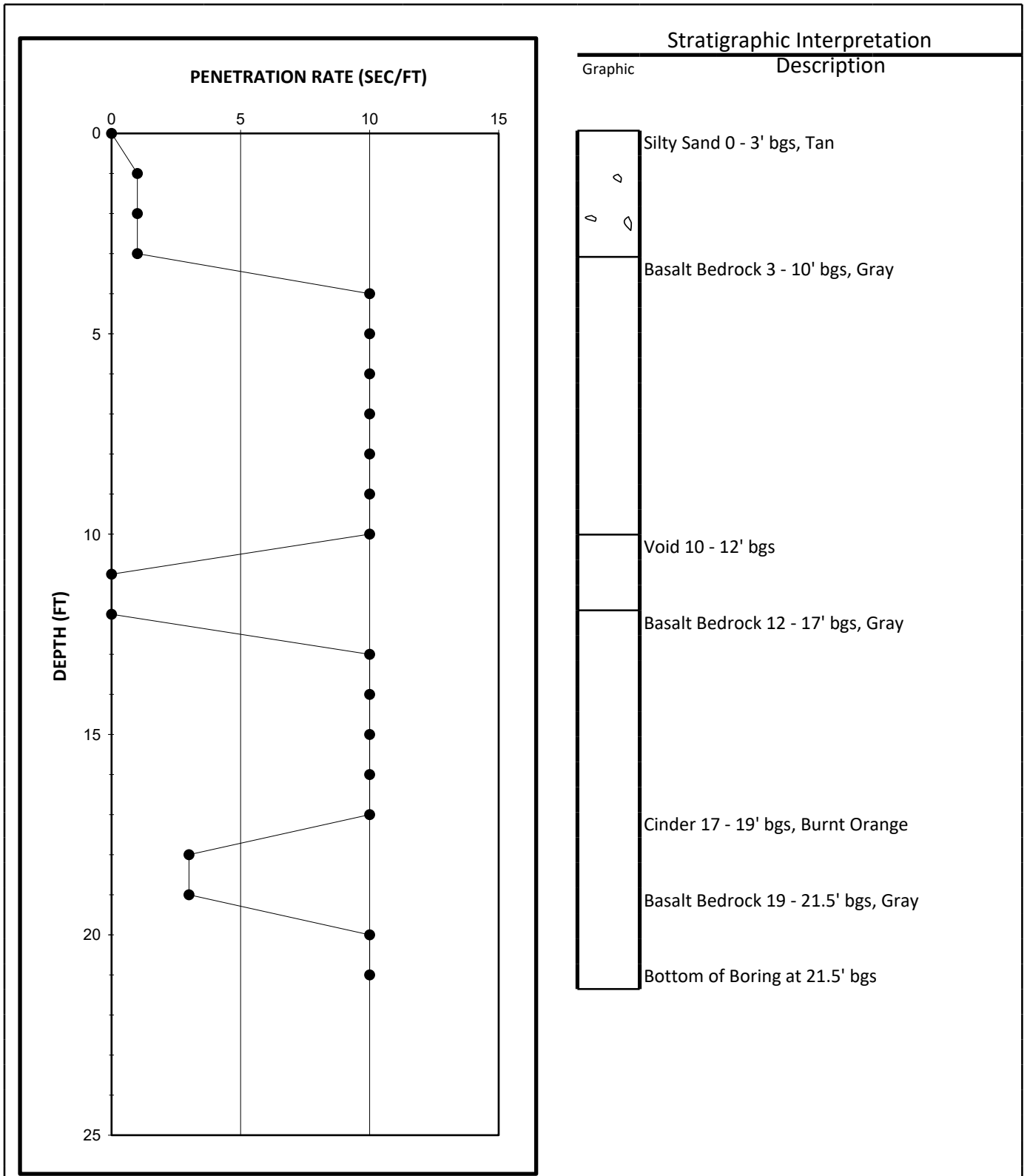


Air-Track Boring AT-21
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 22

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

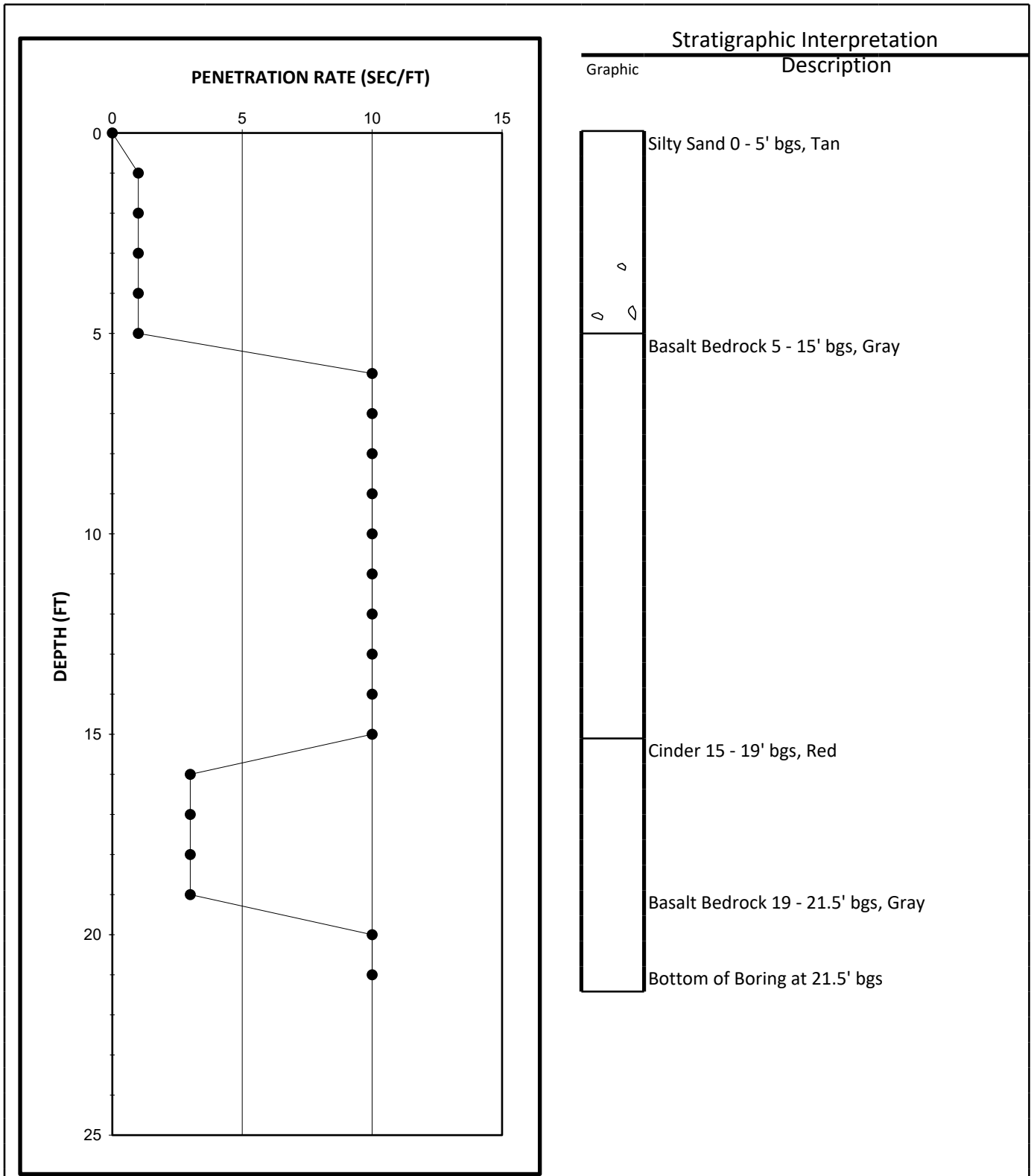


Air-Track Boring AT-22
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 23

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

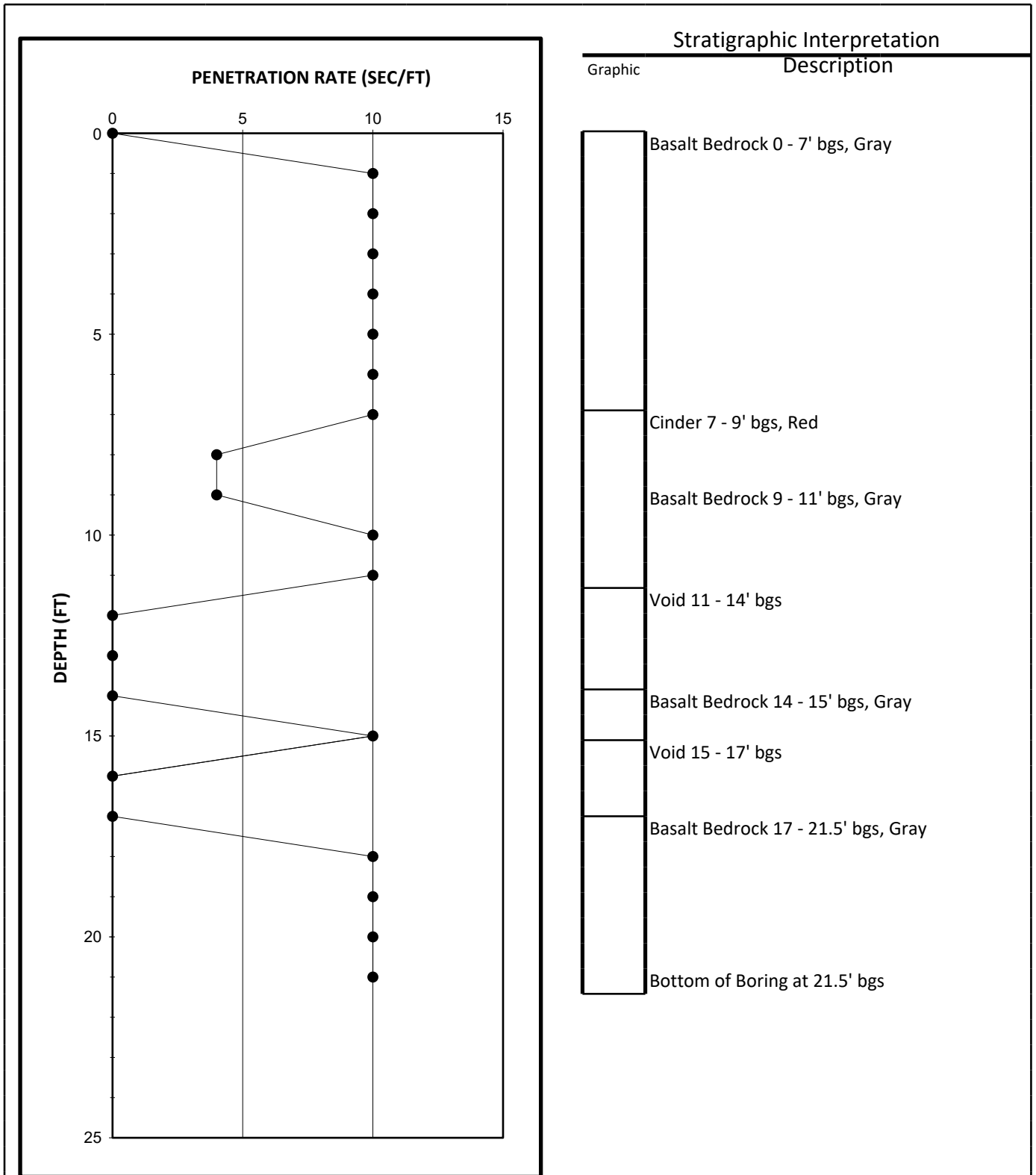


Air-Track Boring AT-23
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 24

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

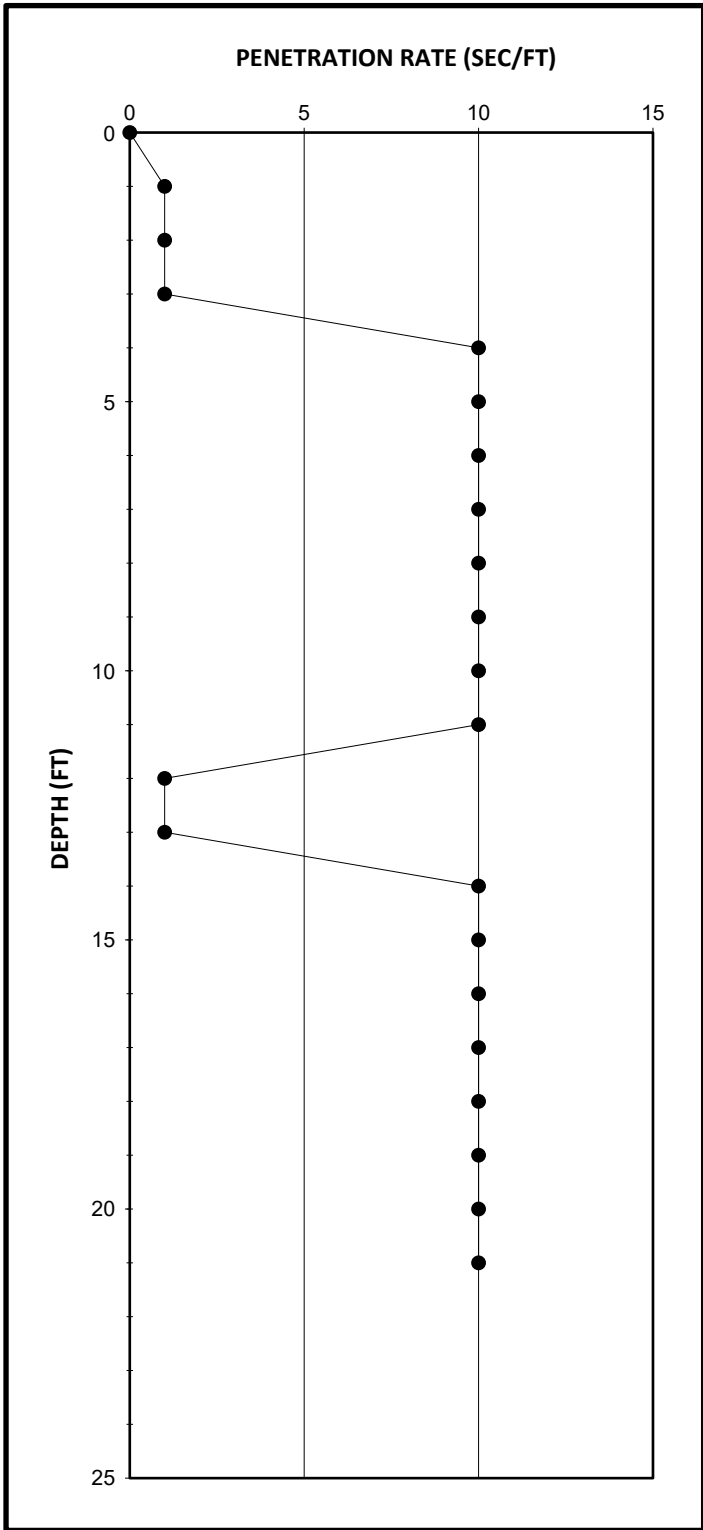
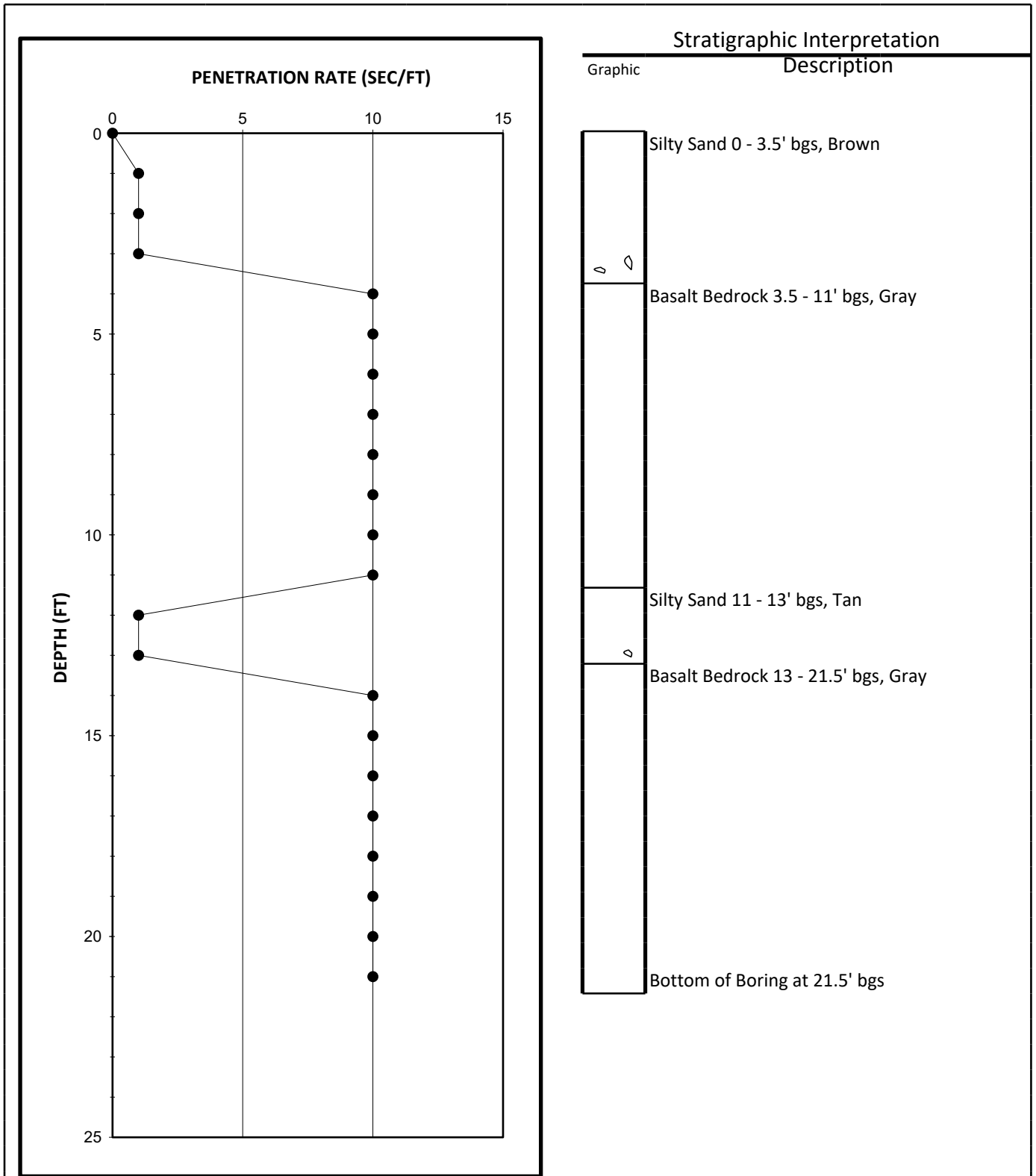


Air-Track Boring AT-24
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 25

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

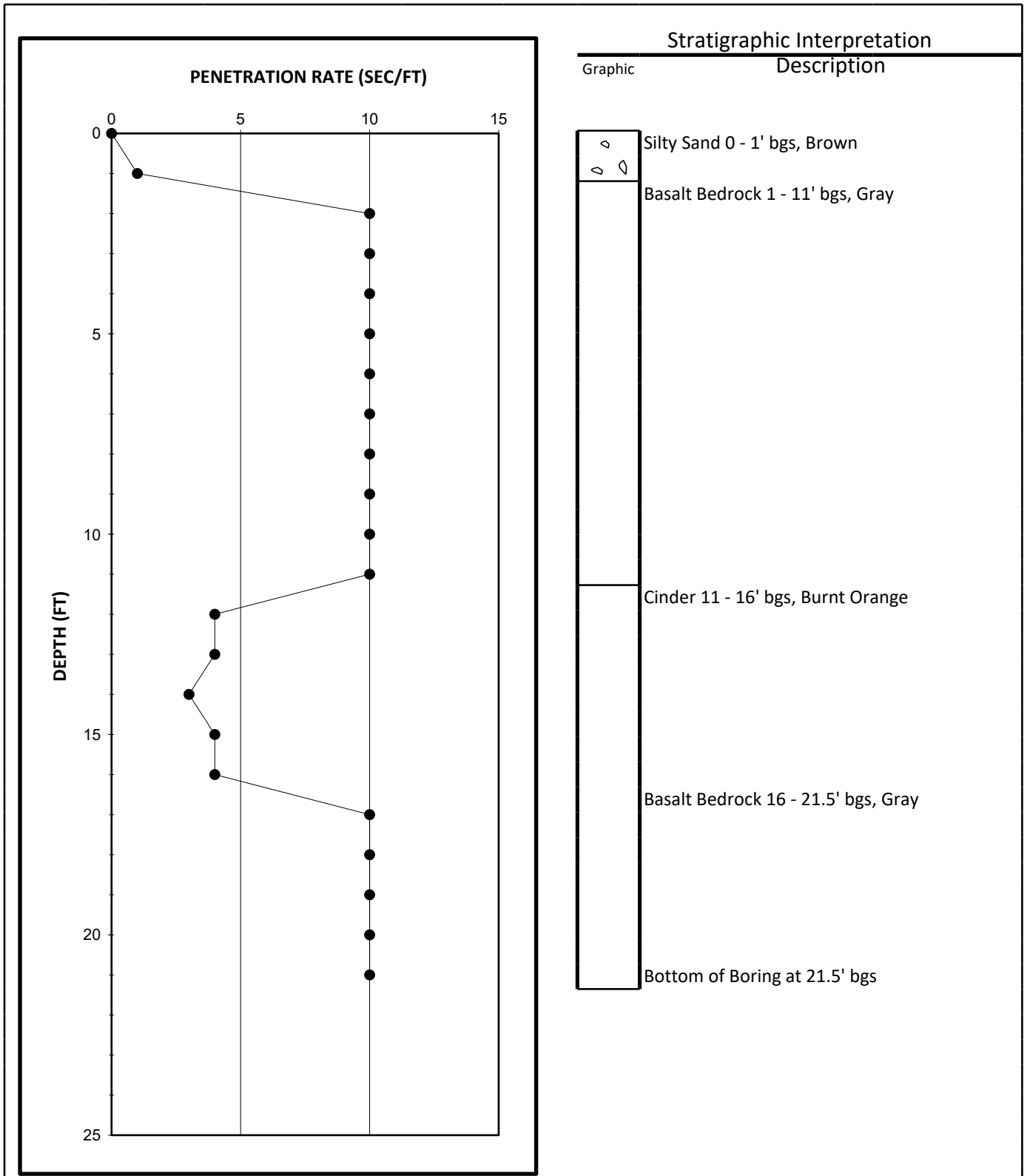


Air-Track Boring AT-25
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 26

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

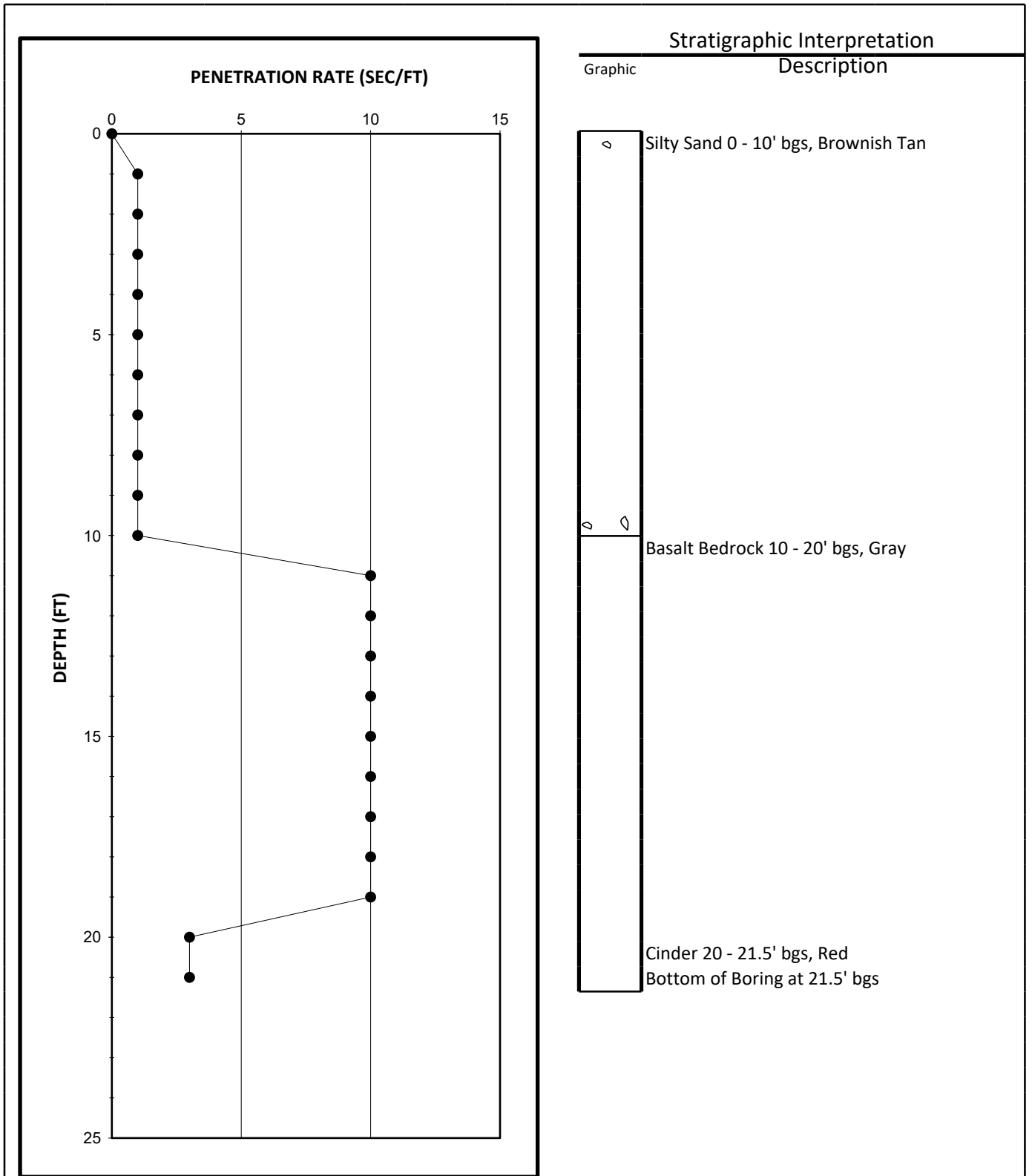


Air-Track Boring AT-26
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 27

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmssl):

Drilling Method:

Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller:

Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

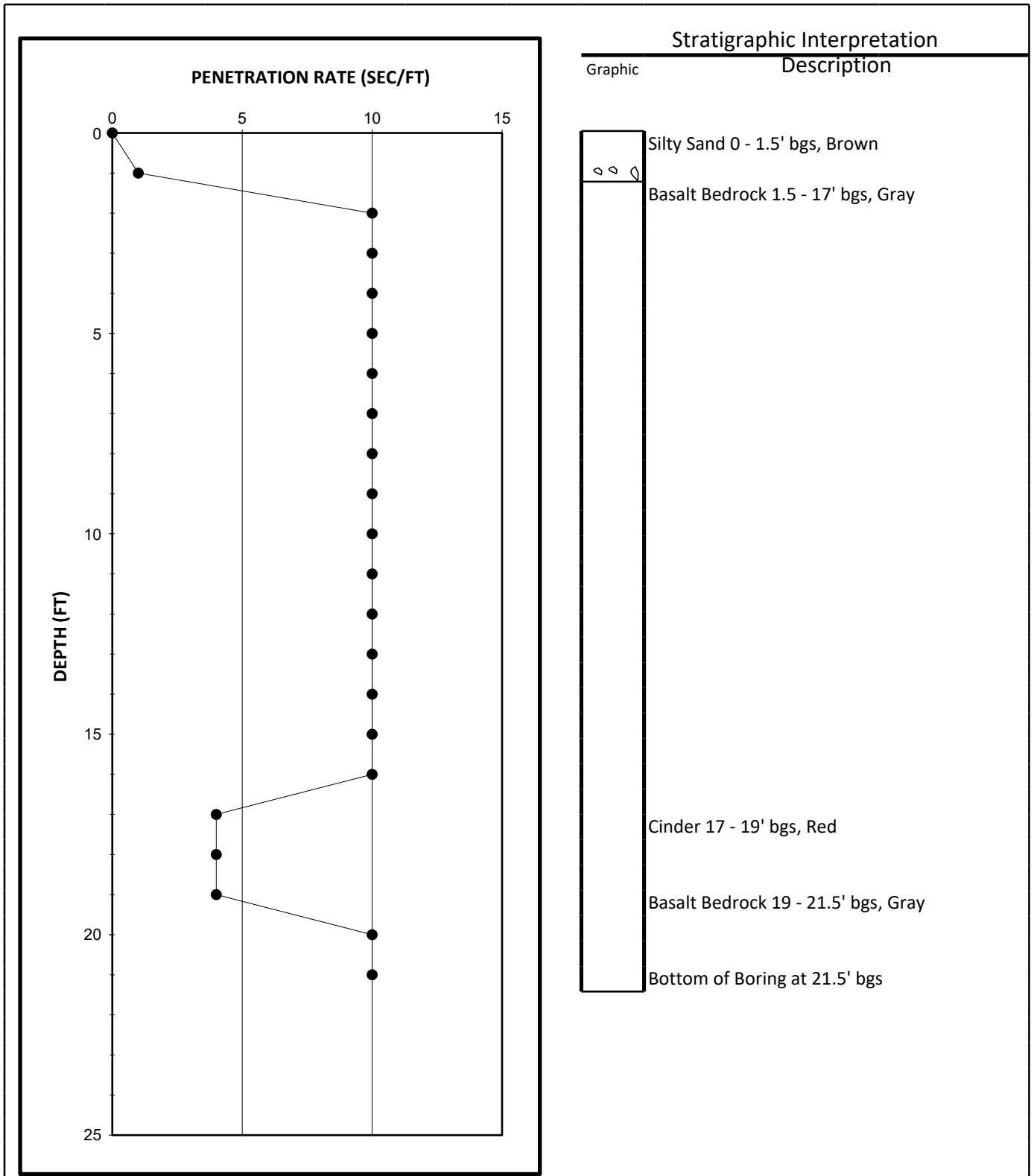


Air-Track Boring AT-27
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 28

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

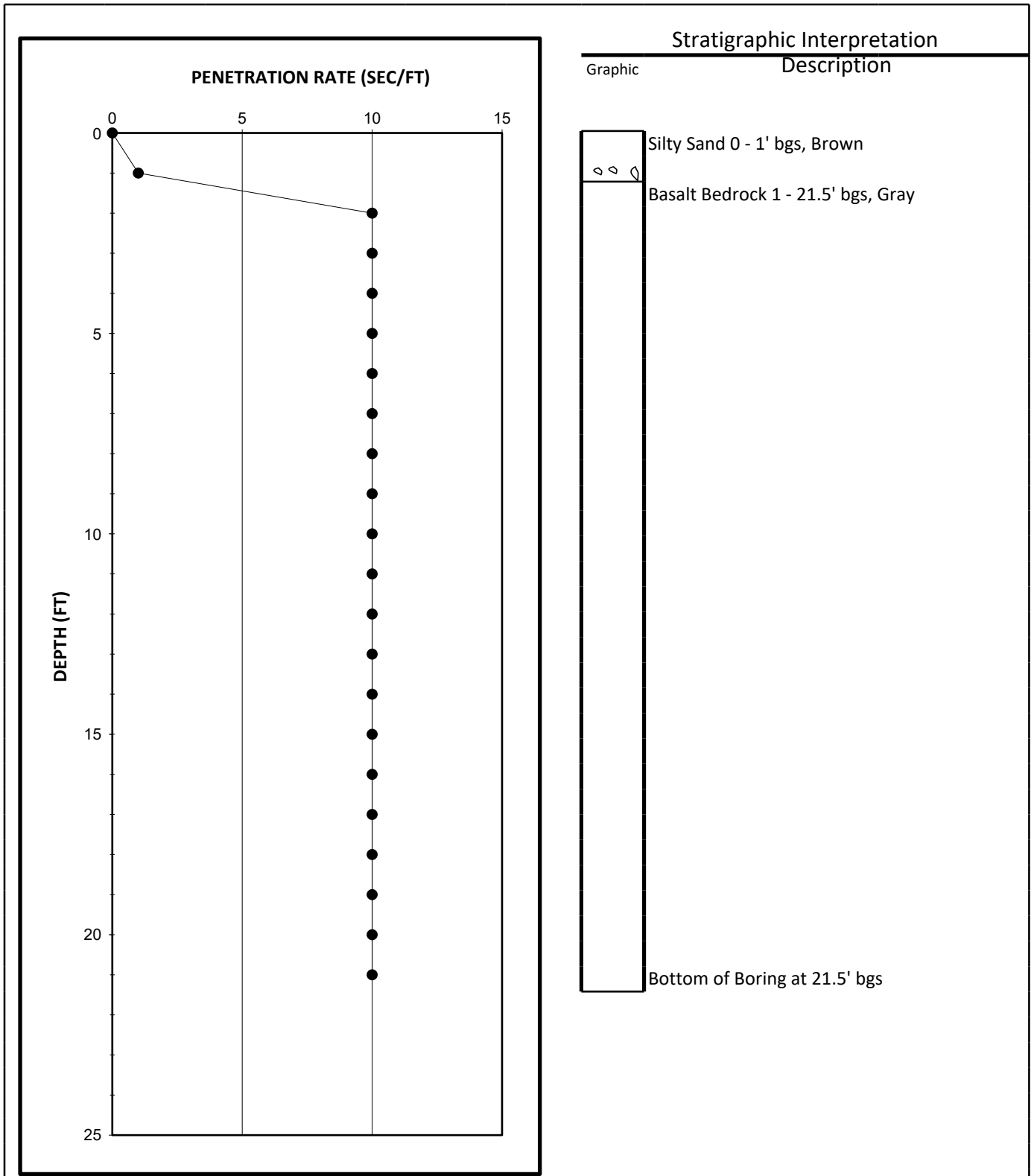


Air-Track Boring AT-28
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 29

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track	Driller: Quality Drilling & Blasting
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting	
Reviewed By: LMS	Boring Diameter (inch): 3.0 in		

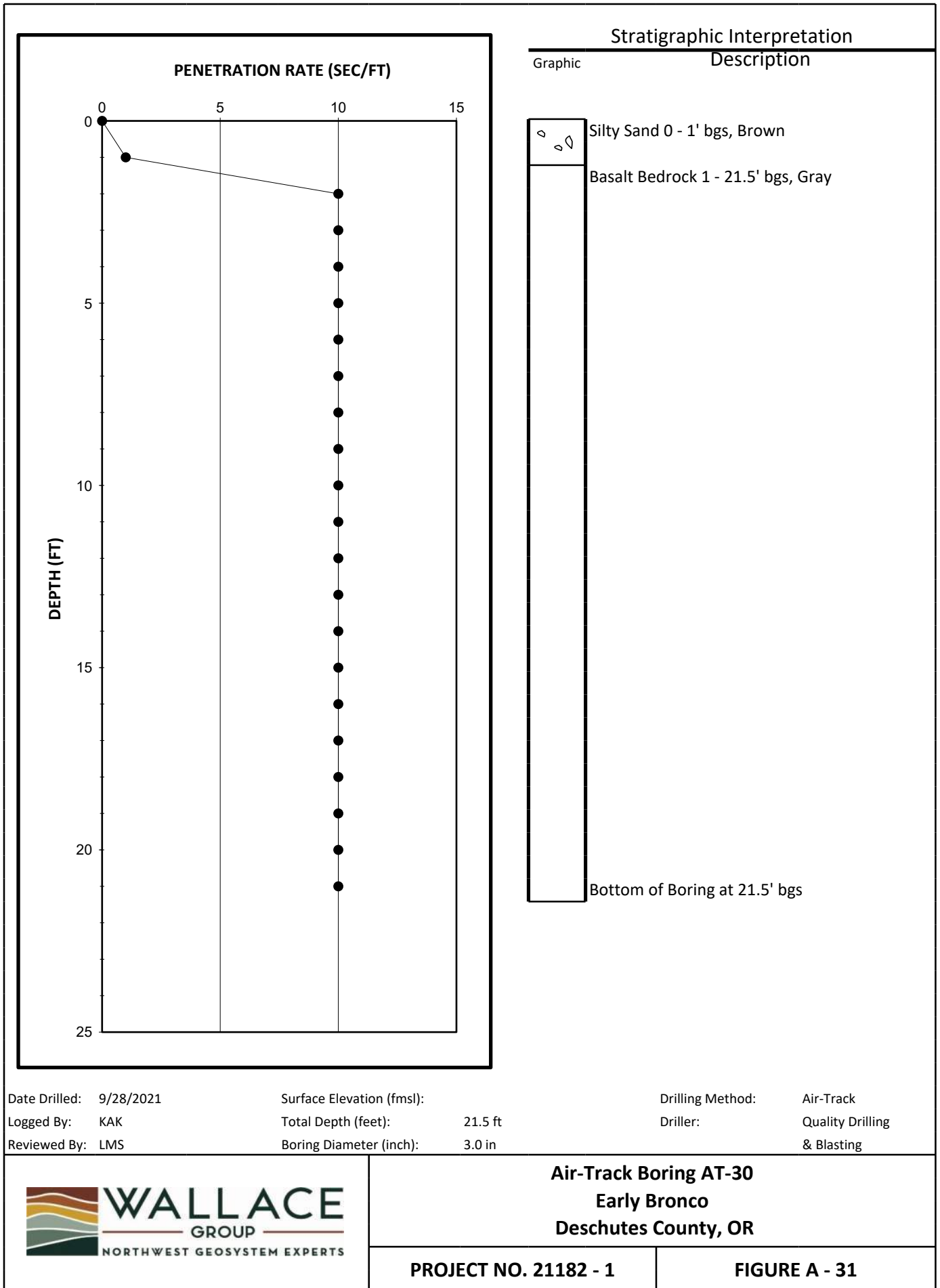


Air-Track Boring AT-29
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 30

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

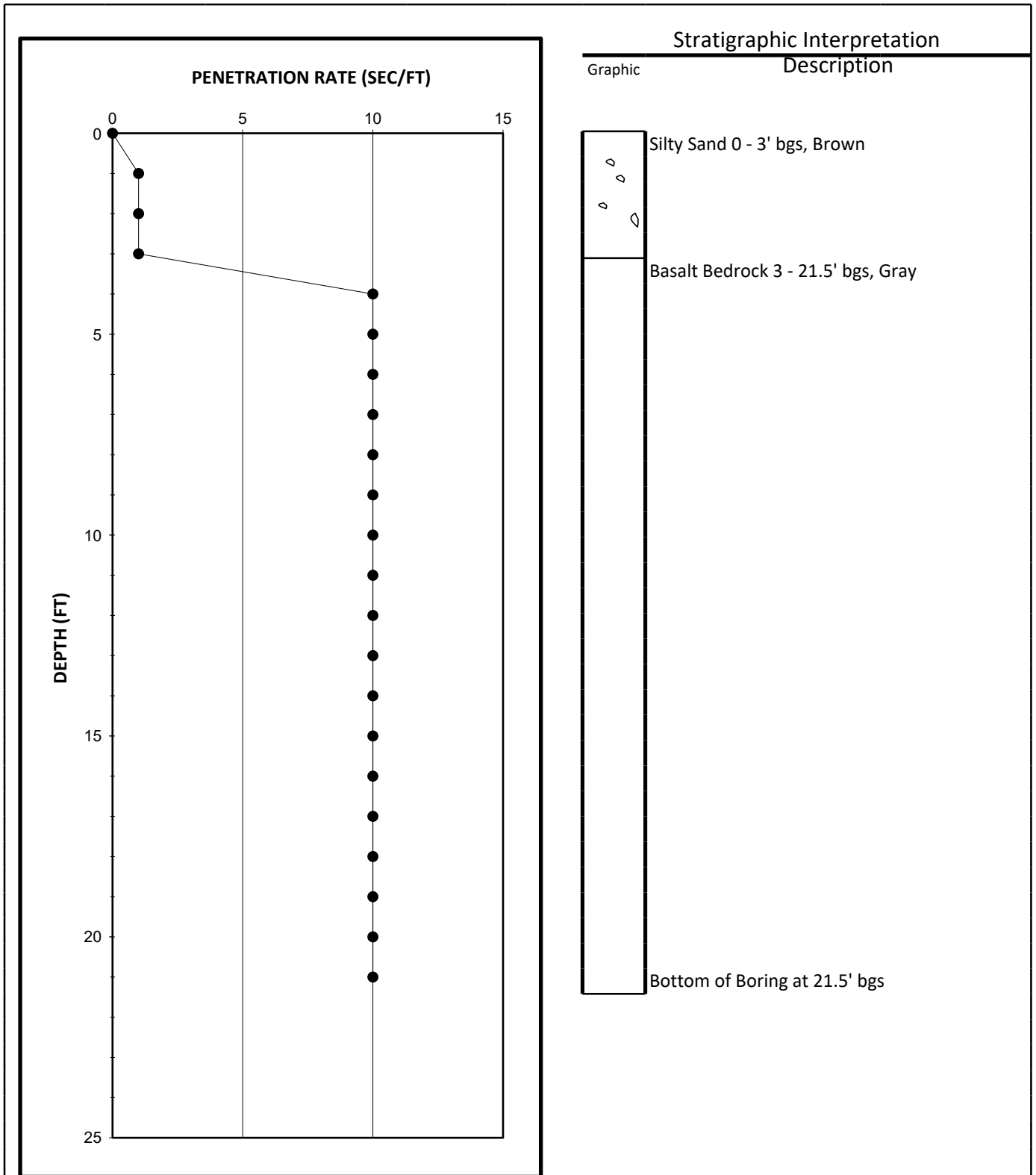


Air-Track Boring AT-30
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 31

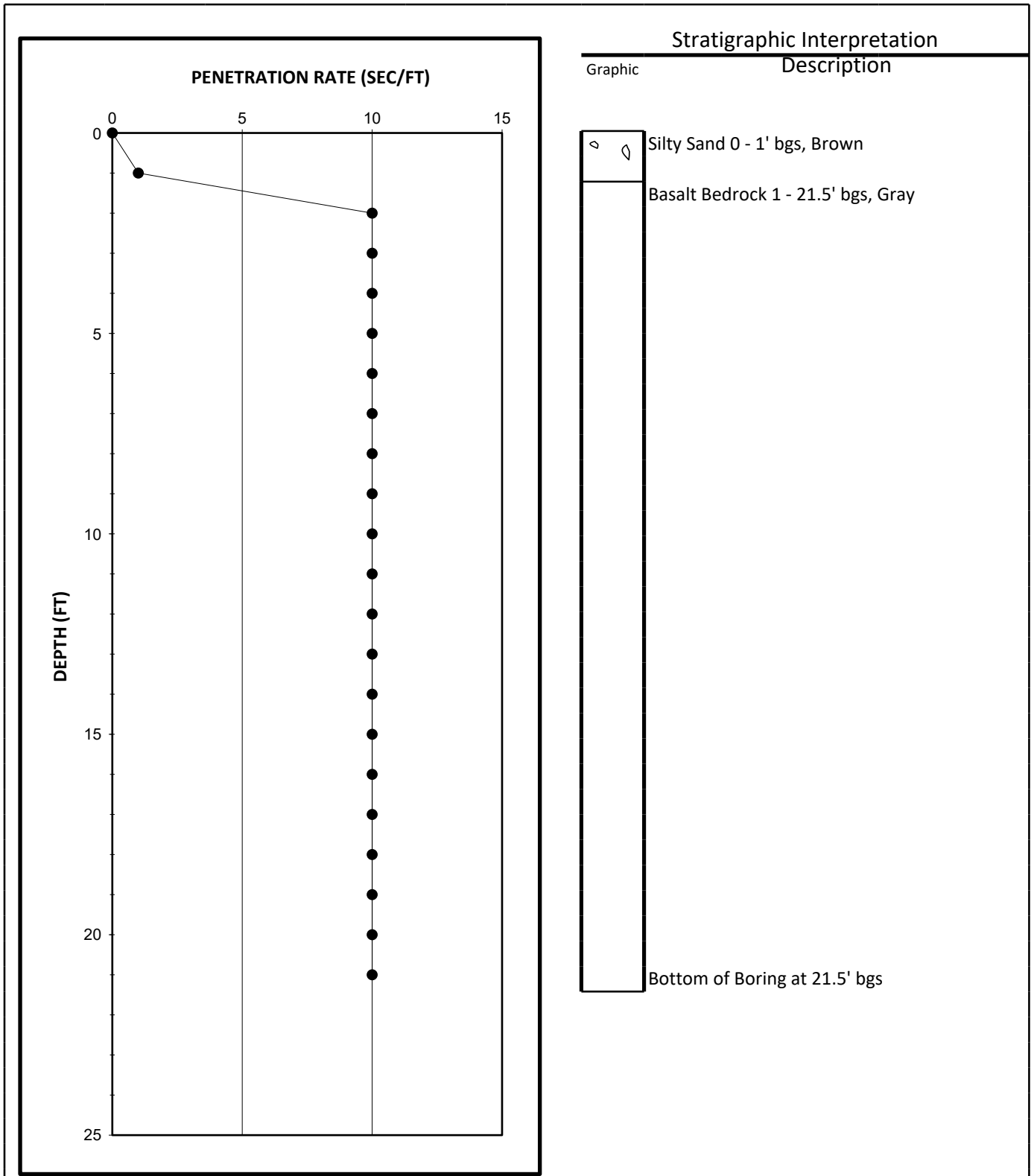
LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-31 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 32

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

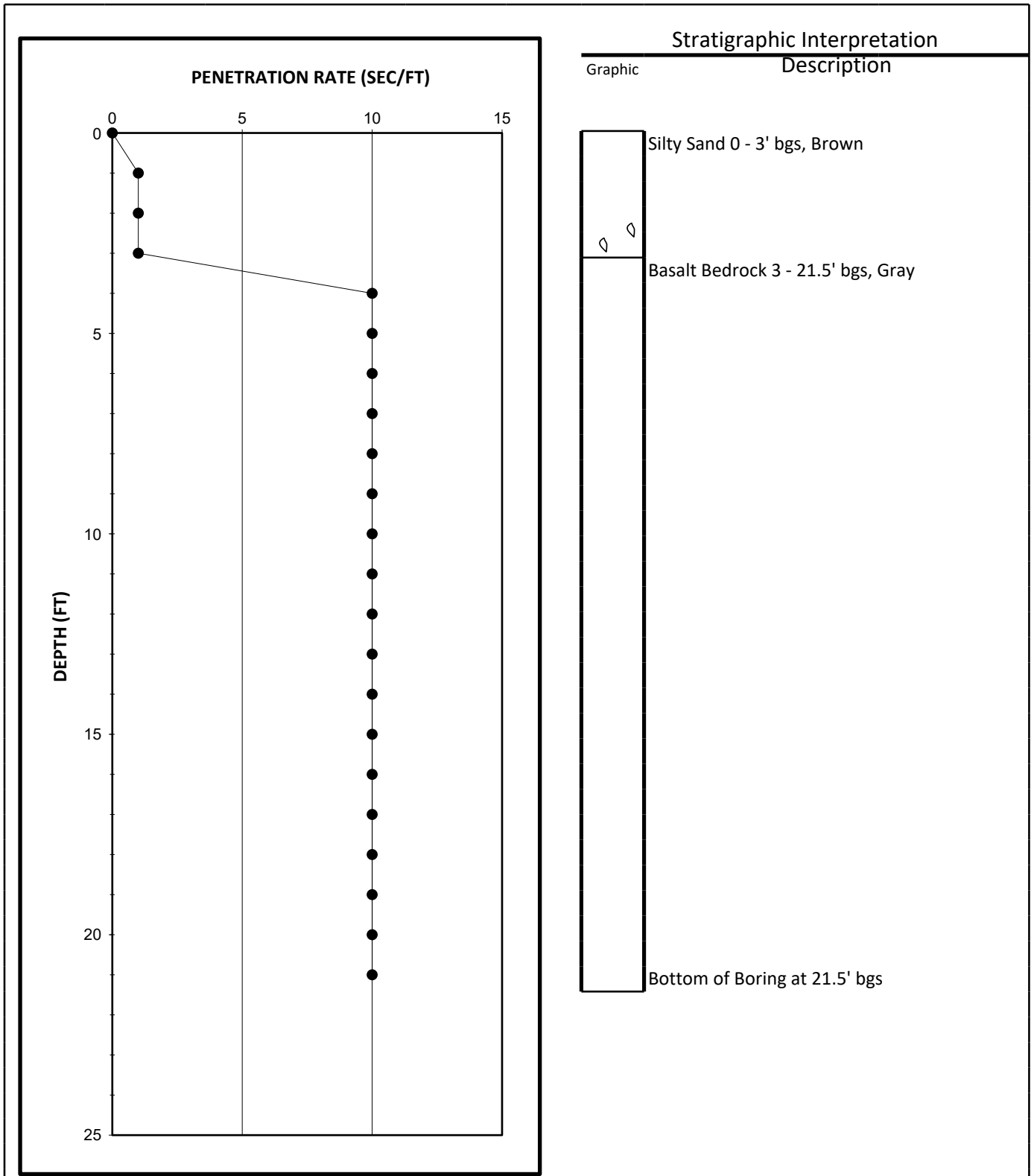


Air-Track Boring AT-32
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 33

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

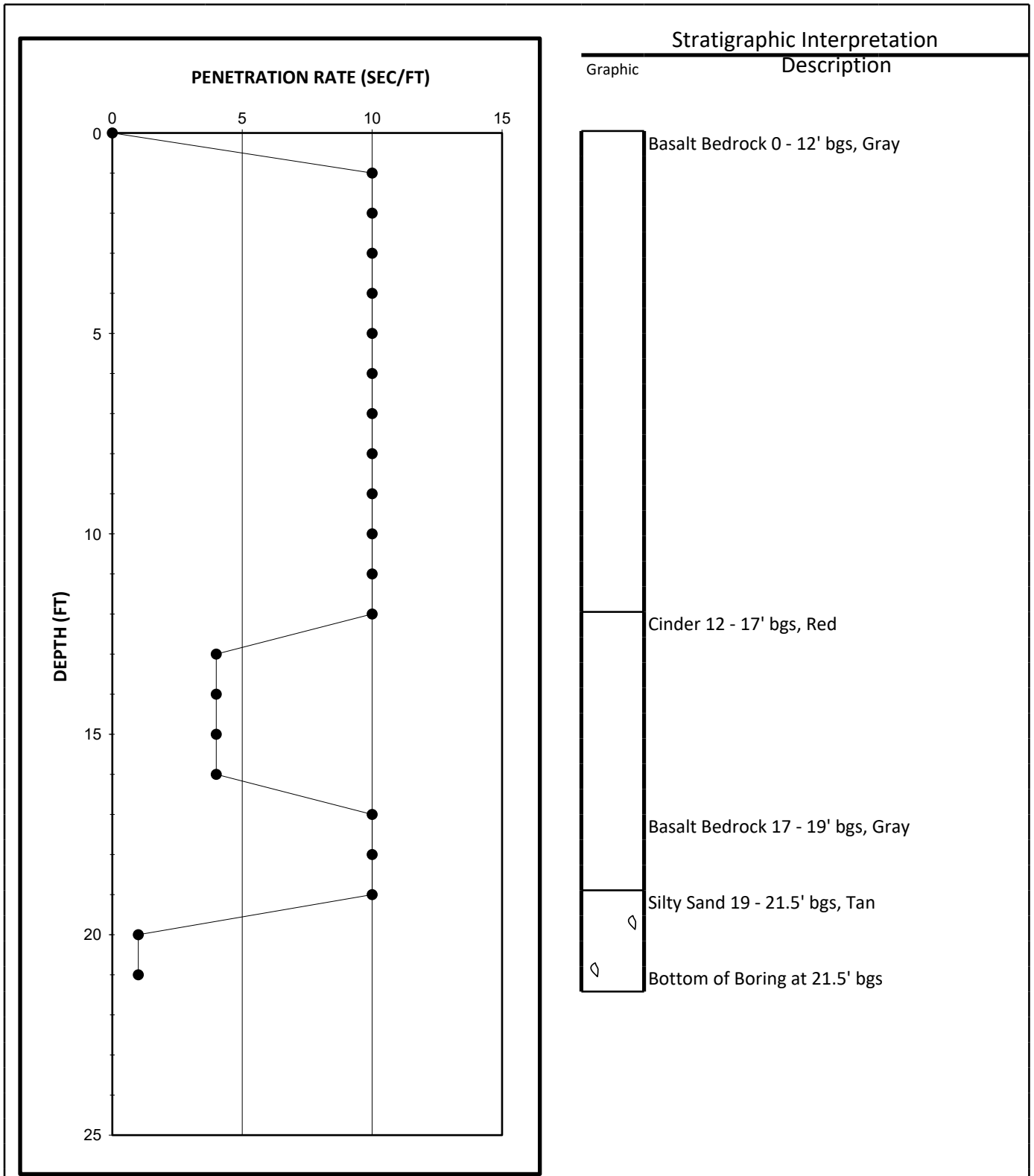


Air-Track Boring AT-33
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 34

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

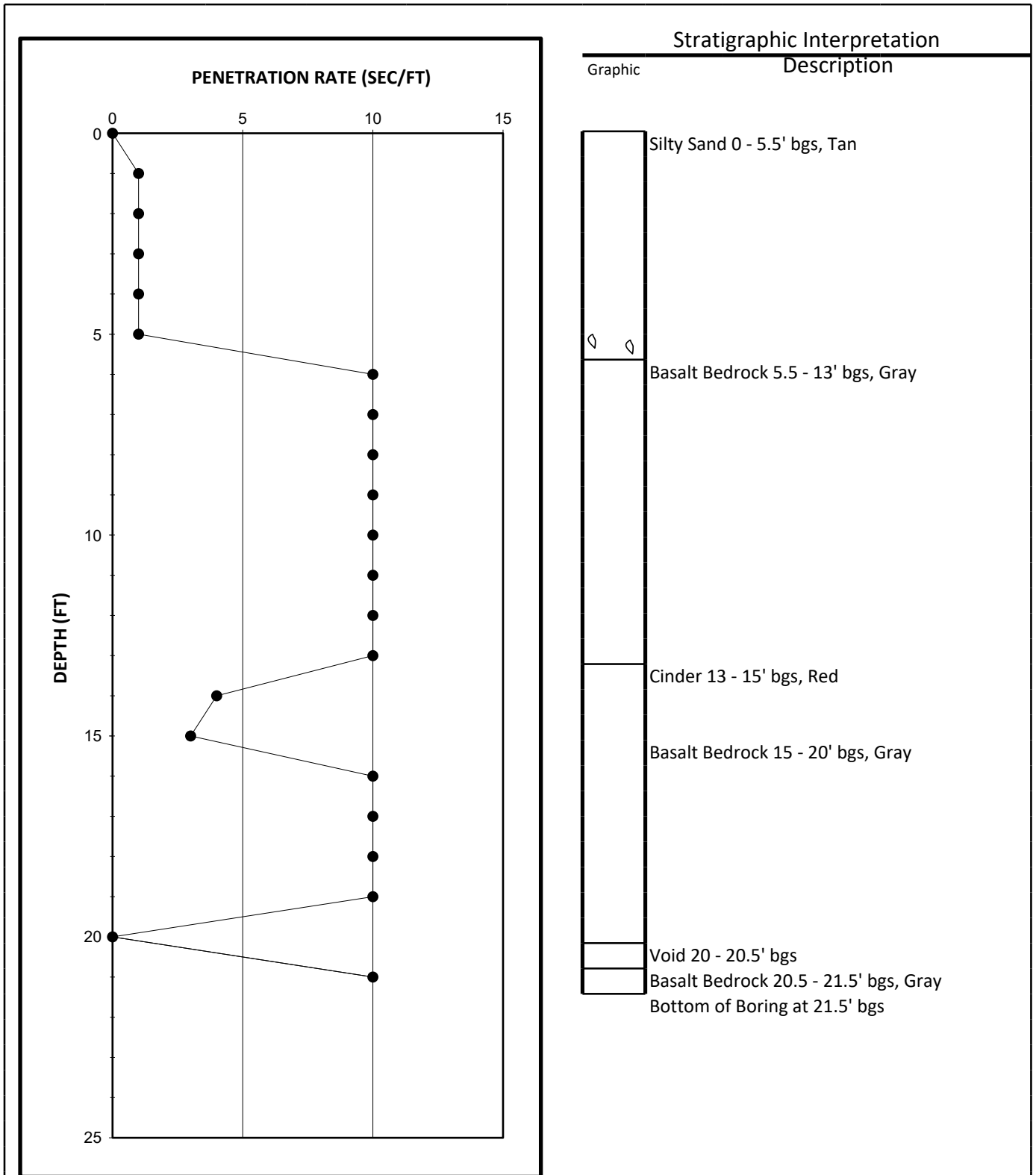


Air-Track Boring AT-34
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 35

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

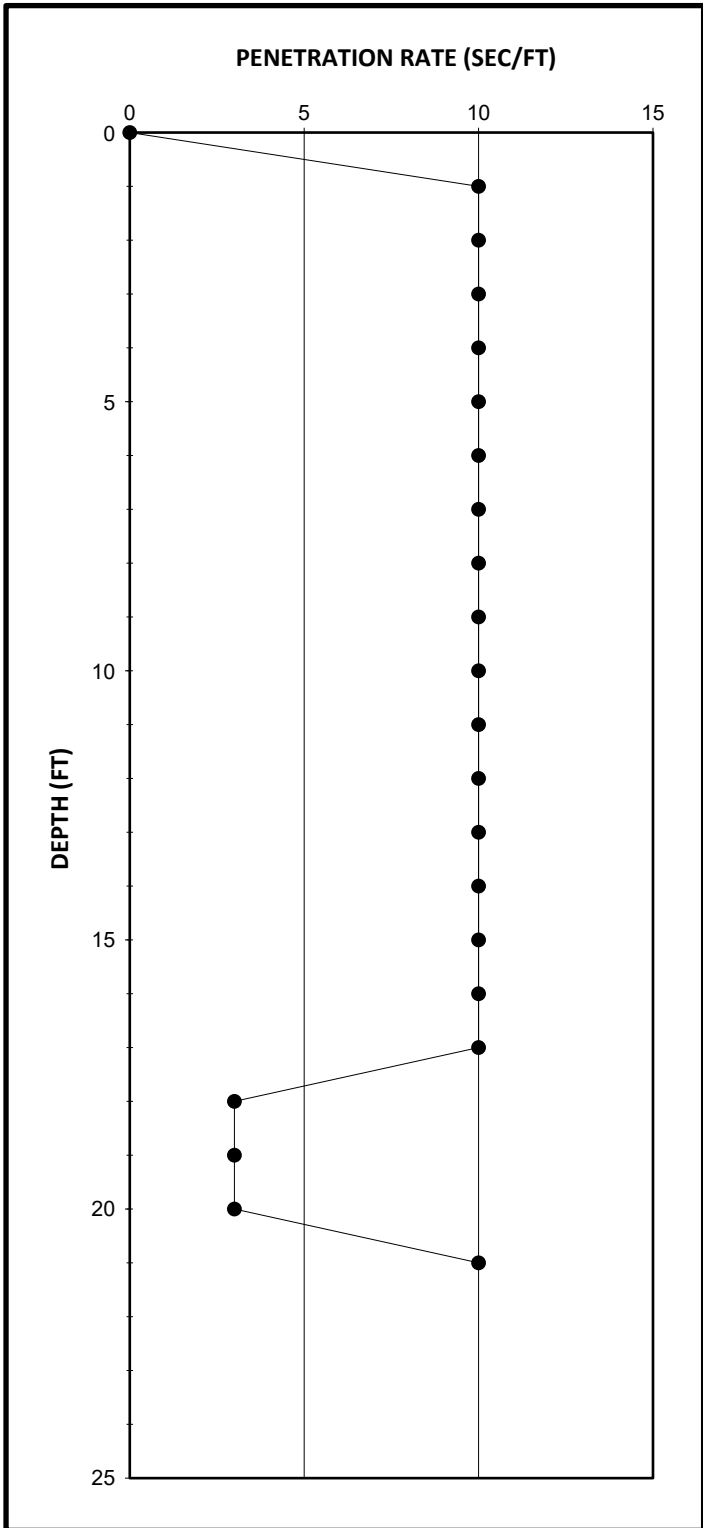
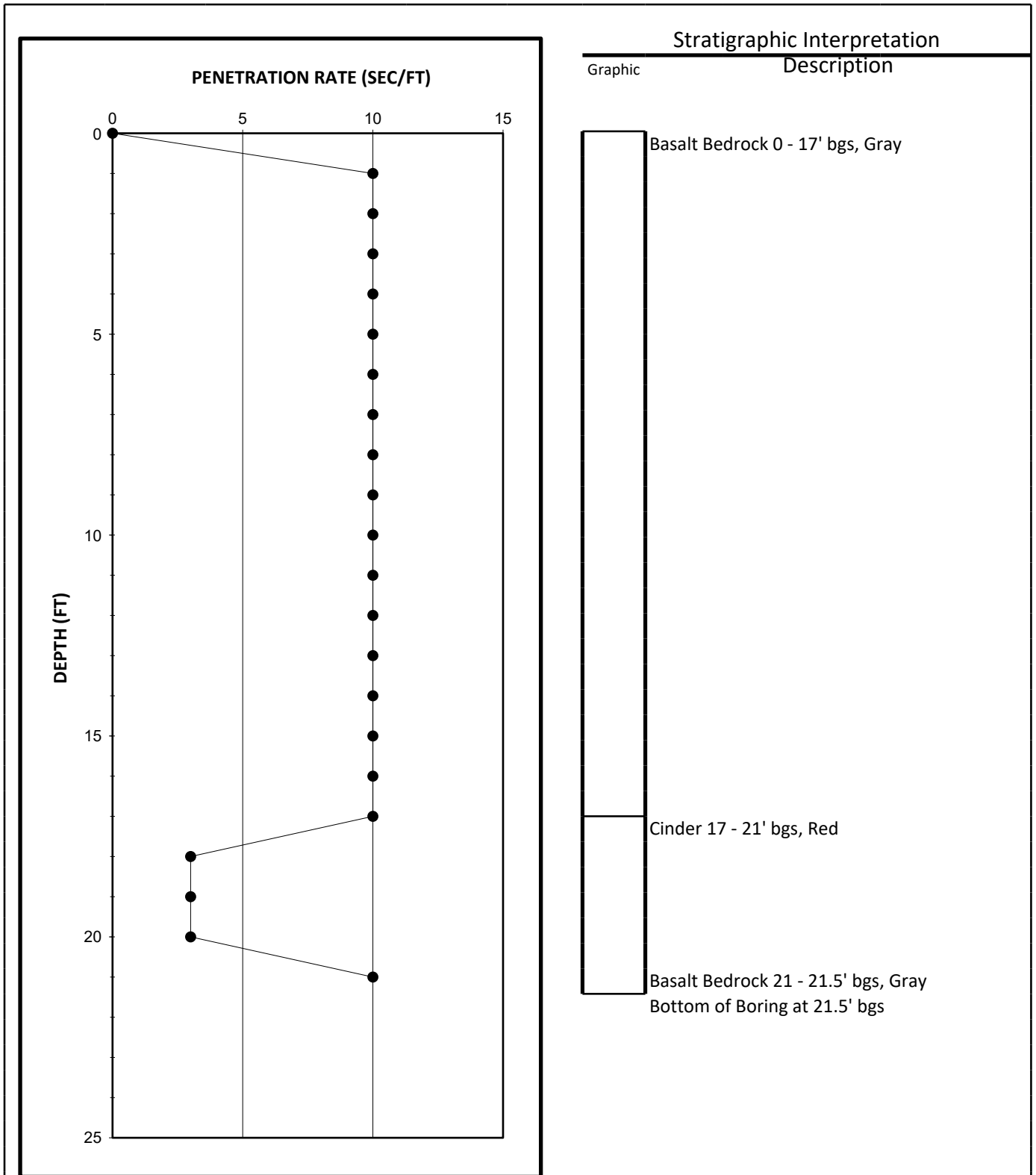


Air-Track Boring AT-35
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 36

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

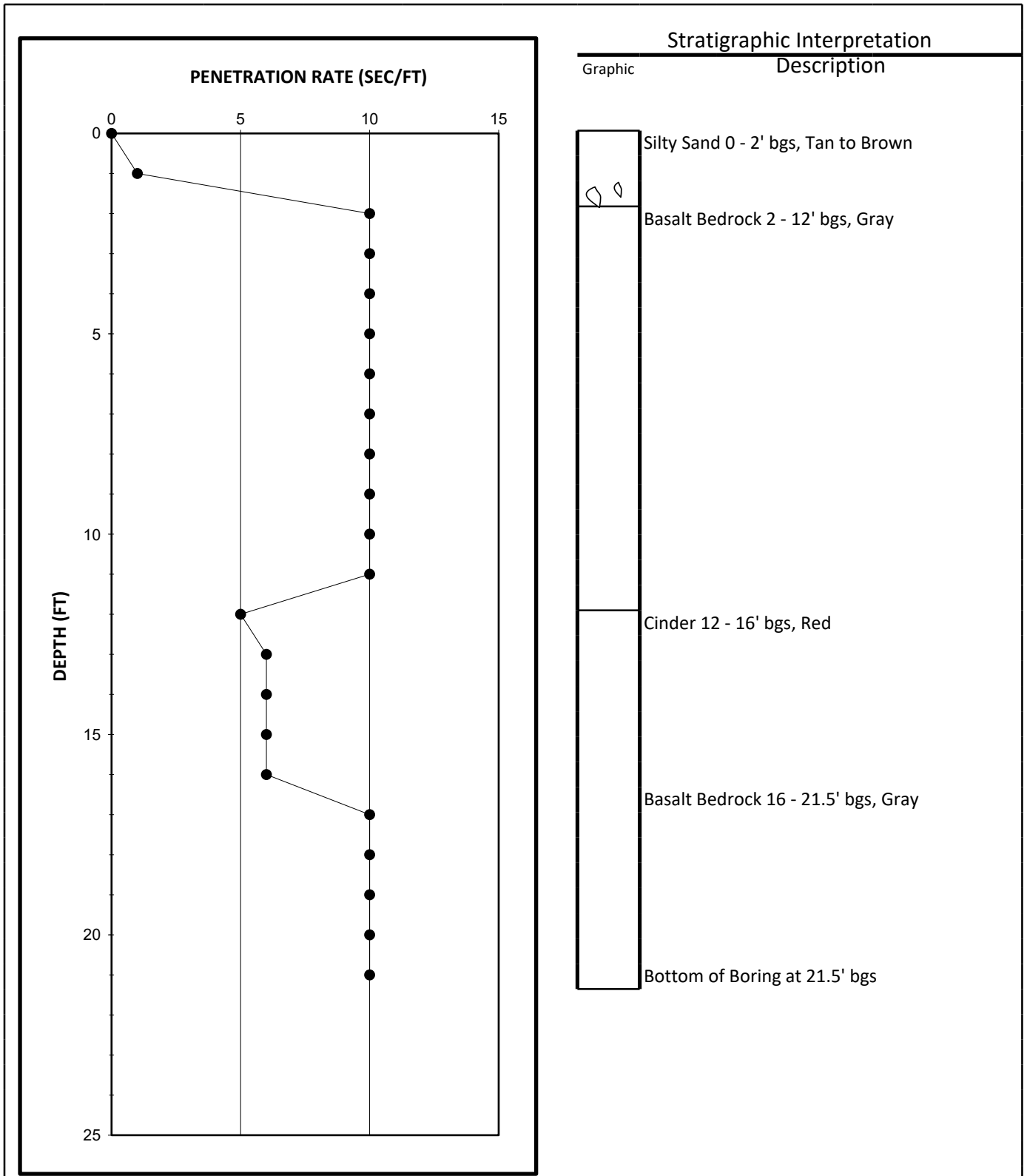


Air-Track Boring AT-36
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 37

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

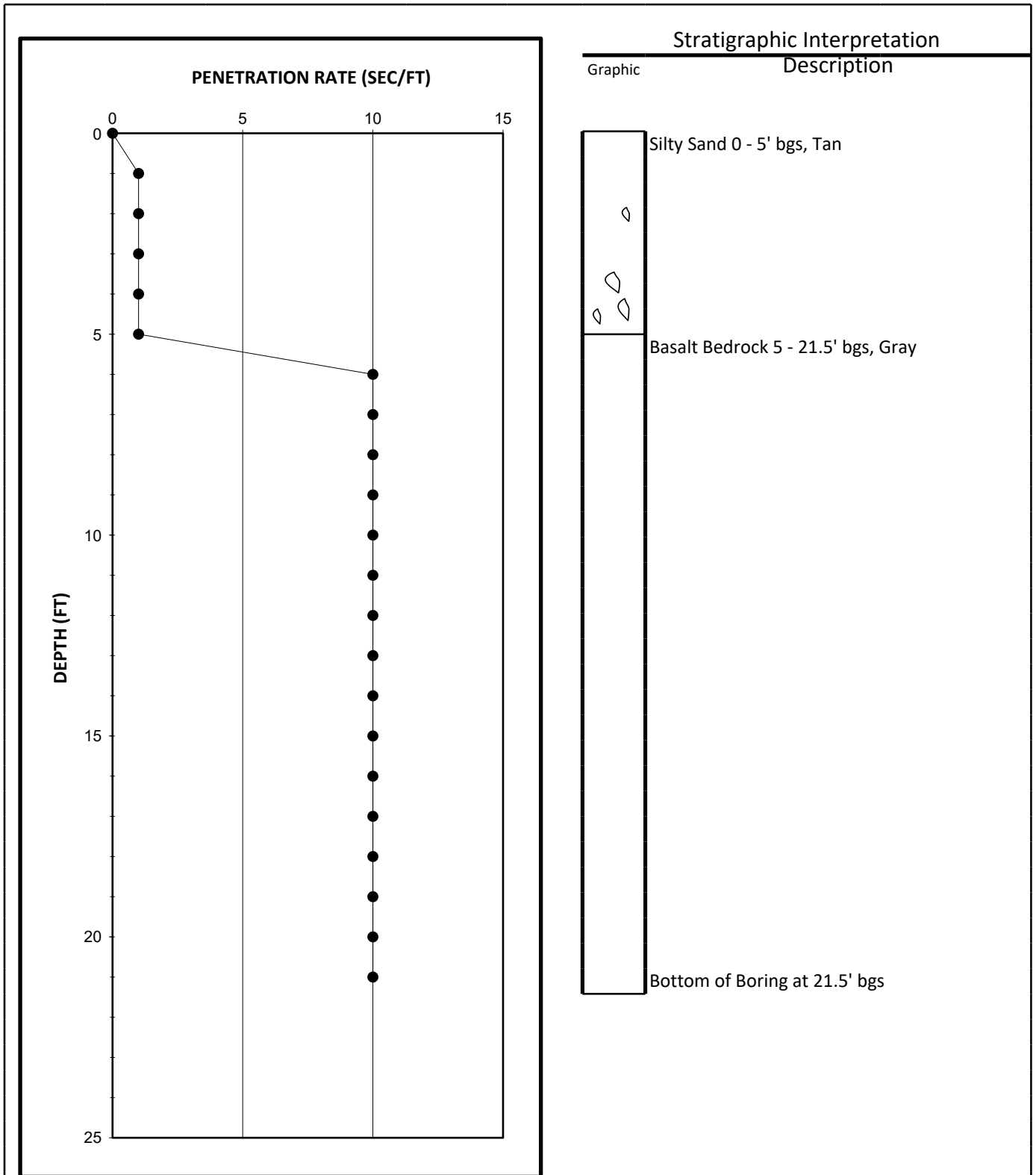


Air-Track Boring AT-37
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 38

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

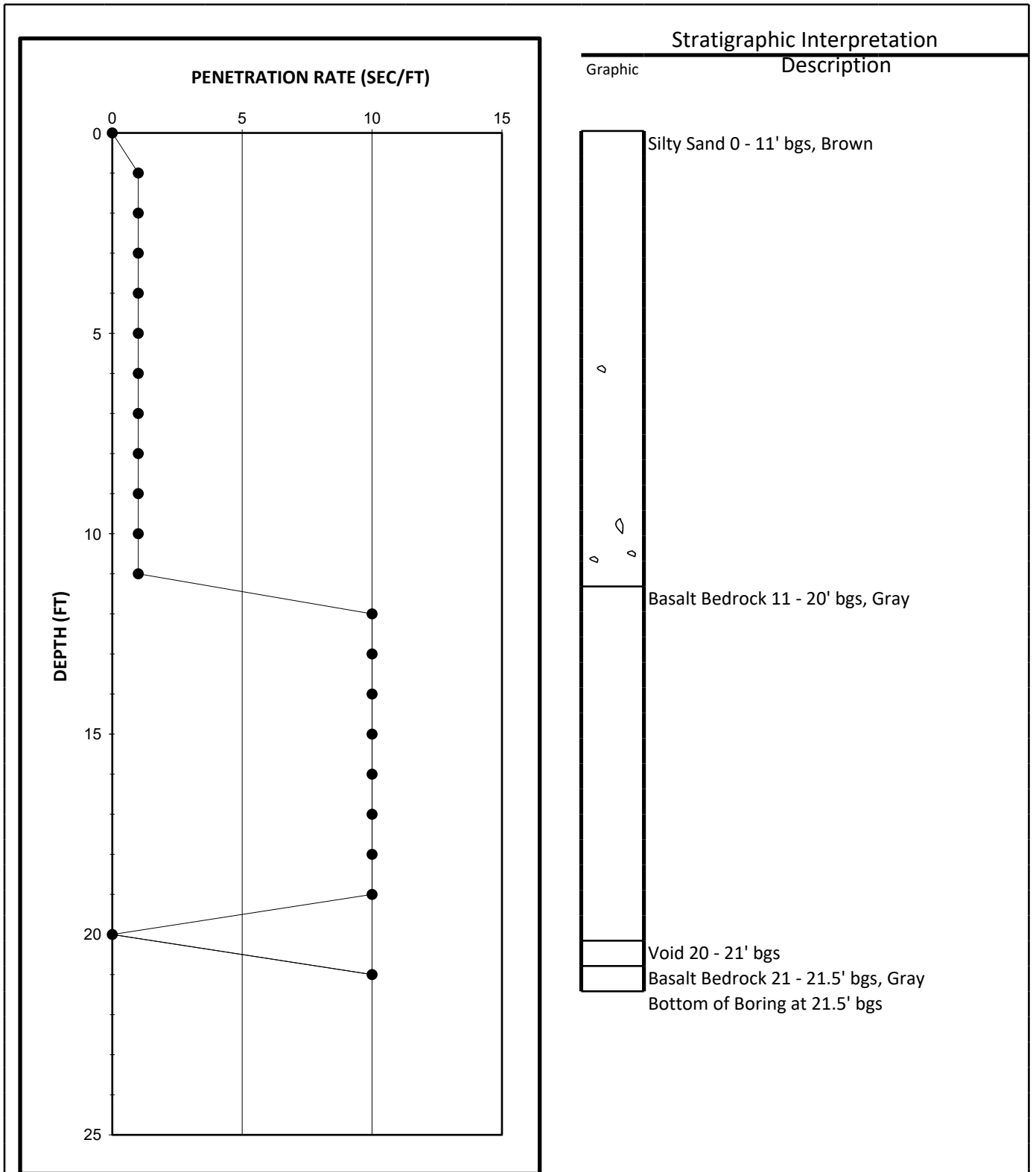


Air-Track Boring AT-38
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 39

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method:

Air-Track

Logged By: KAK

Total Depth (feet):

21.5 ft

Driller:

Quality Drilling

Reviewed By: LMS

Boring Diameter (inch):

3.0 in

& Blasting

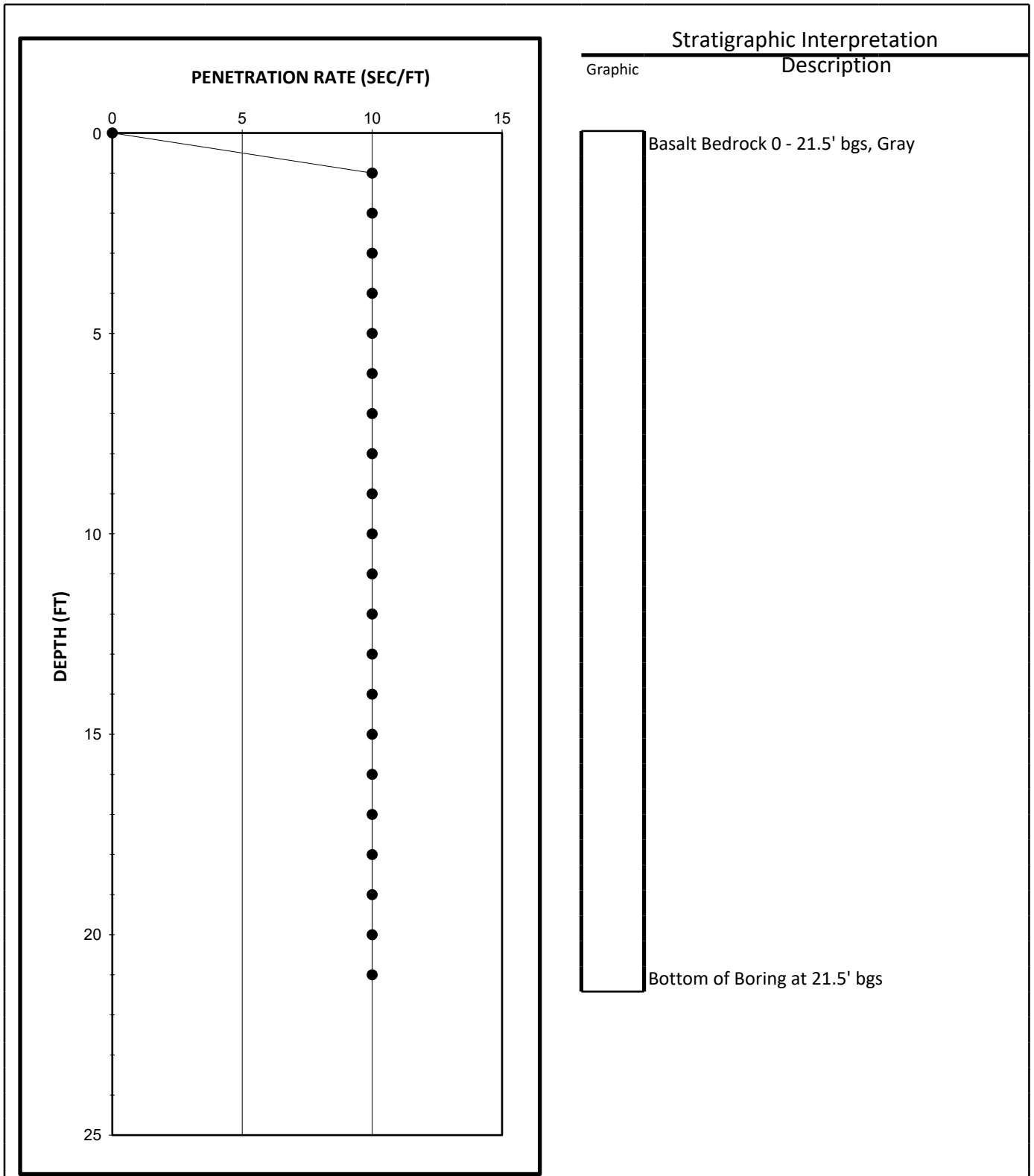


Air-Track Boring AT-39
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 40

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

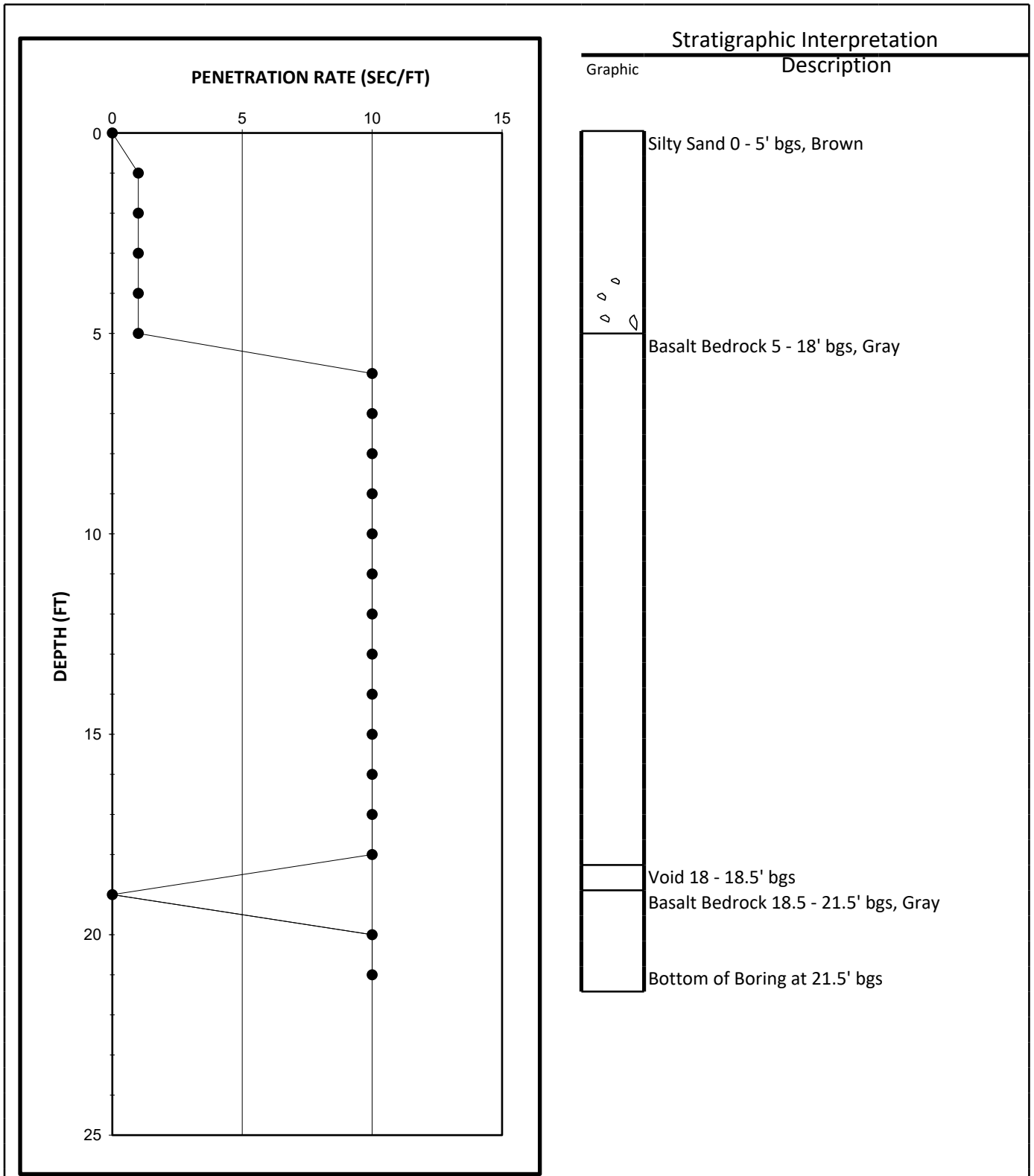


Air-Track Boring AT-40
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 41

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

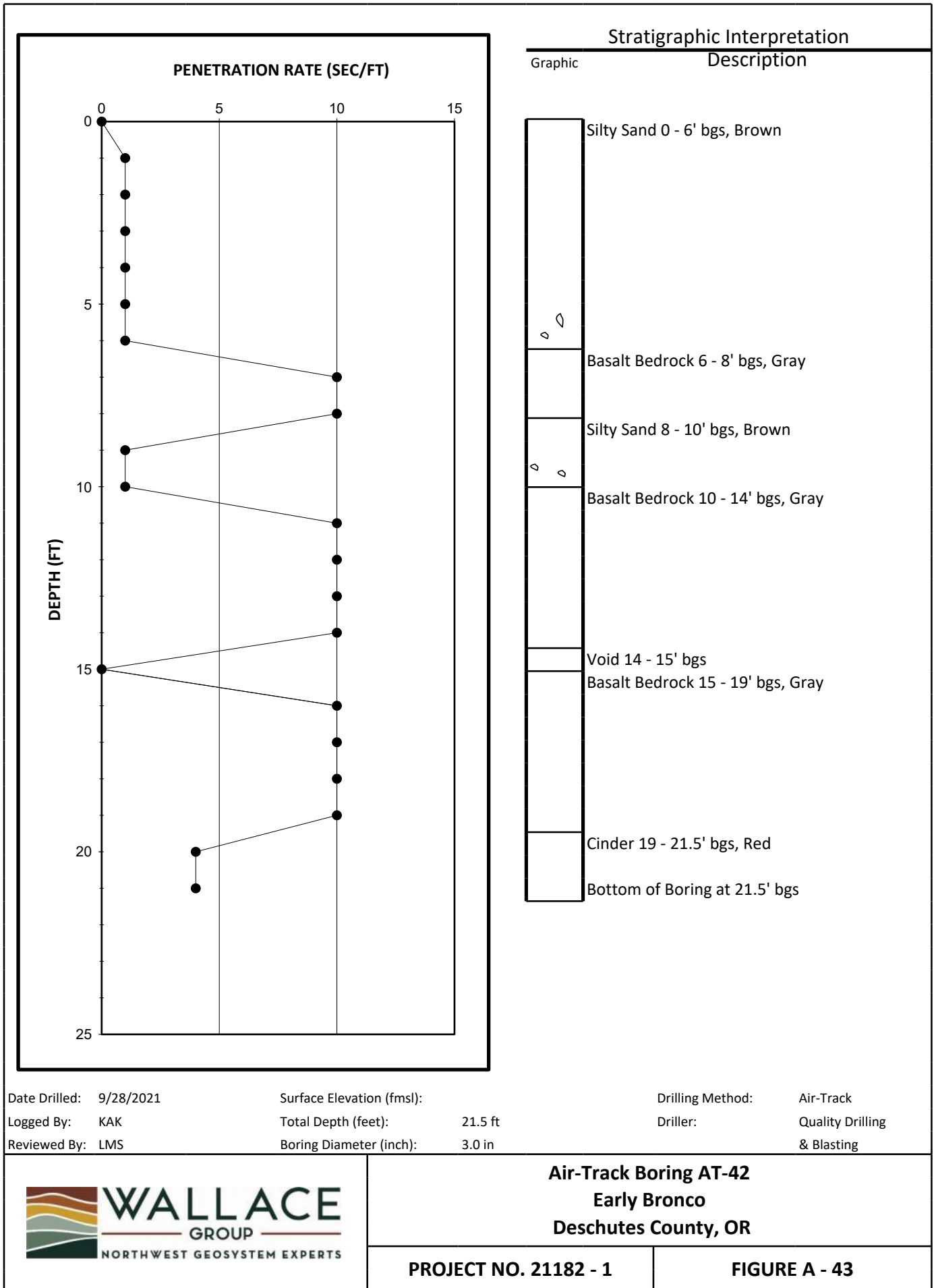


Air-Track Boring AT-41
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 42

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

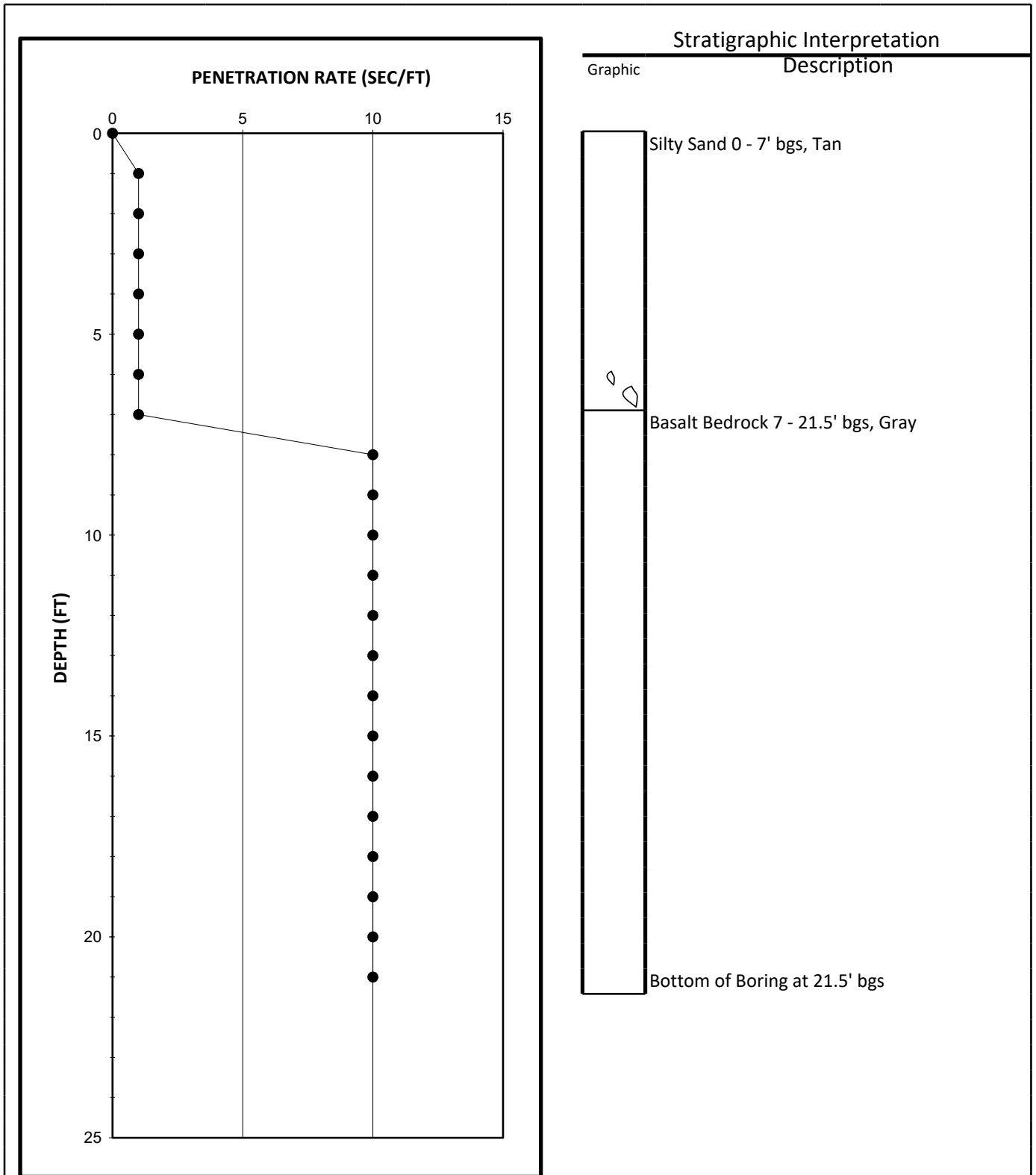


Air-Track Boring AT-42
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 43

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

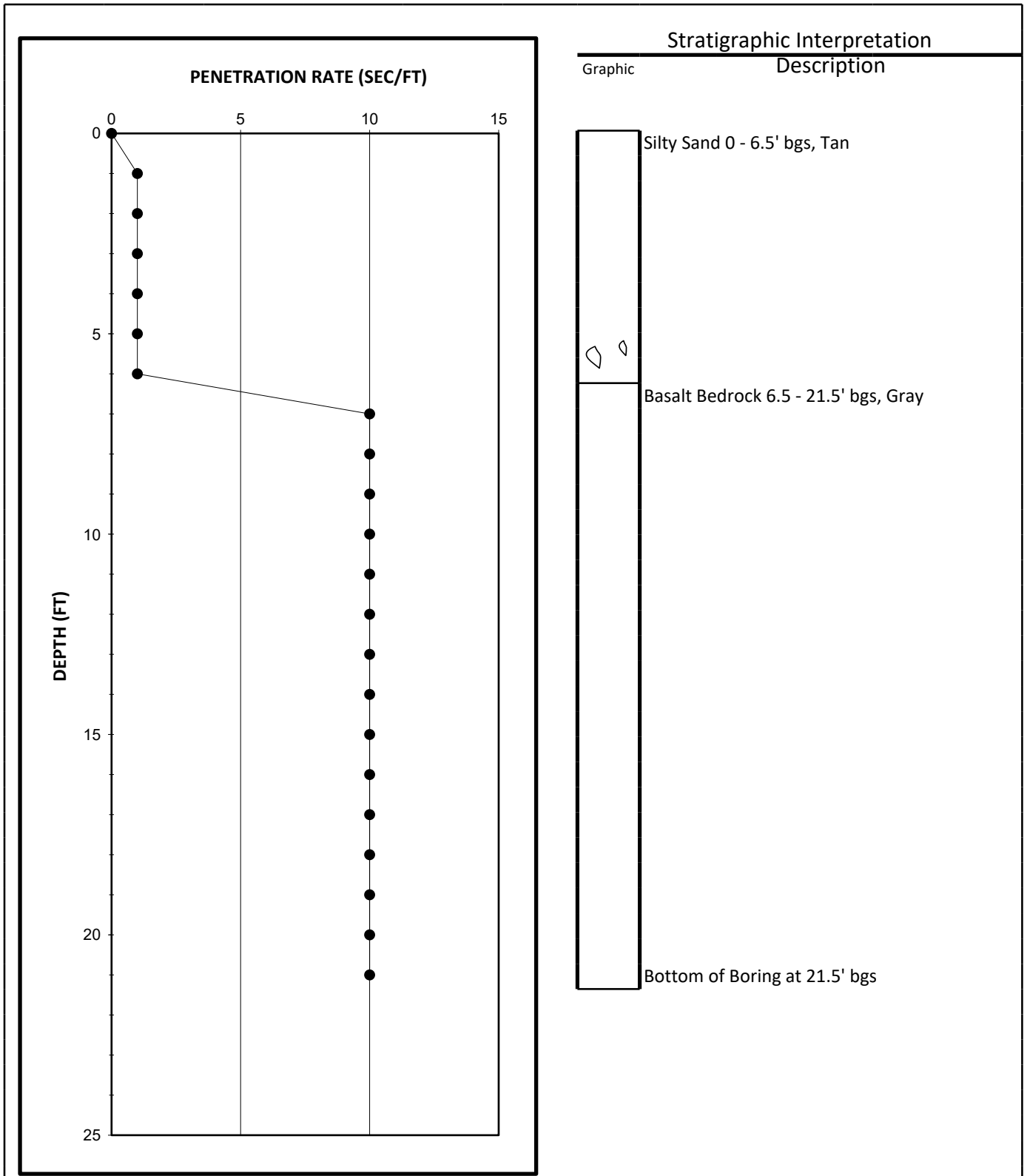


Air-Track Boring AT-43
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 44

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

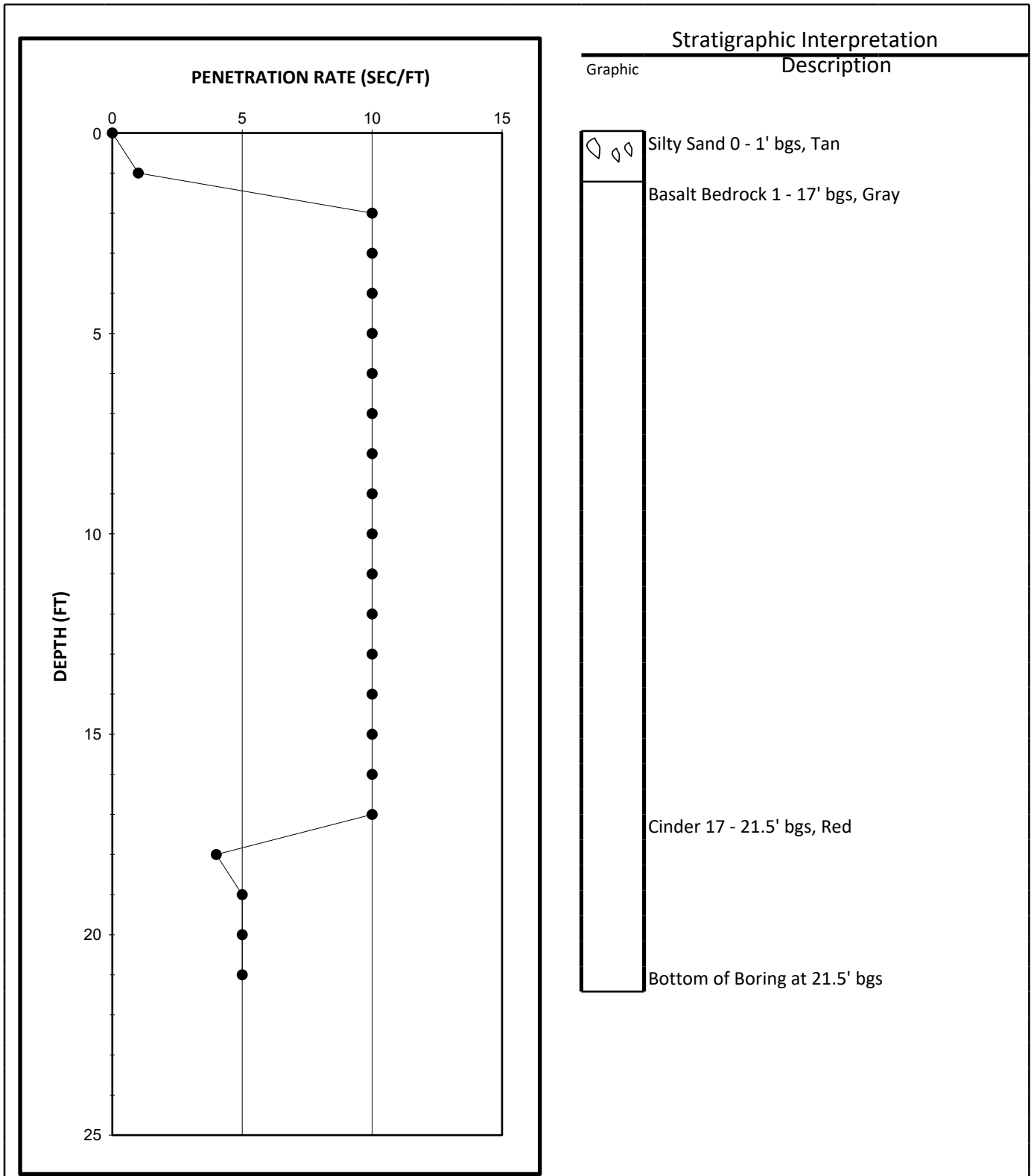


Air-Track Boring AT-44
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 45

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

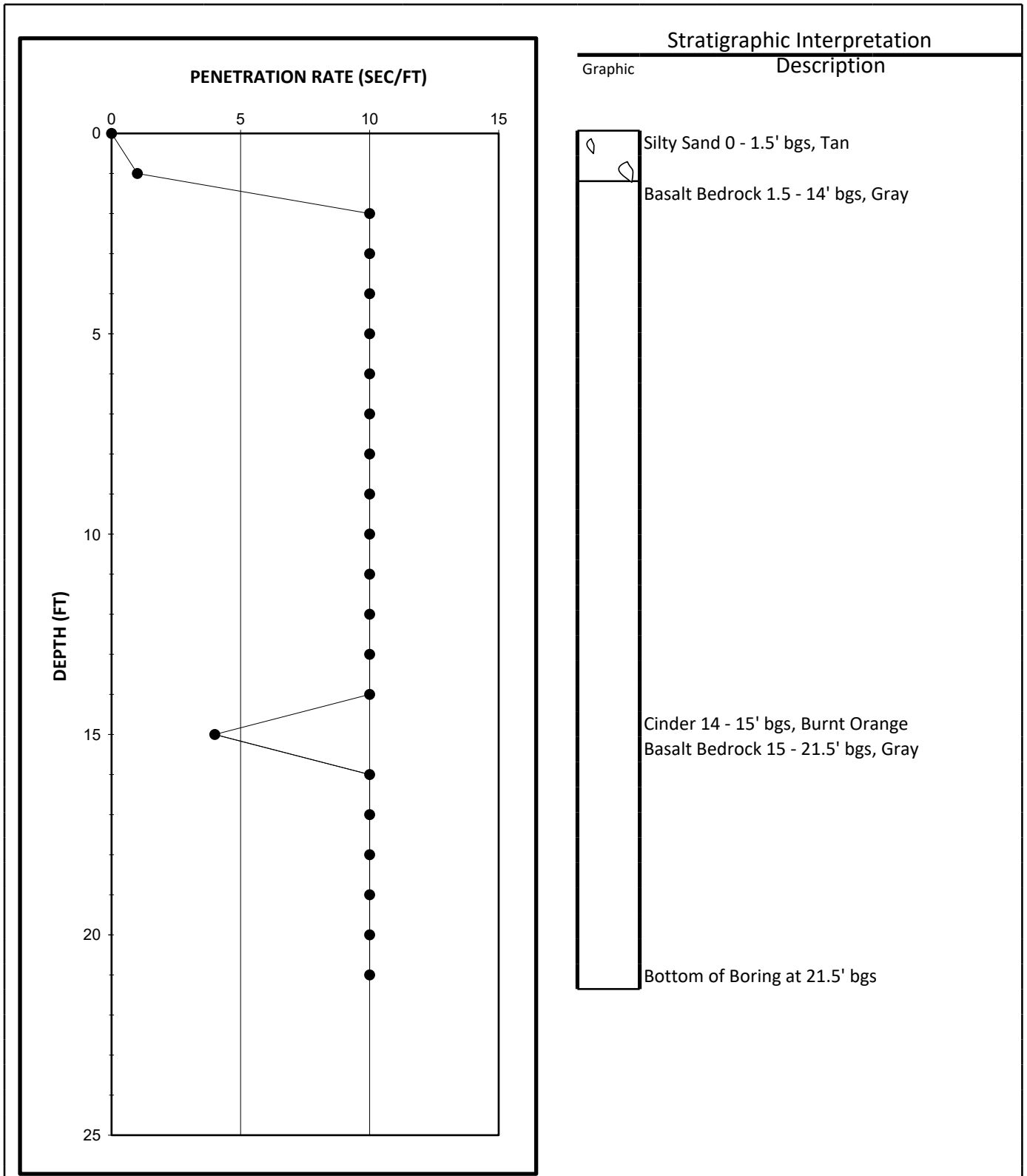


Air-Track Boring AT-45
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 46

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

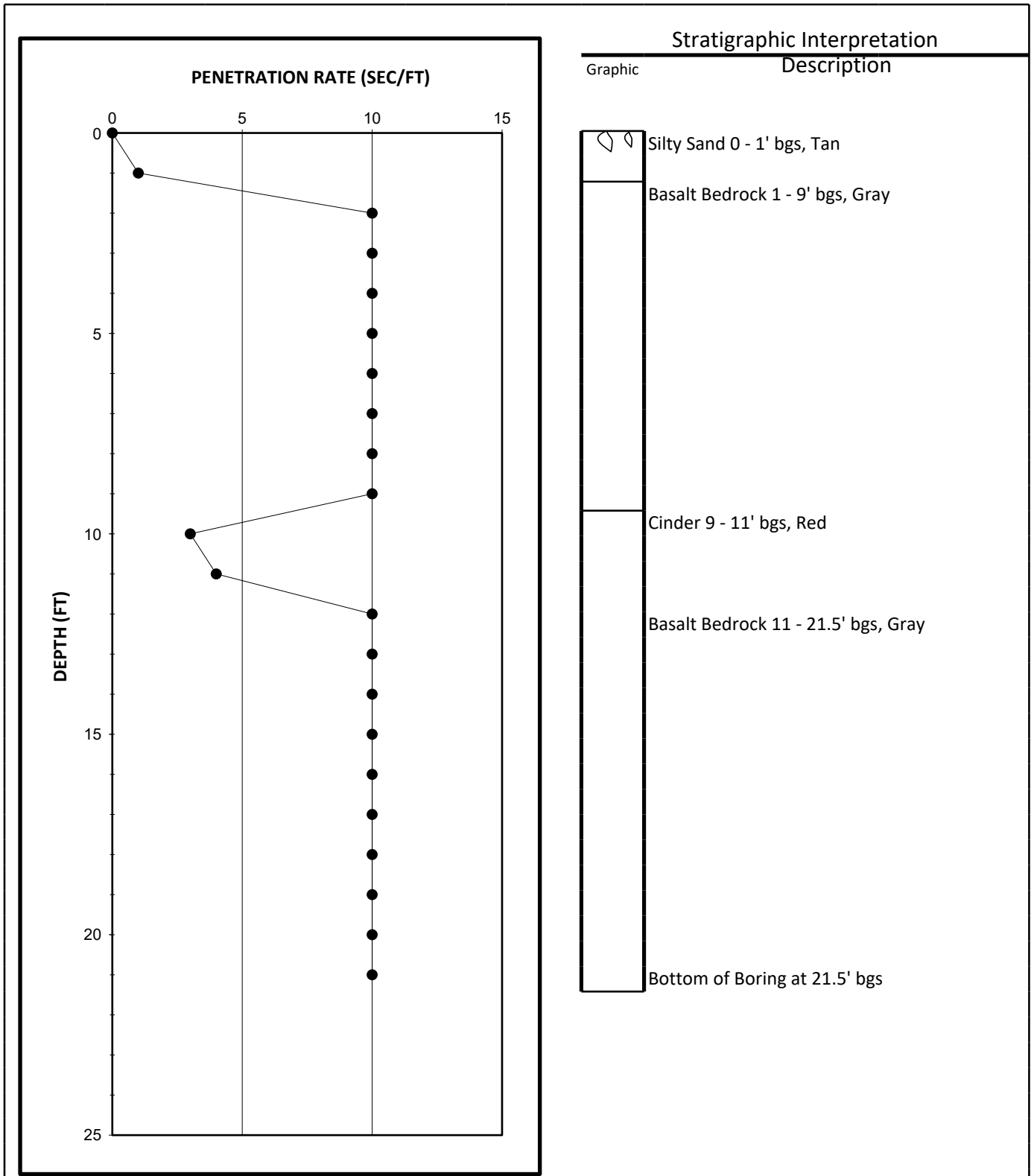


Air-Track Boring AT-46
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 47

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

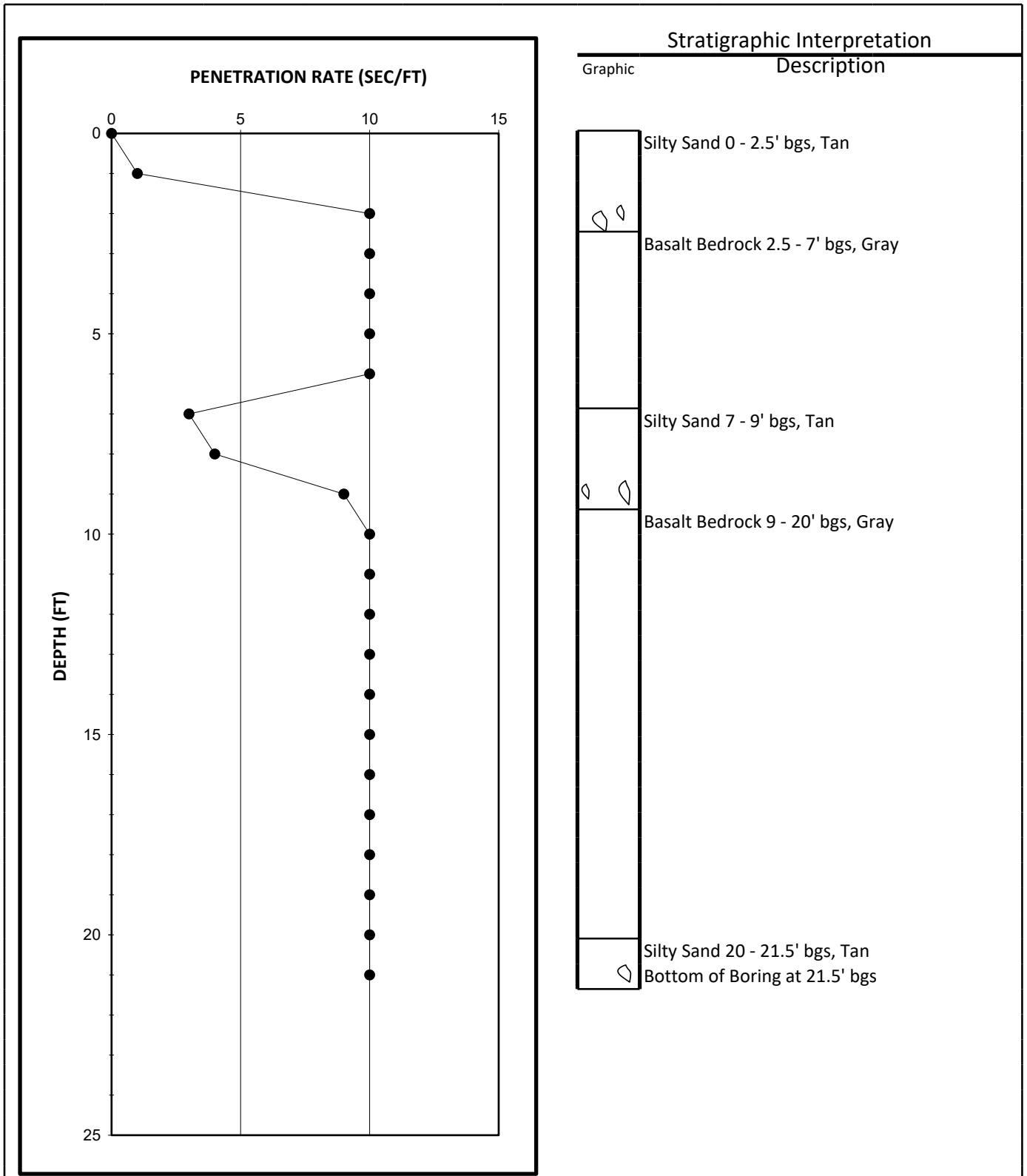


Air-Track Boring AT-47
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 48

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

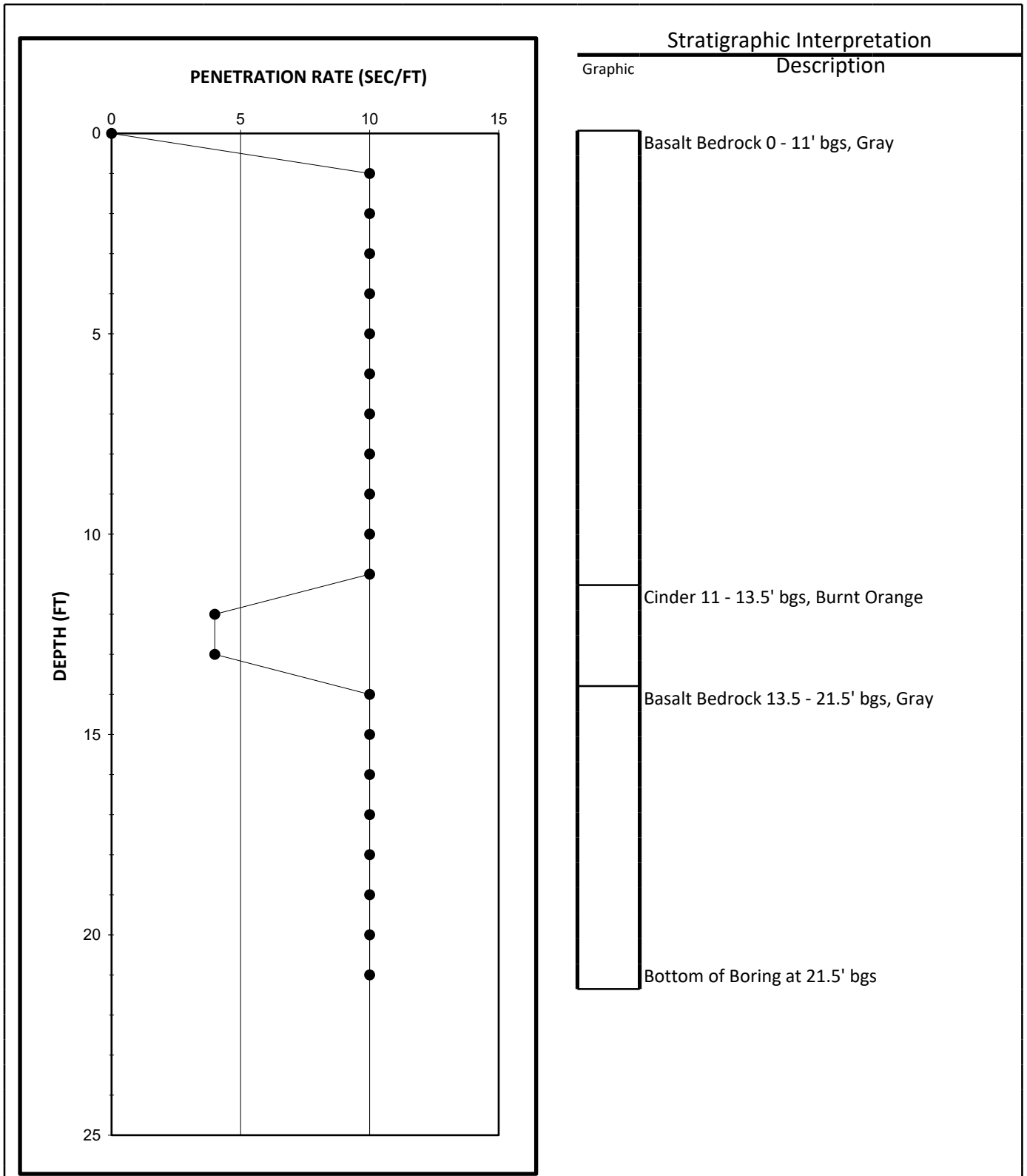


Air-Track Boring AT-48
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 49

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

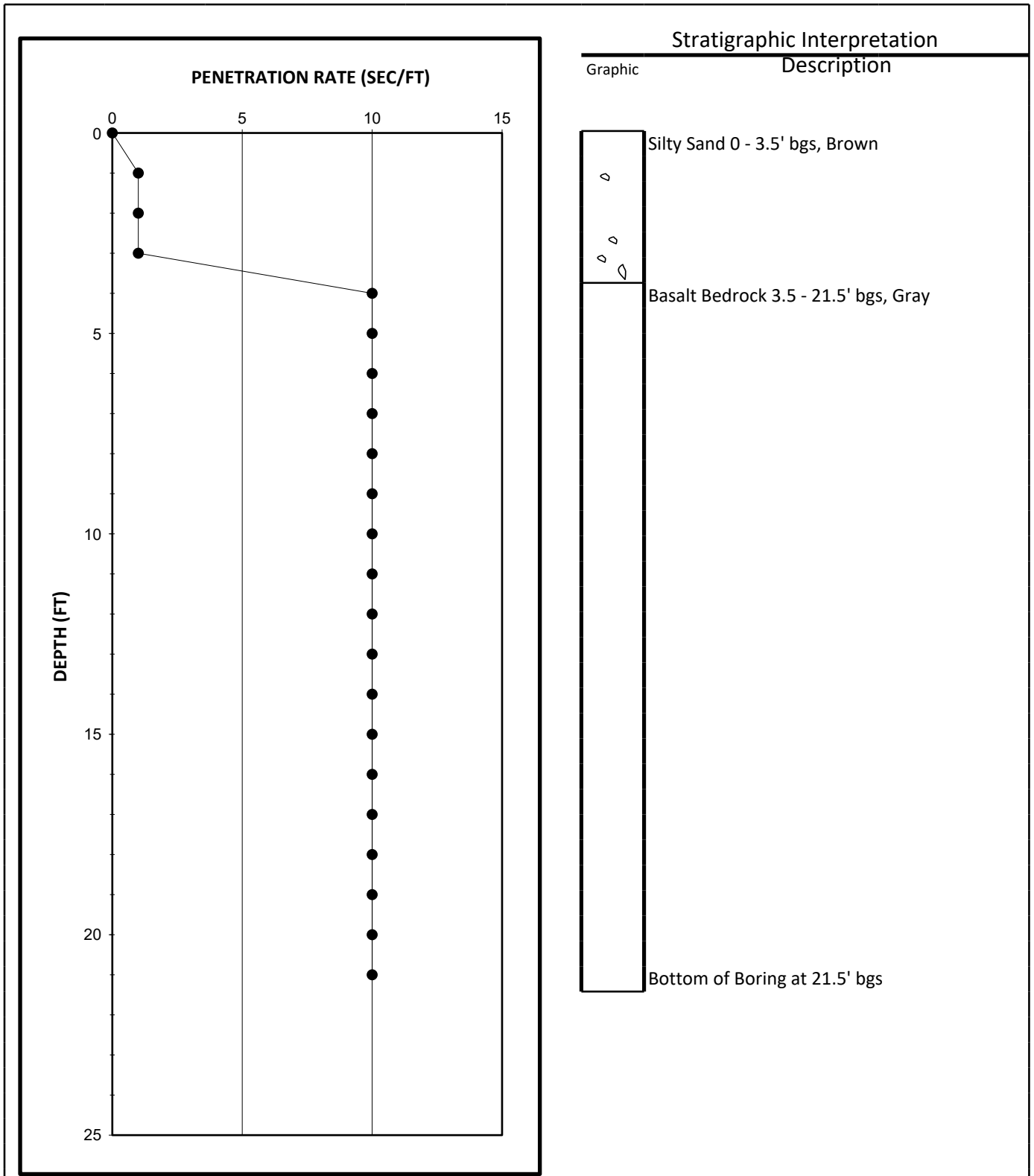


Air-Track Boring AT-49
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 50

LOG OF AIR TRACK BORING



Date Drilled: 9/28/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

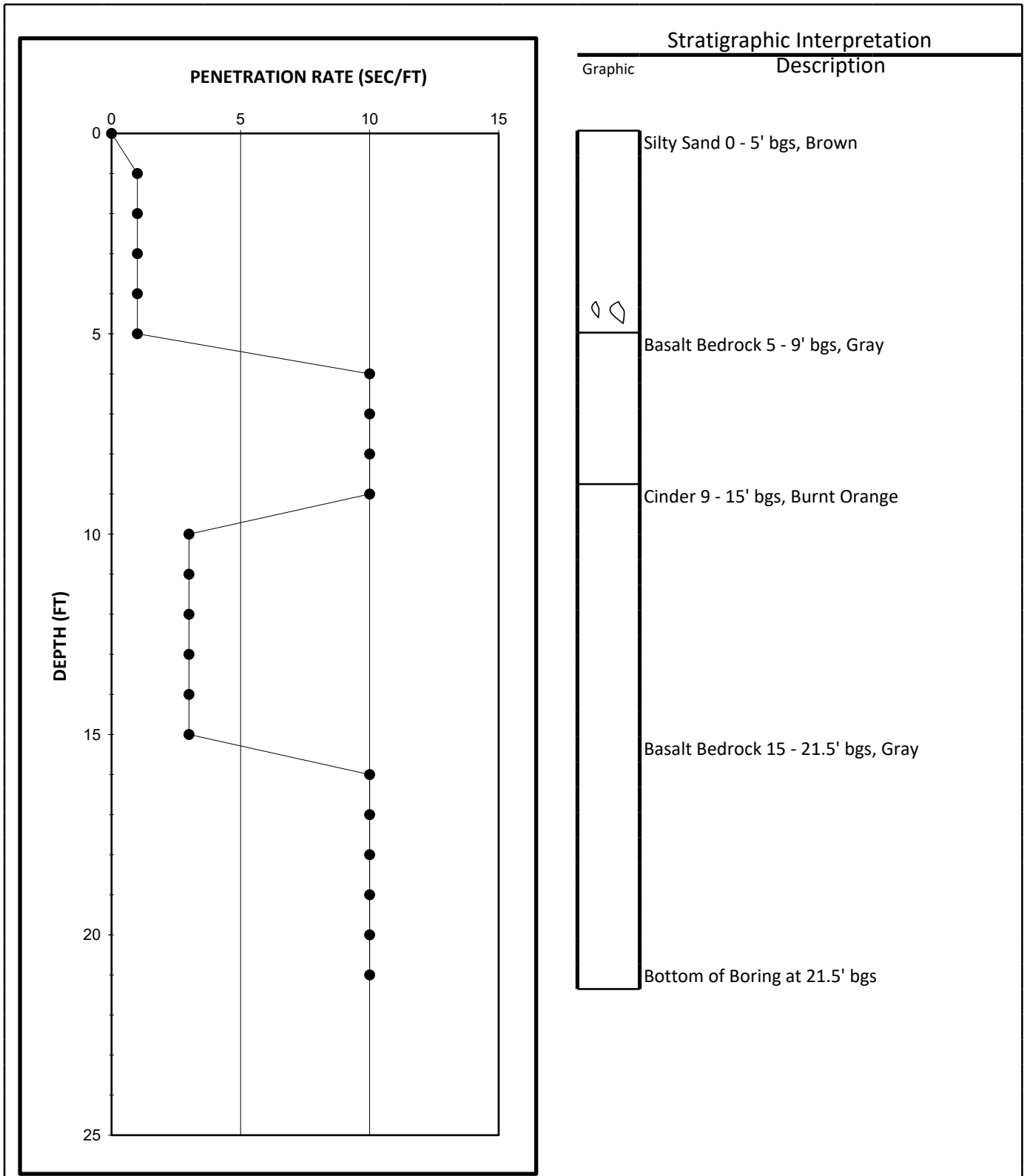


Air-Track Boring AT-50
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 51

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmssl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

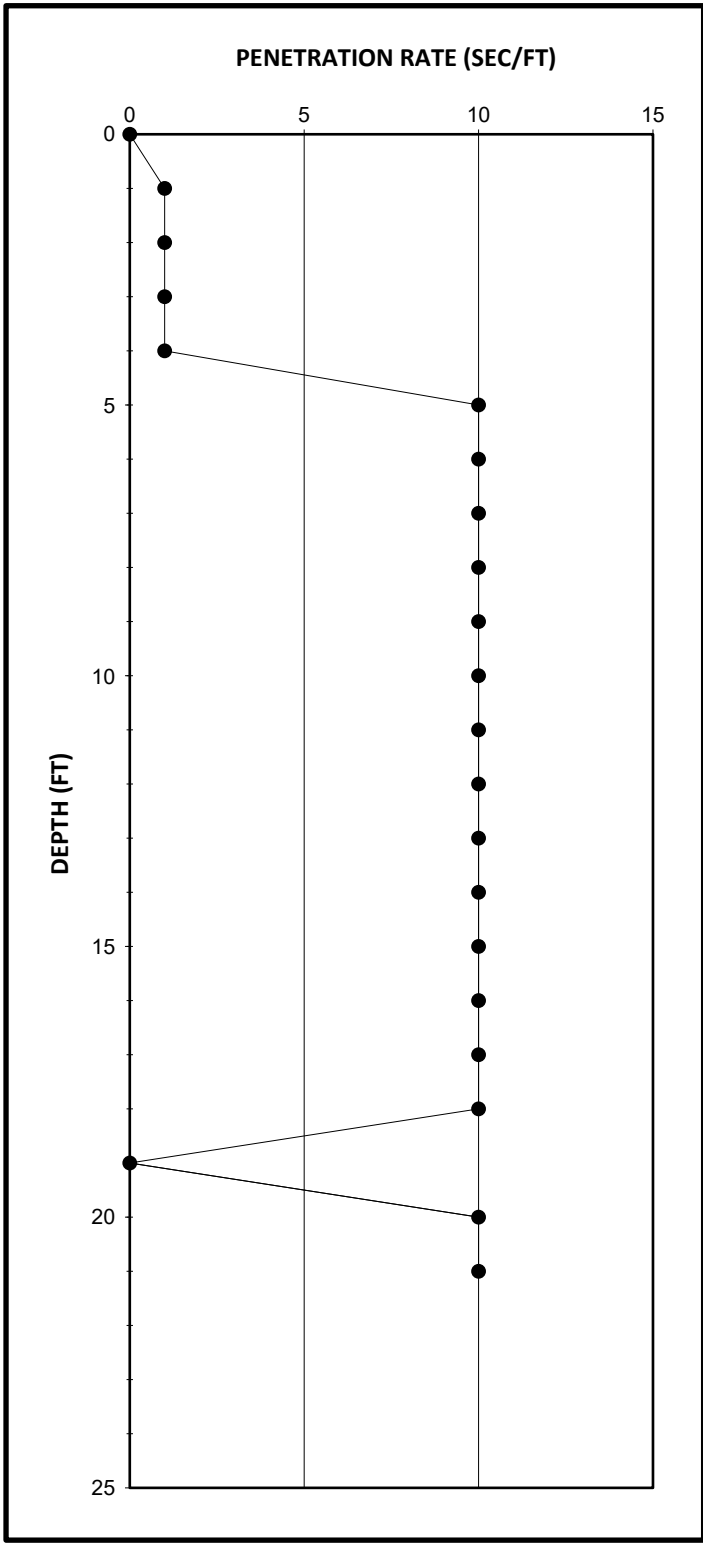
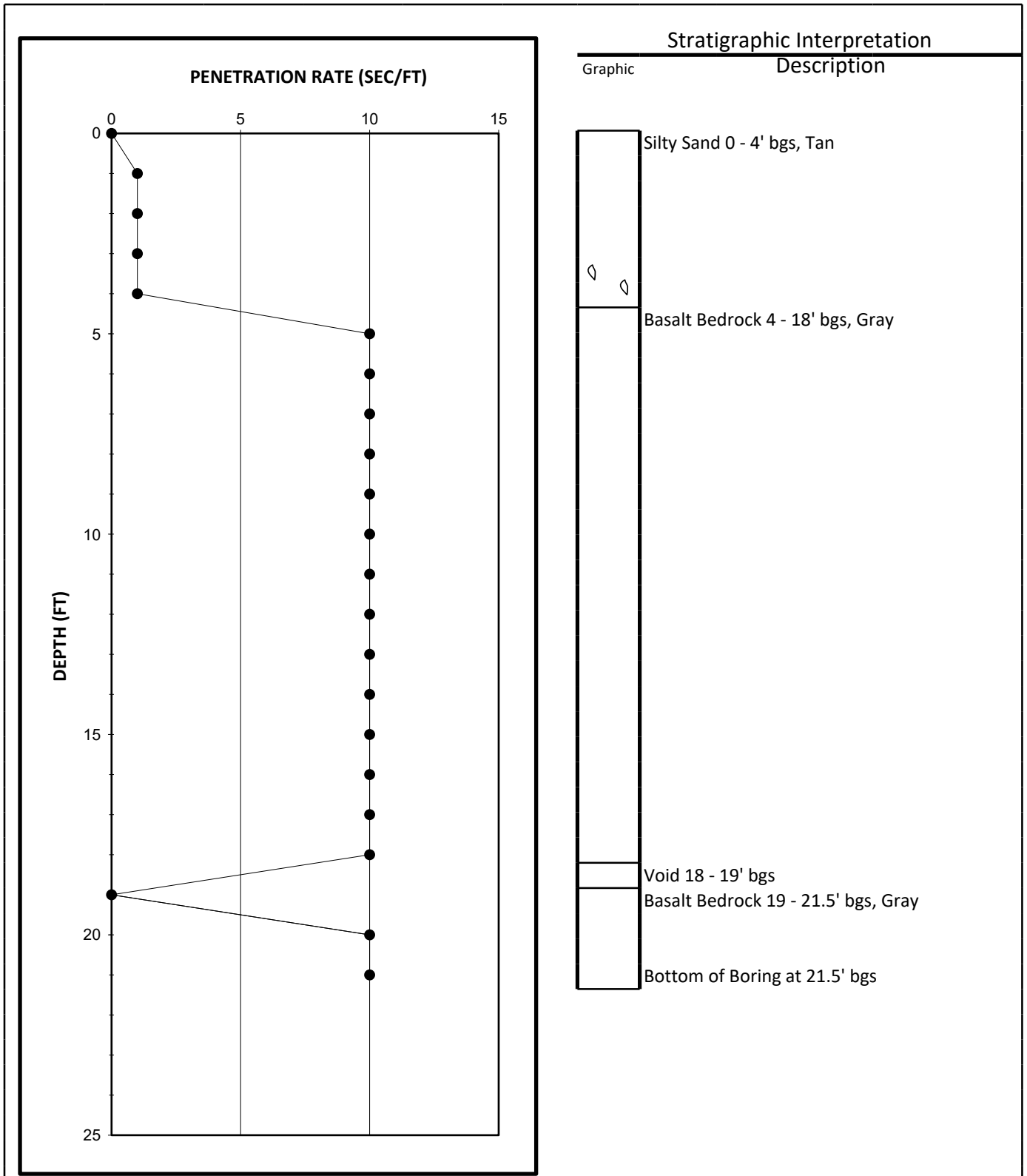


Air-Track Boring AT-51
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 52

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

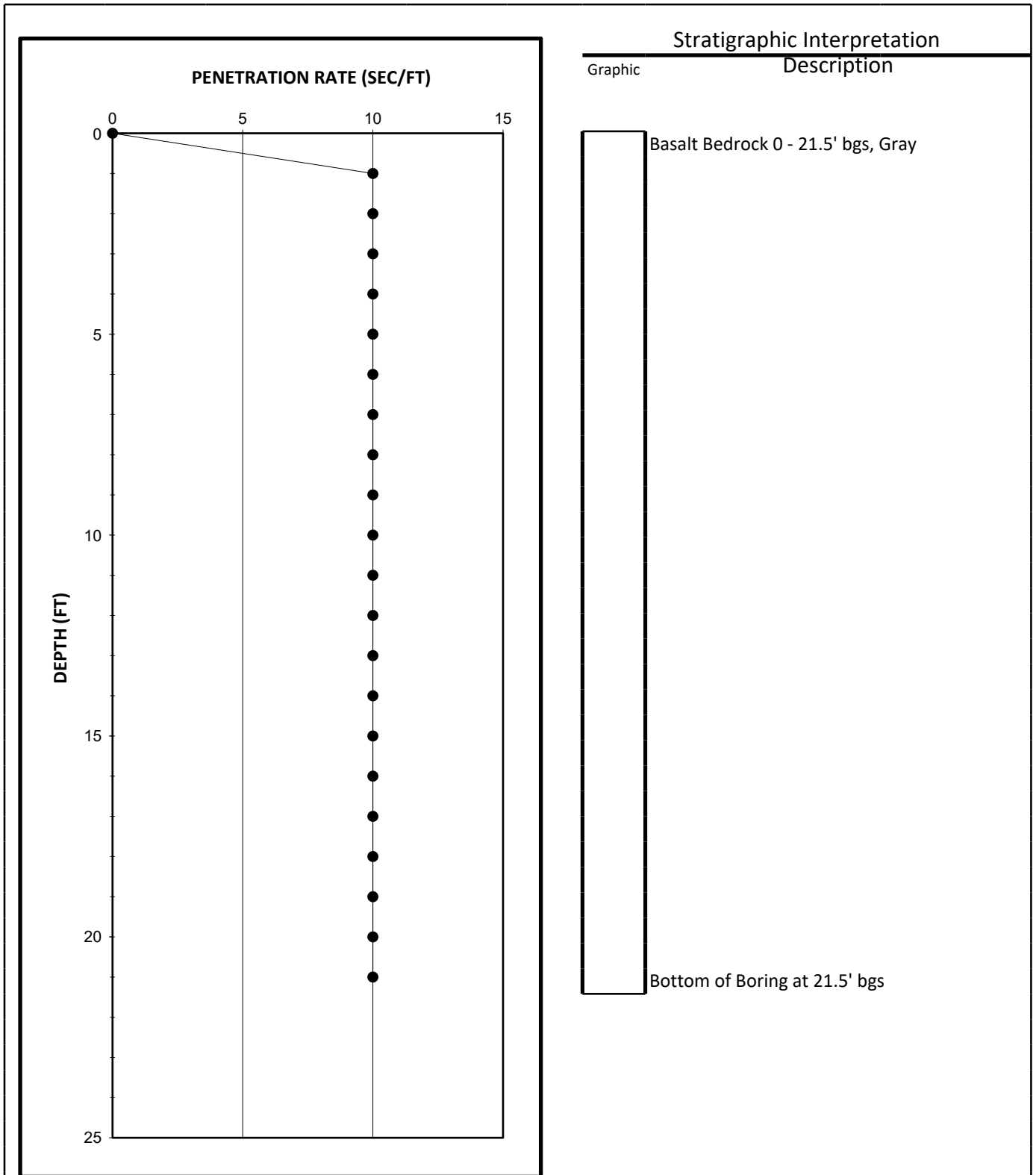


Air-Track Boring AT-52
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 53

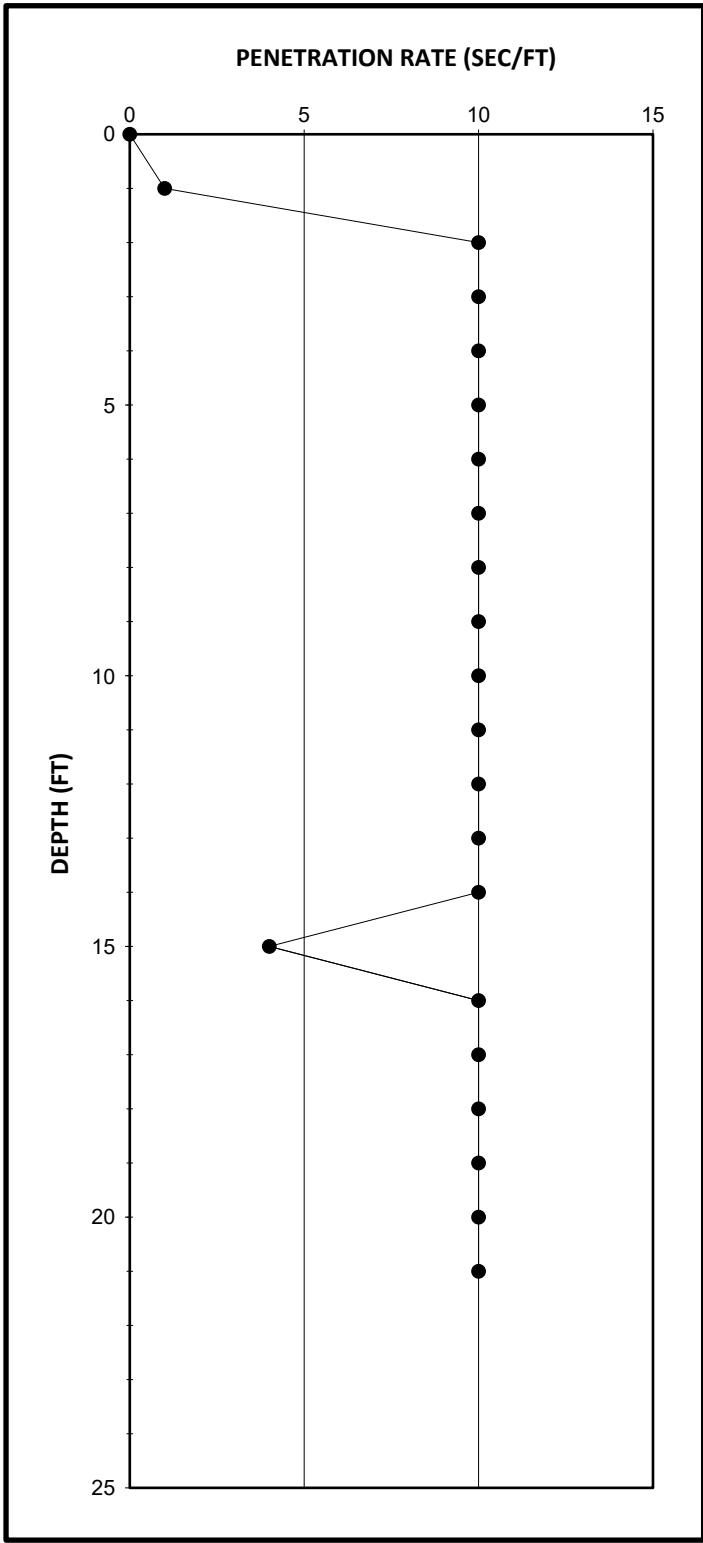
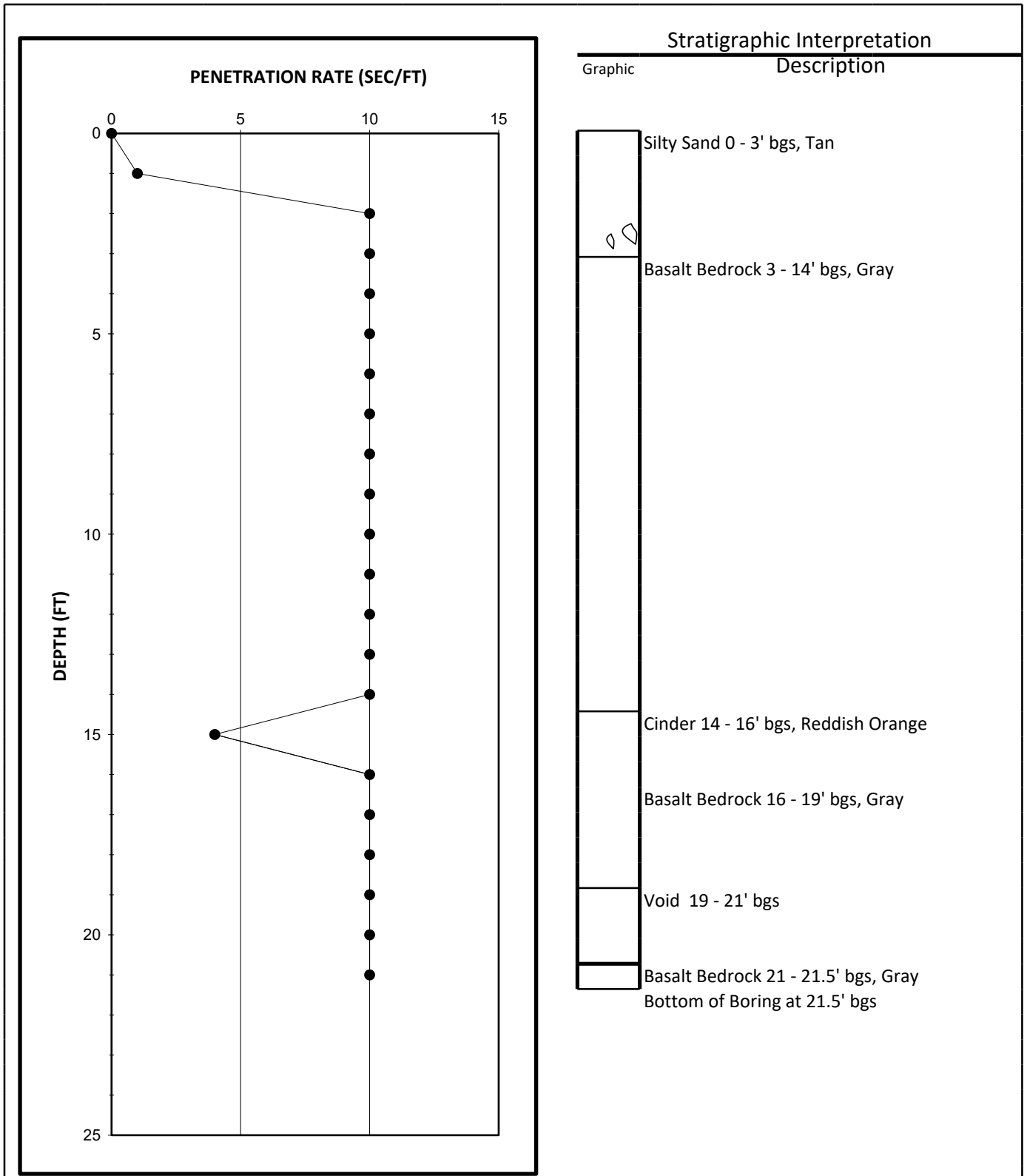
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-53 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 54

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

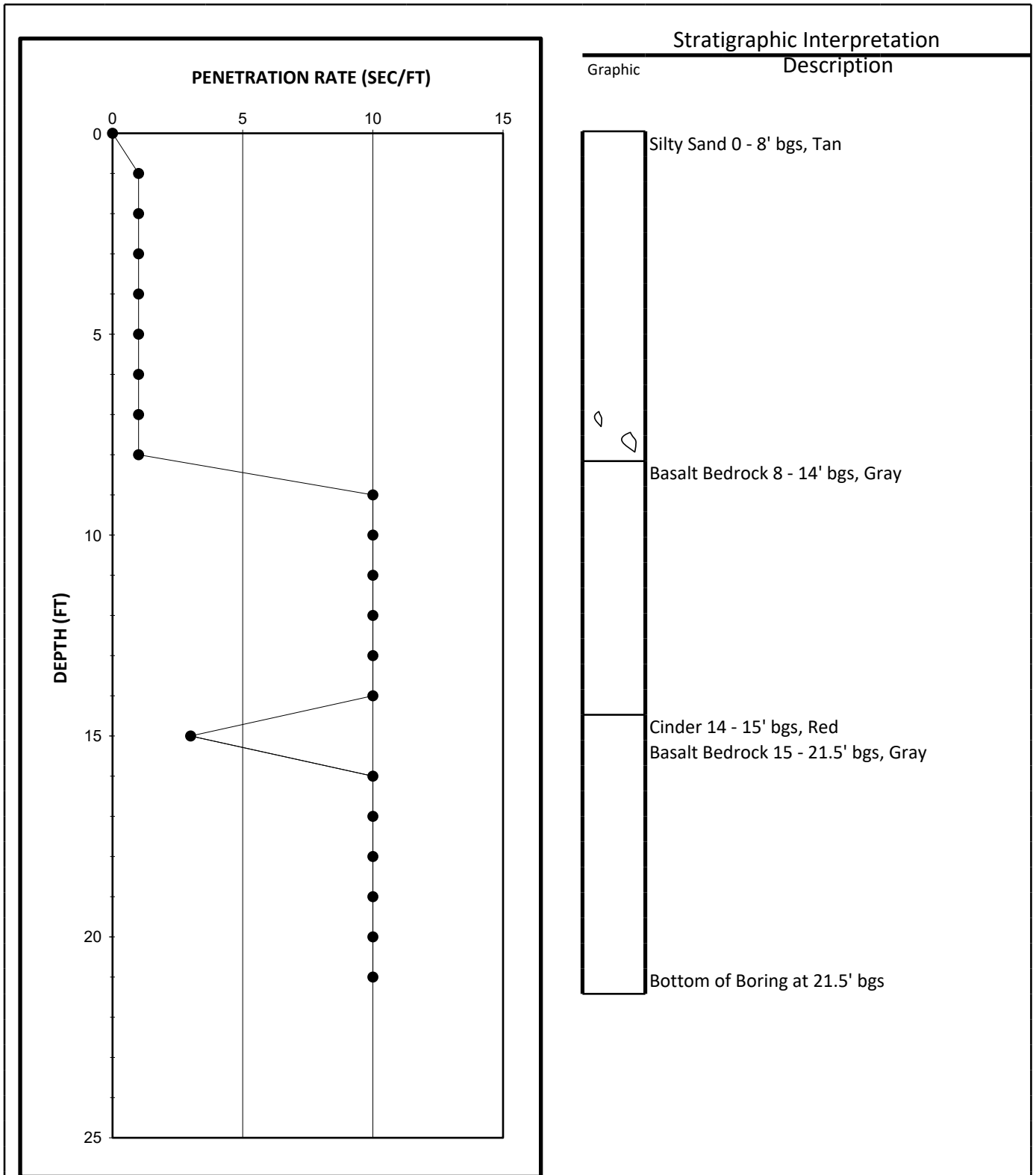


Air-Track Boring AT-54
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 55

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021

Surface Elevation (fmsl):

Drilling Method:

Air-Track

Logged By: KAK

Total Depth (feet):

21.5 ft

Driller:

Quality Drilling

Reviewed By: LMS

Boring Diameter (inch):

3.0 in

& Blasting

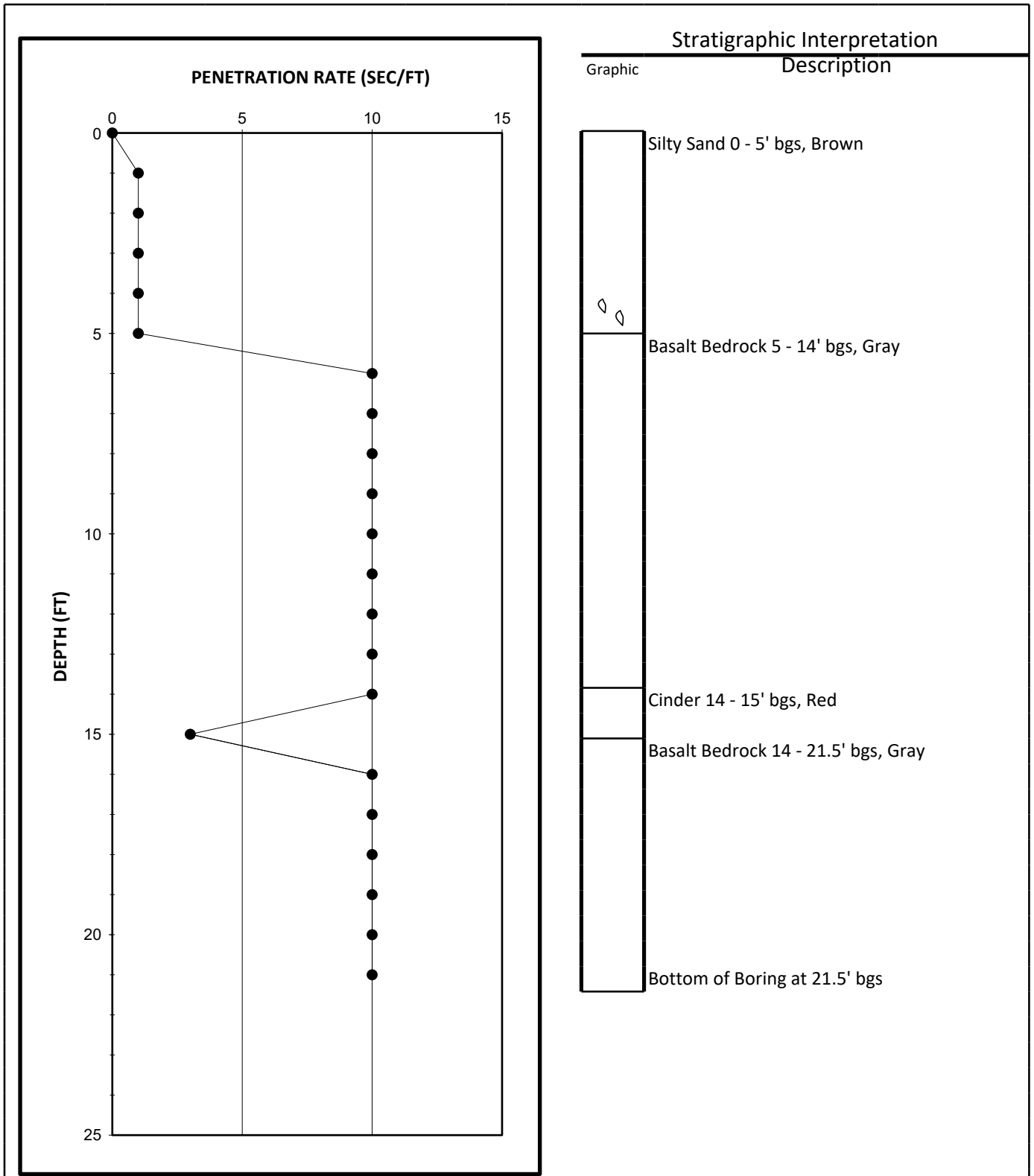


Air-Track Boring AT-55
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 56

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

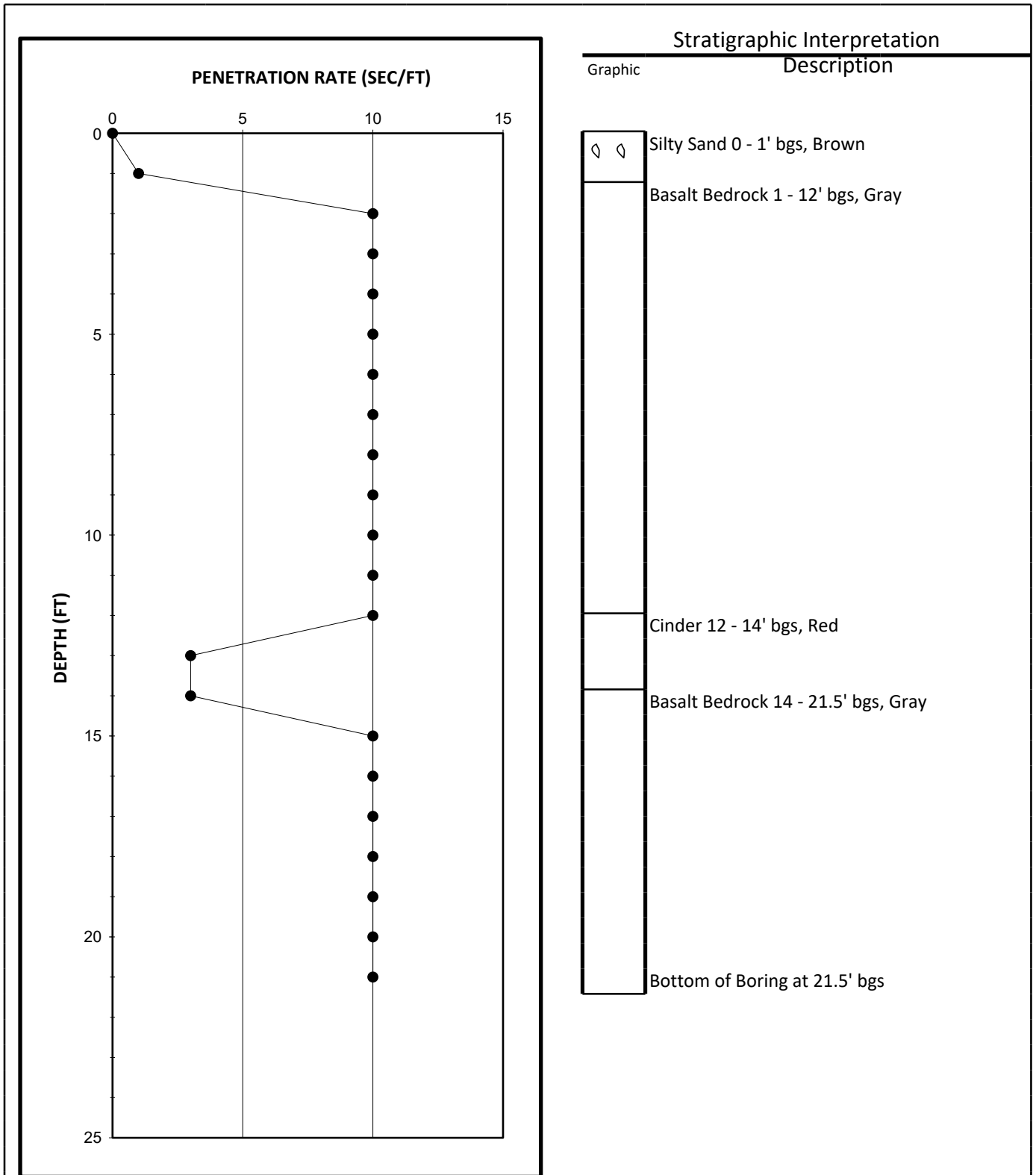


Air-Track Boring AT-56
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 57

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

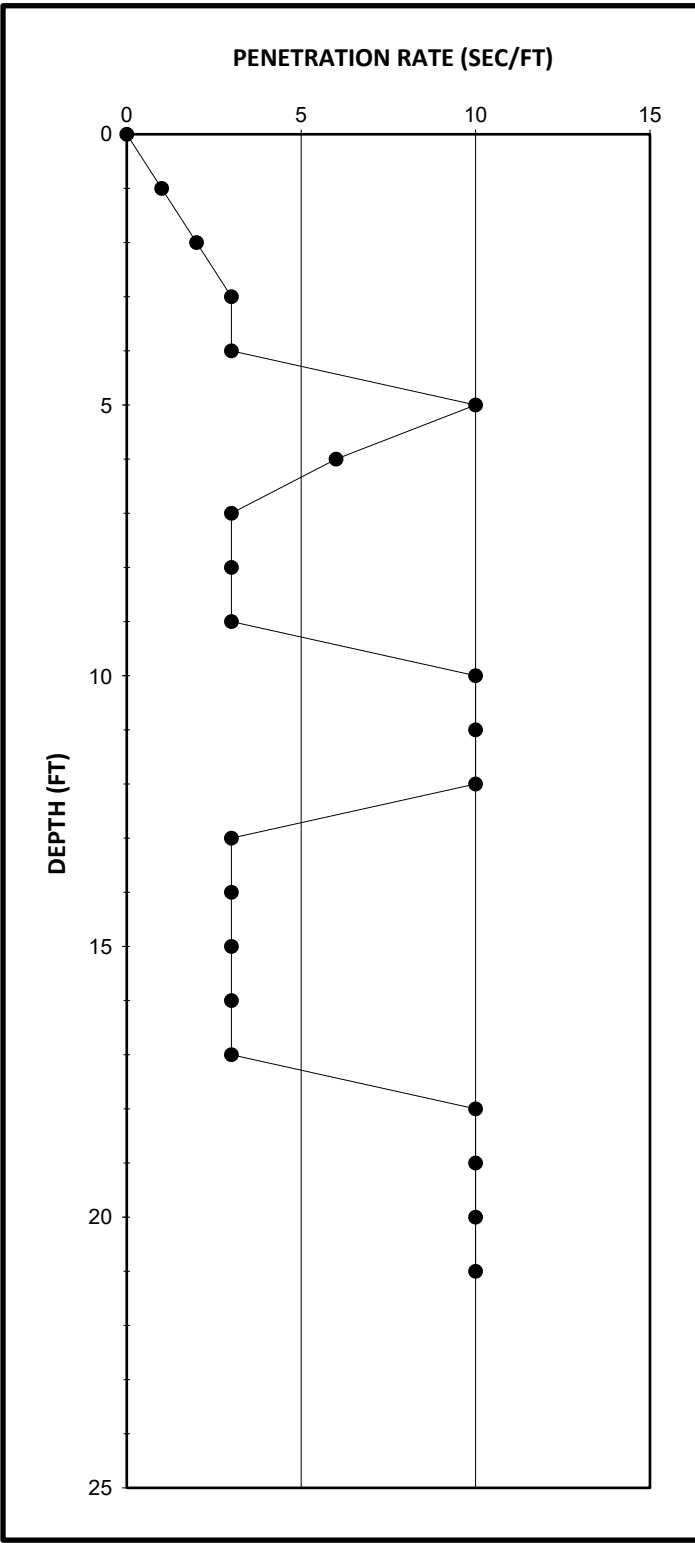
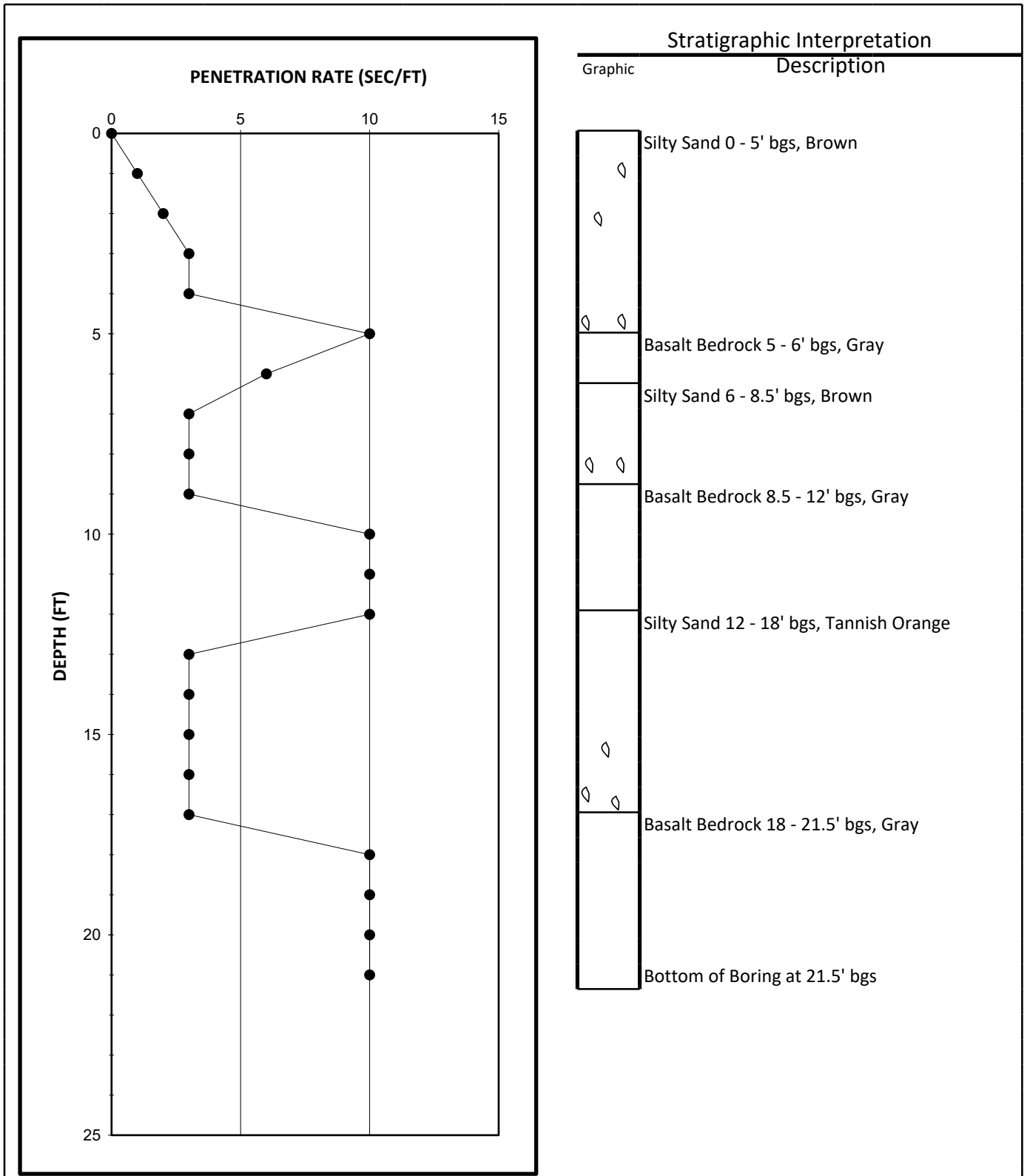


Air-Track Boring AT-57
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 58

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

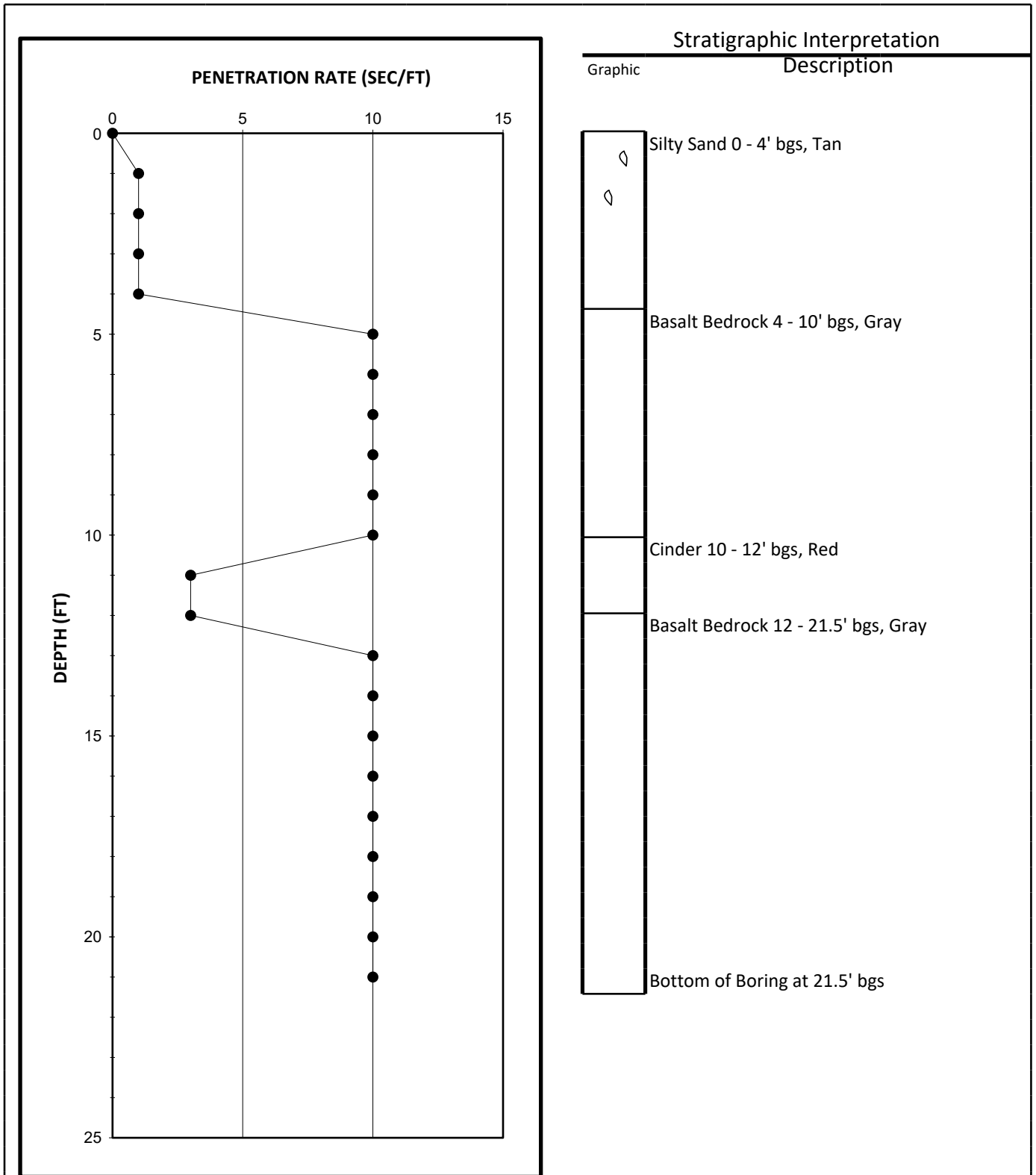


Air-Track Boring AT-58
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 59

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting

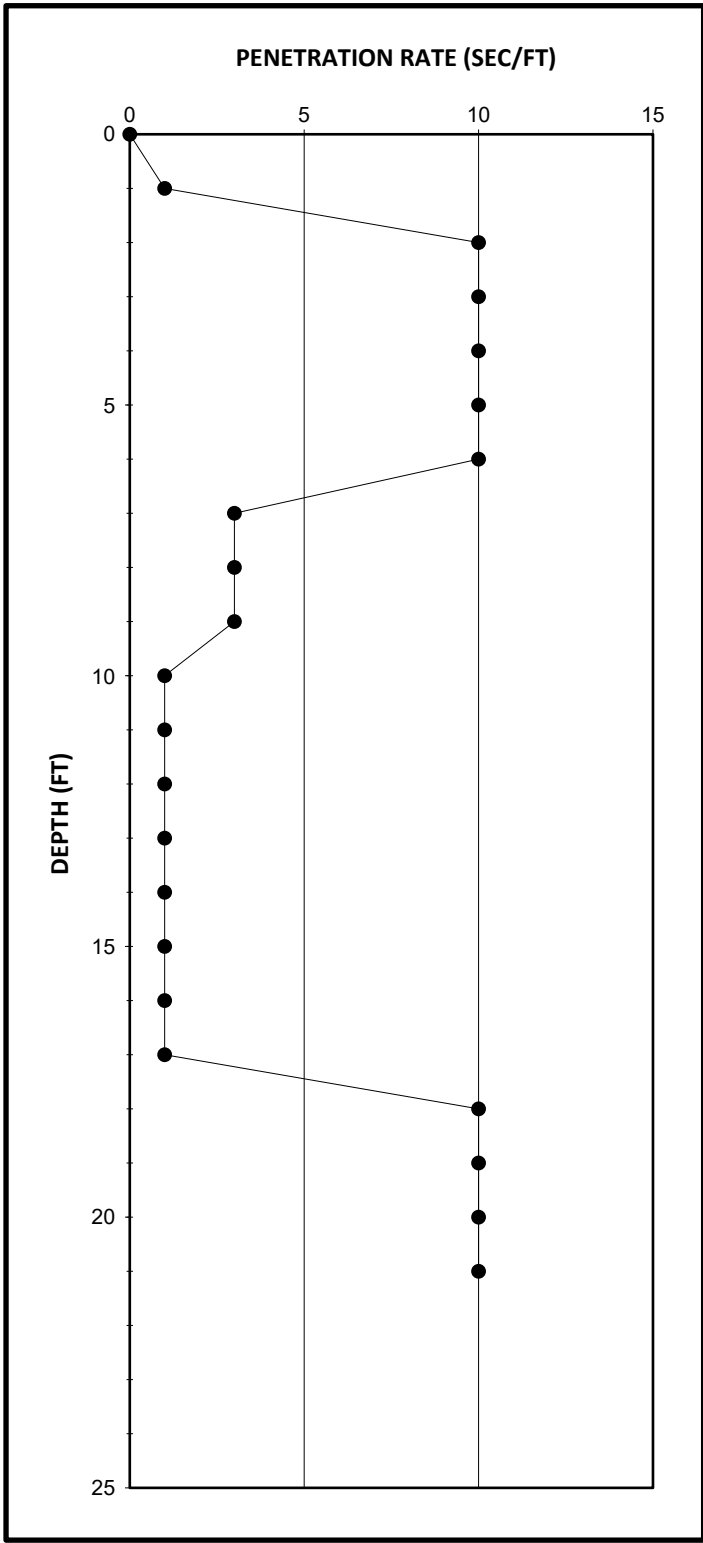
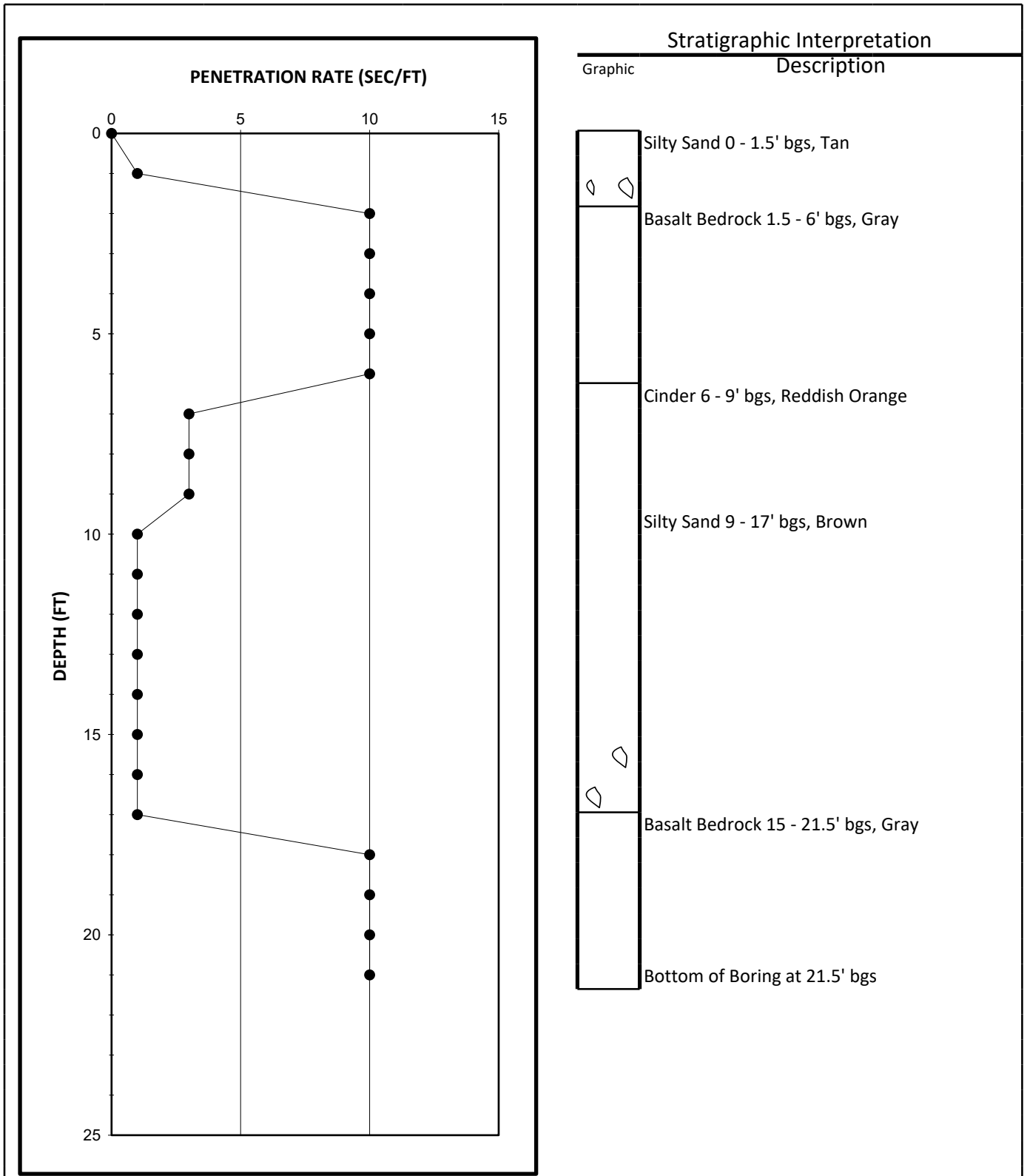


Air-Track Boring AT-59
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 60

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

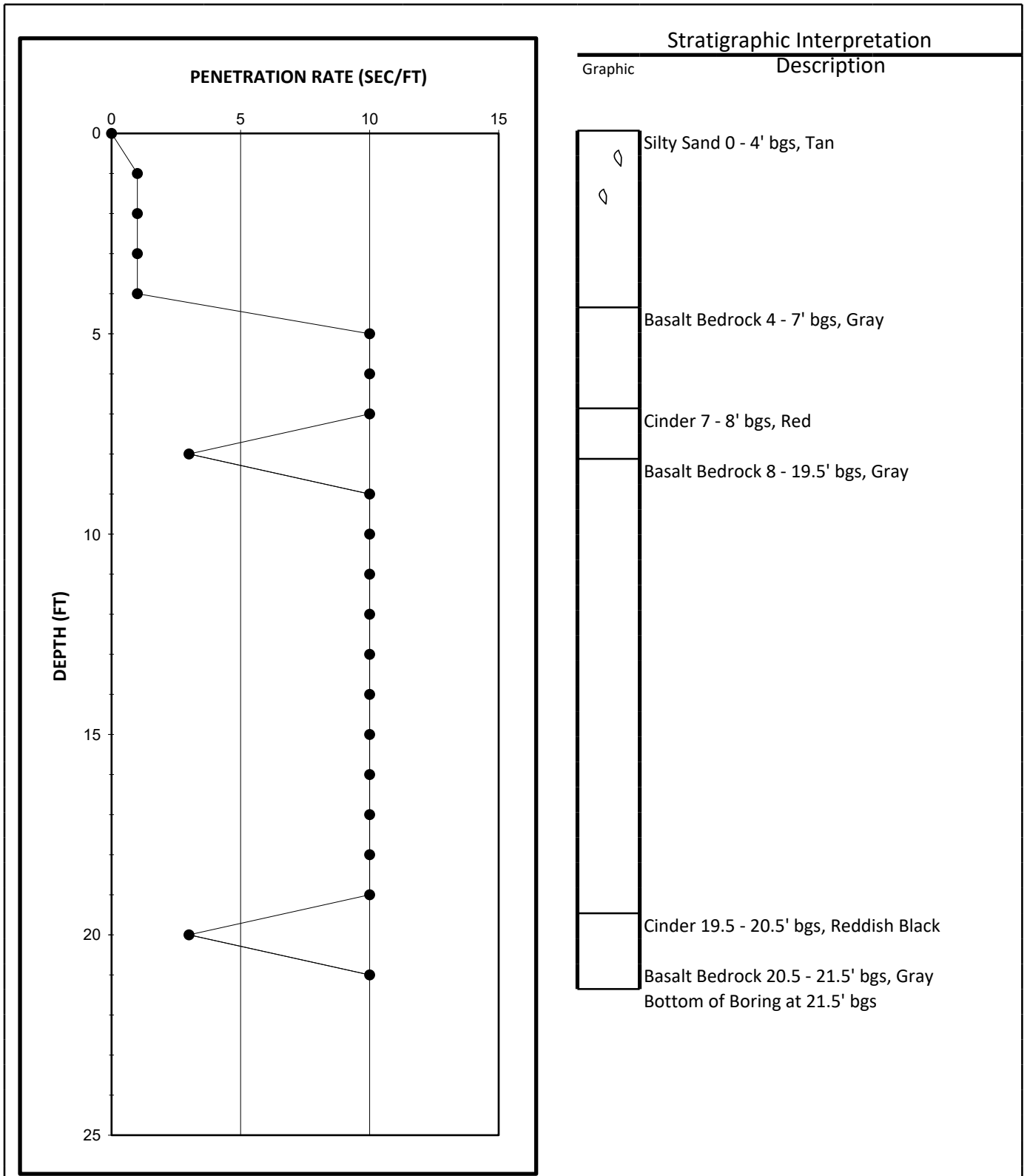


Air-Track Boring AT-60
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 61

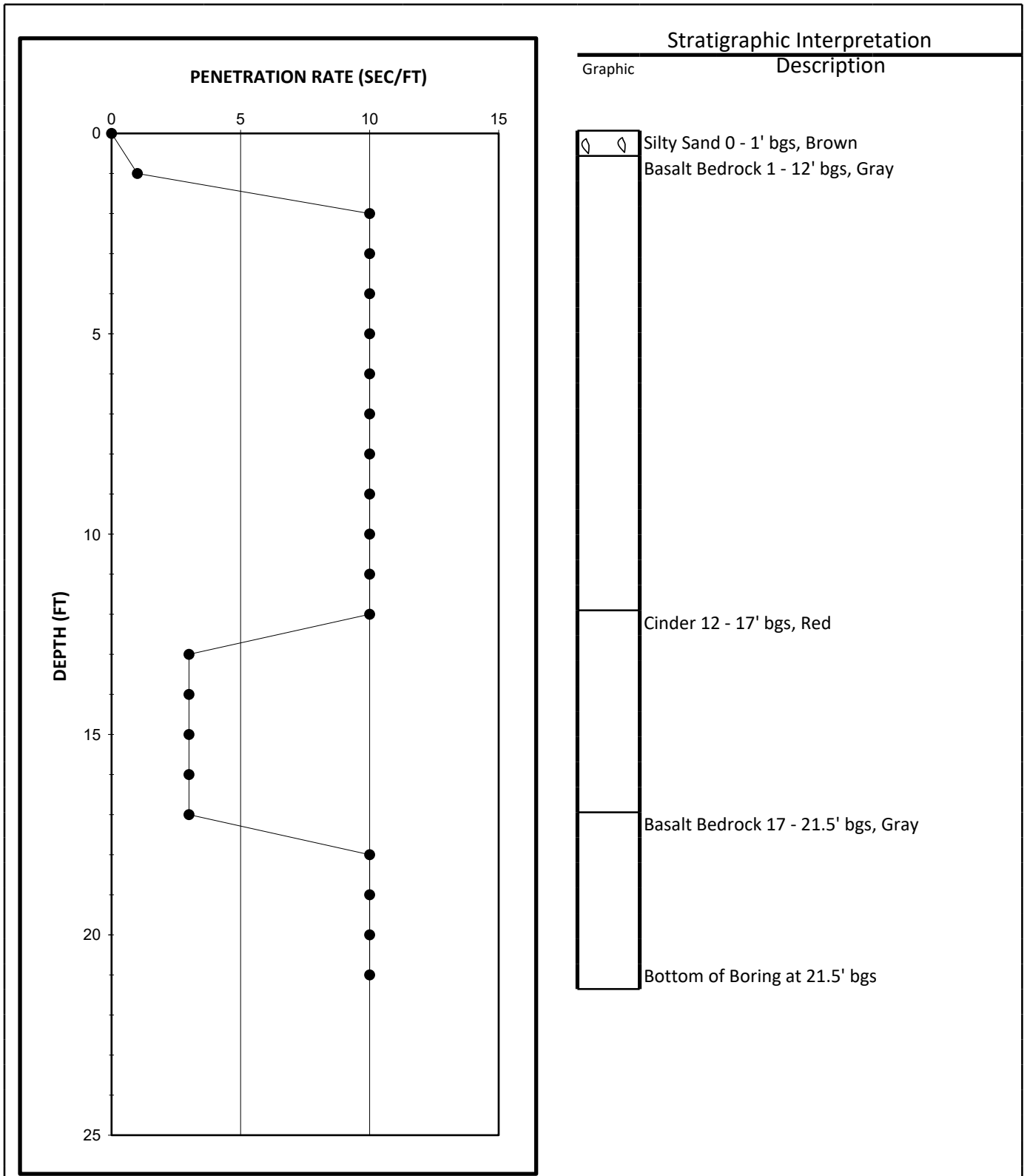
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

 <p>WALLACE GROUP NORTHWEST GEOSYSTEM EXPERTS</p>	<p>Air-Track Boring AT-61 Early Bronco Deschutes County, OR</p>	
	<p>PROJECT NO. 21182 - 1</p>	<p>FIGURE A - 62</p>

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

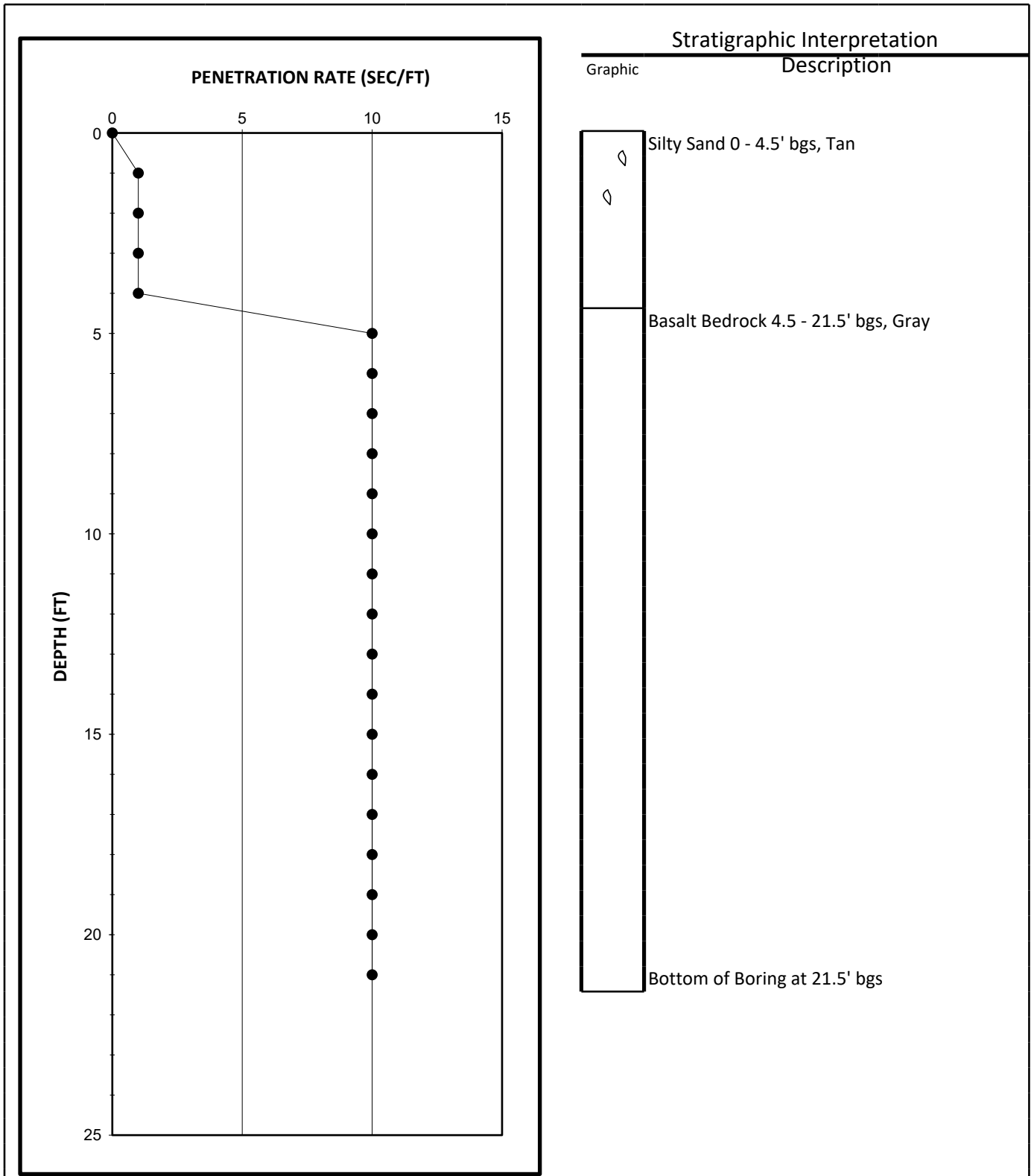


Air-Track Boring AT-62
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 63

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

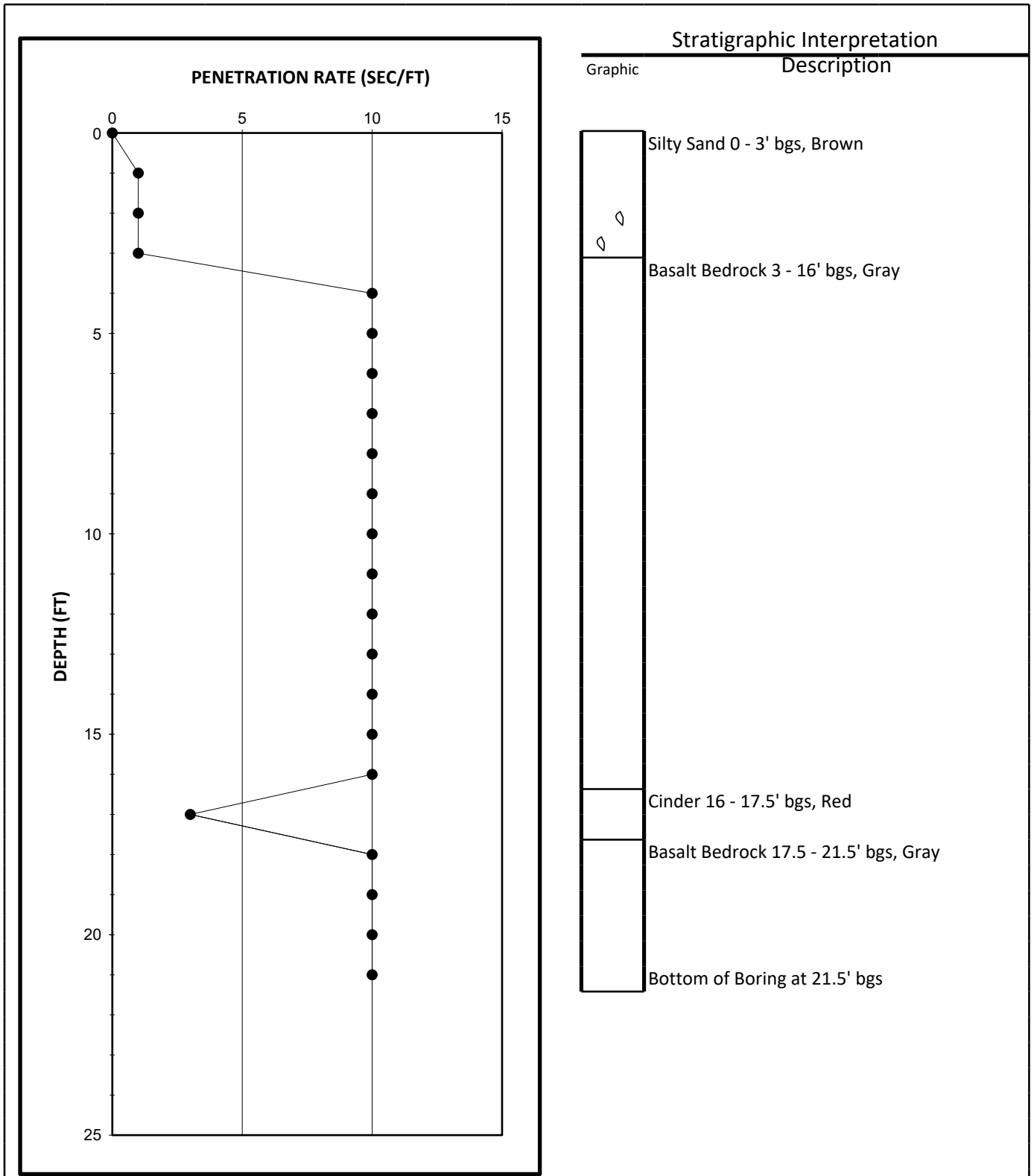


Air-Track Boring AT-63
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 64

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

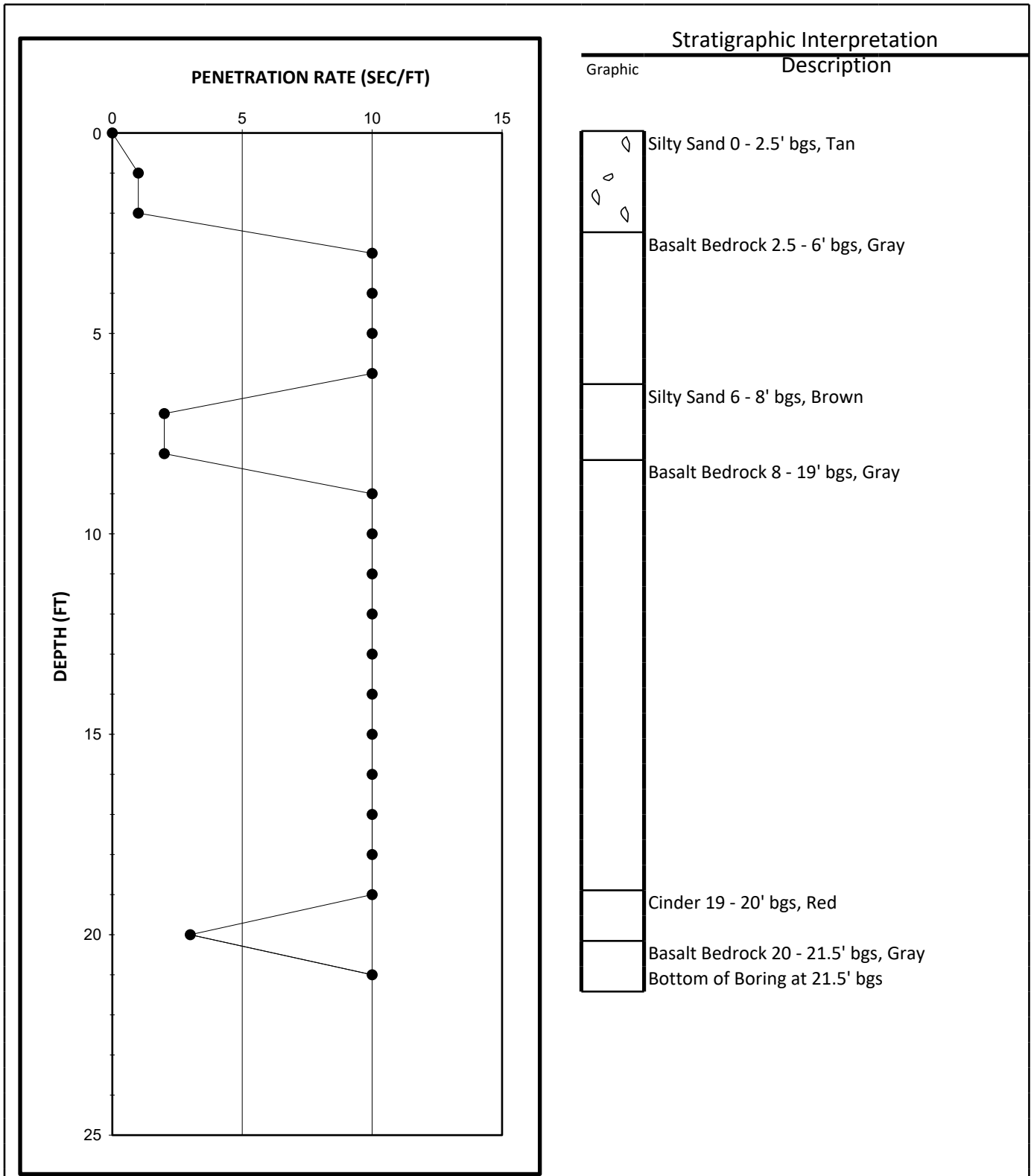


Air-Track Boring AT-64
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 65

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

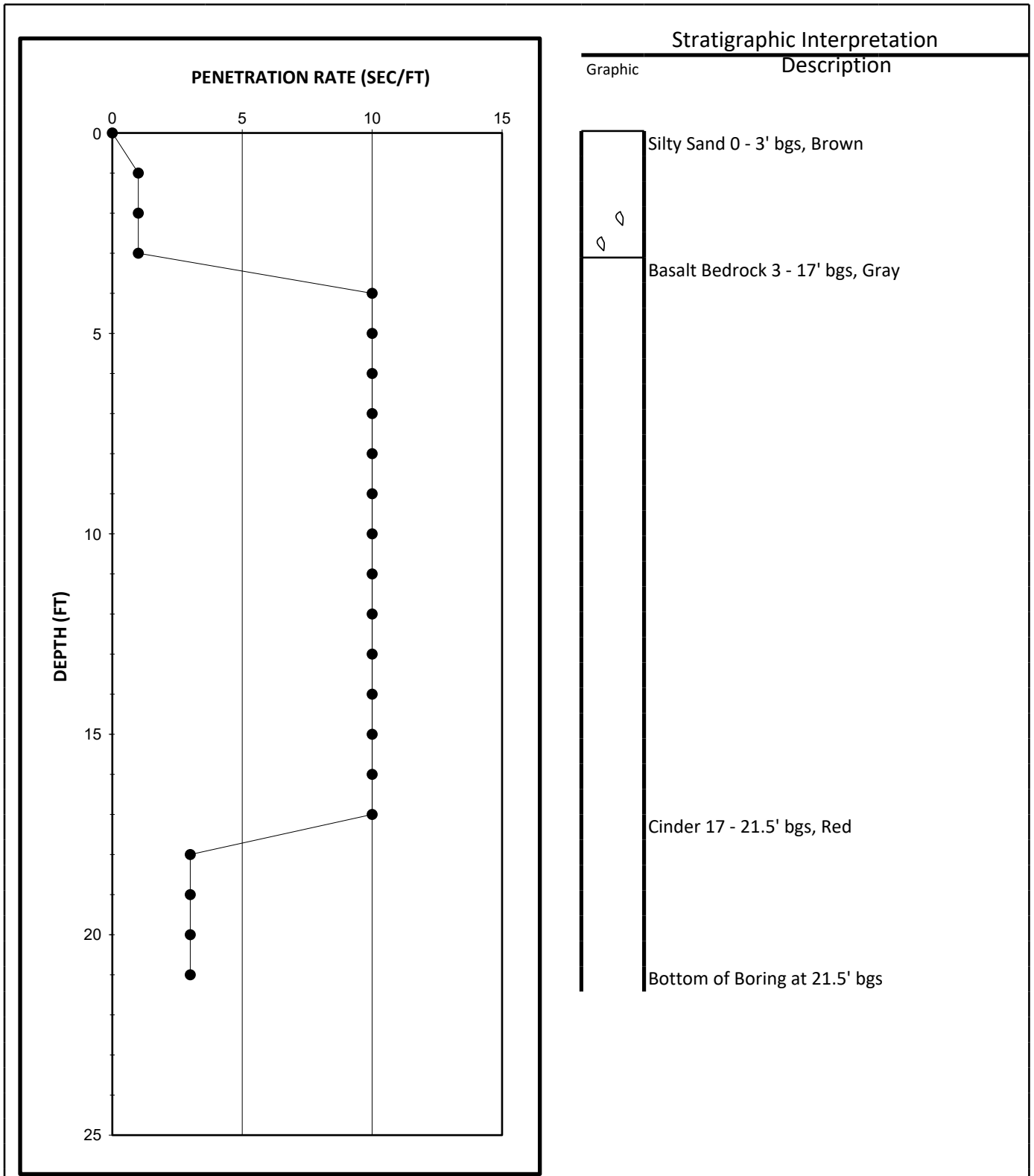


Air-Track Boring AT-65
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 66

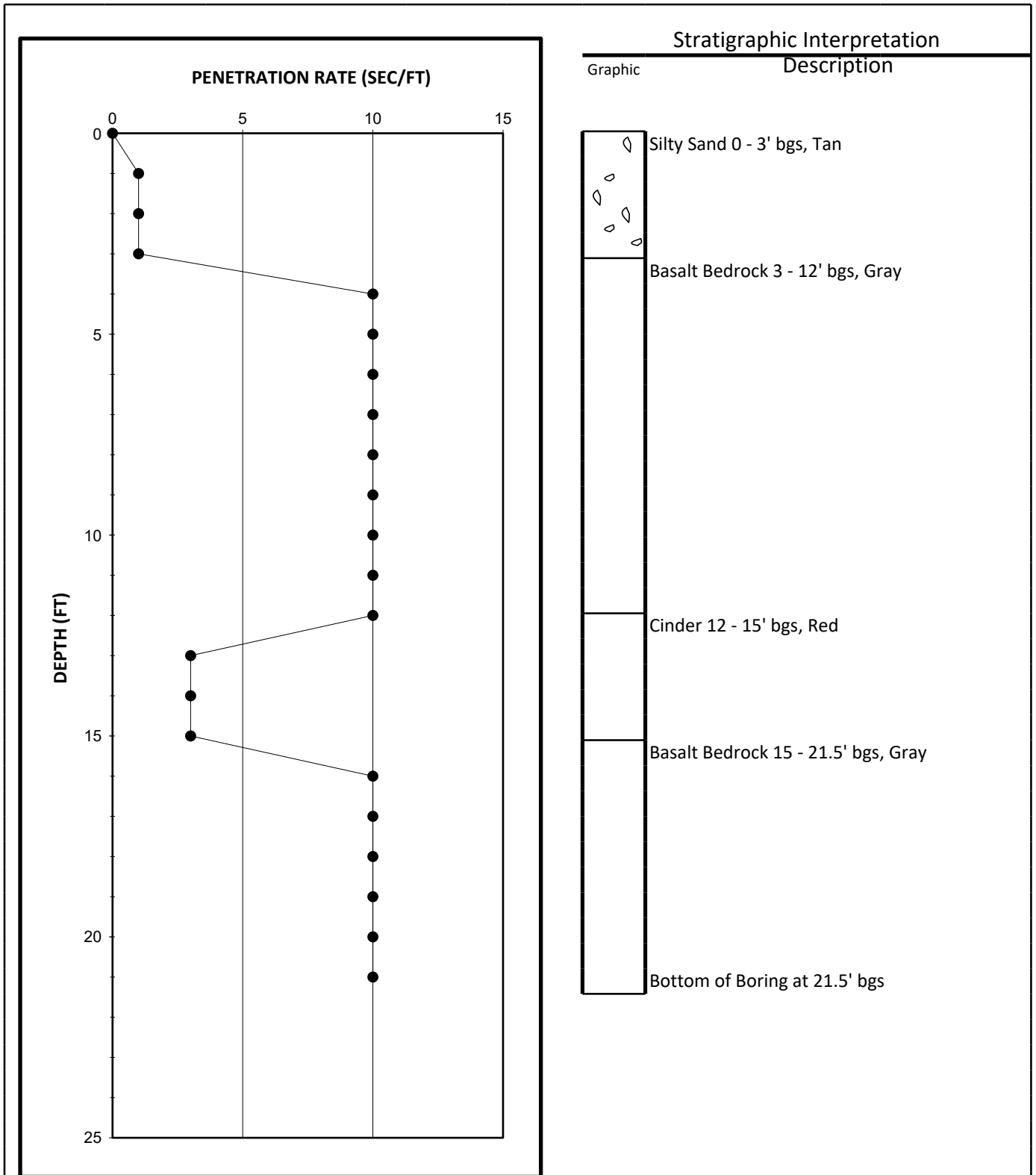
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

 <p>WALLACE GROUP NORTHWEST GEOSYSTEM EXPERTS</p>	<p>Air-Track Boring AT-66 Early Bronco Deschutes County, OR</p>	
	<p>PROJECT NO. 21182 - 1</p>	<p>FIGURE A - 67</p>

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

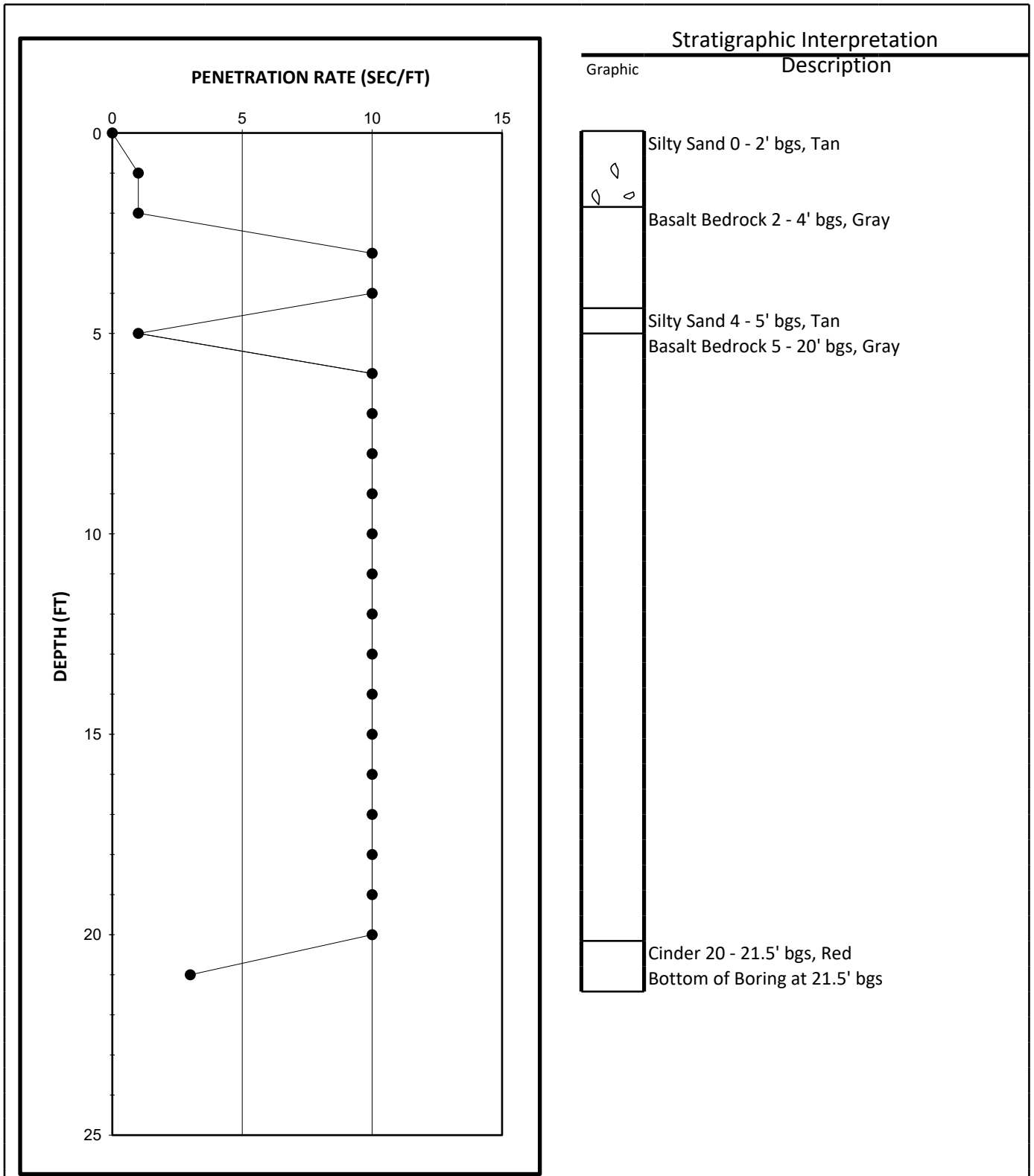


Air-Track Boring AT-67
Early Bronco
Deschutes County, OR


PROJECT NO. 21182 - 1

FIGURE A - 68

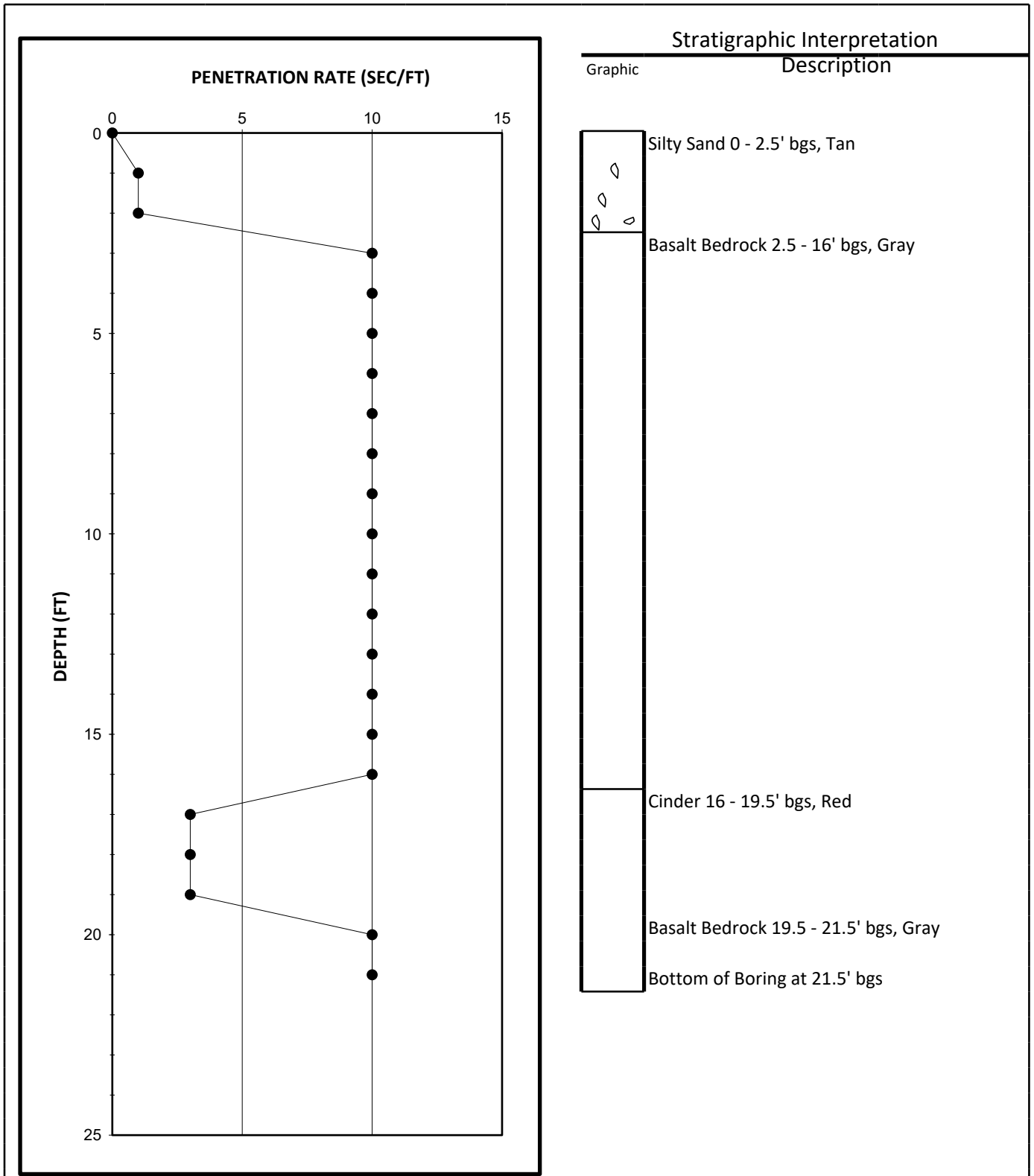
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

 <p>WALLACE GROUP NORTHWEST GEOSYSTEM EXPERTS</p>	<p>Air-Track Boring AT-68 Early Bronco Deschutes County, OR</p>	
	<p>PROJECT NO. 21182 - 1</p>	<p>FIGURE A - 69</p>

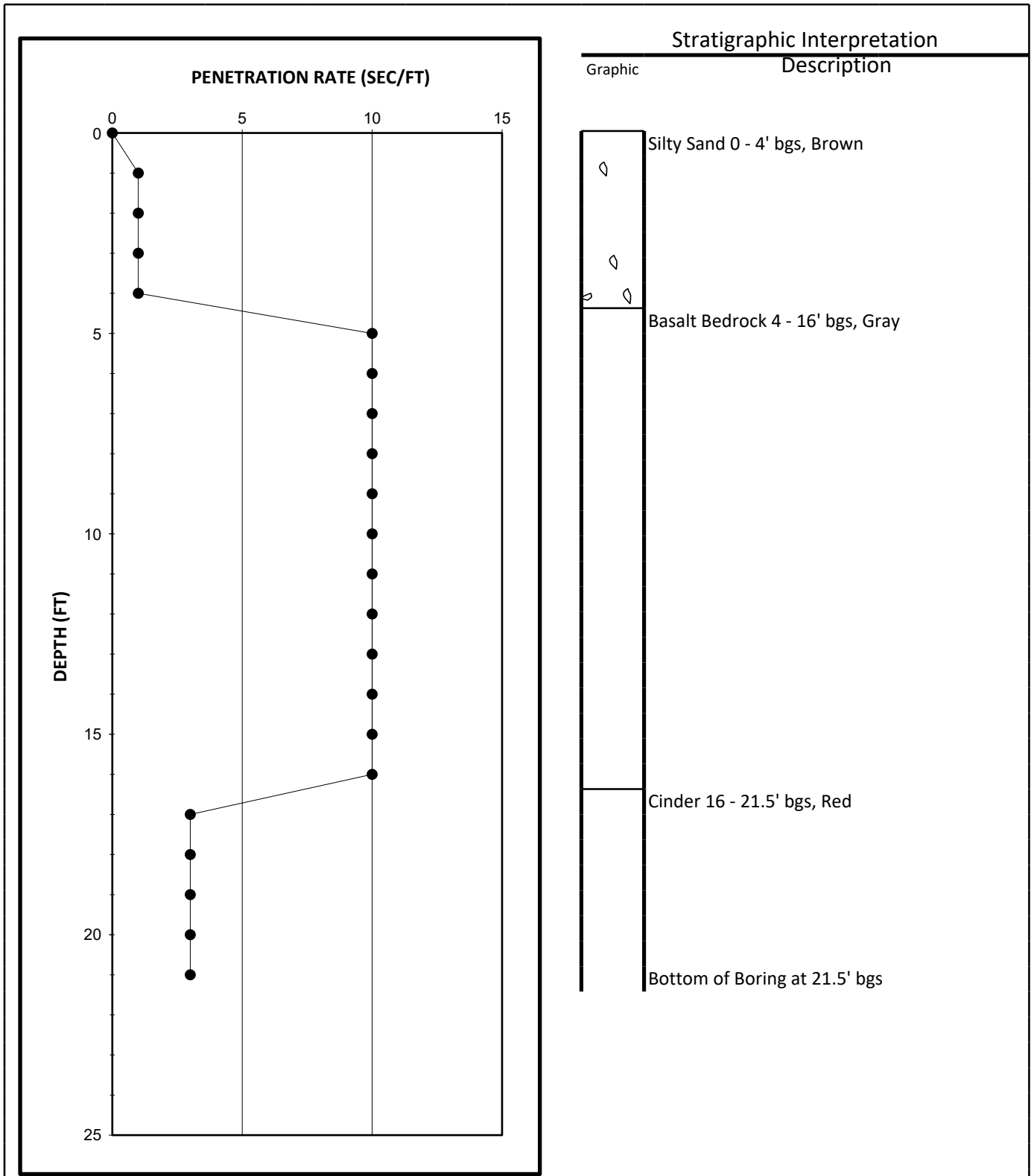
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-69 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 70

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling & Blasting
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	

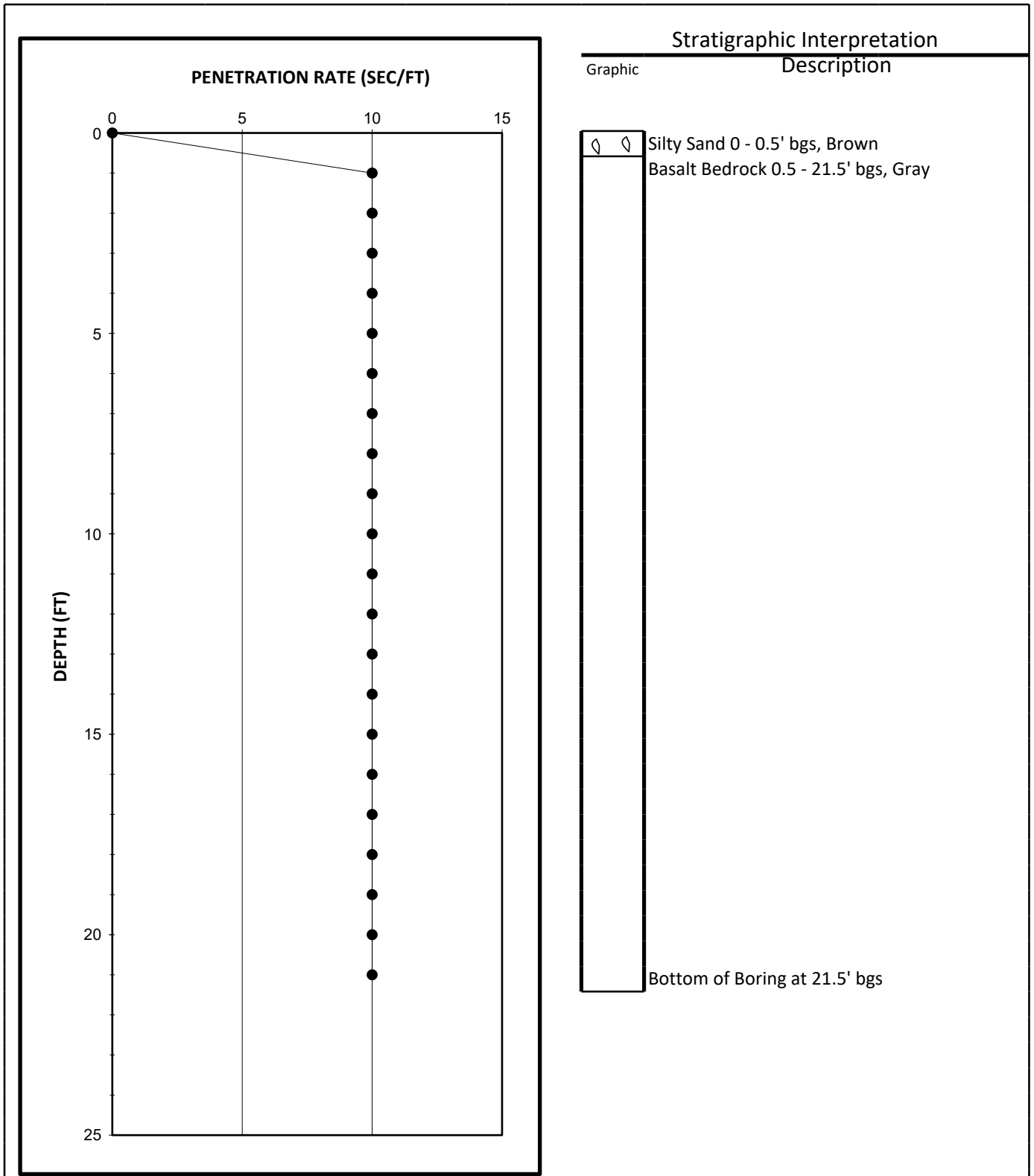


Air-Track Boring AT-70
Early Bronco
Deschutes County, OR


PROJECT NO. 21182 - 1

FIGURE A - 71

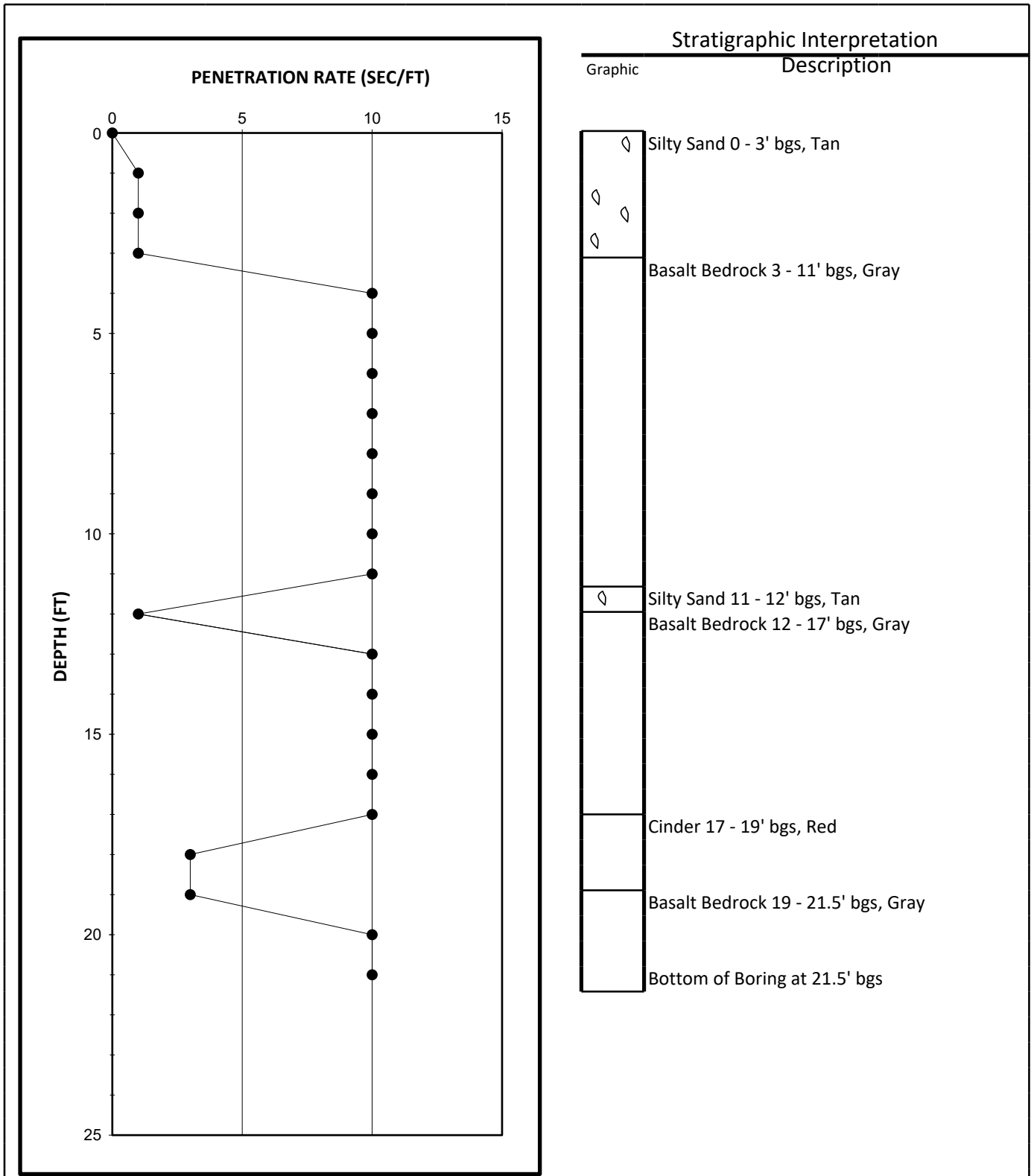
LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021	Surface Elevation (fmsl):	Drilling Method: Air-Track
Logged By: KAK	Total Depth (feet): 21.5 ft	Driller: Quality Drilling
Reviewed By: LMS	Boring Diameter (inch): 3.0 in	& Blasting

	Air-Track Boring AT-71 Early Bronco Deschutes County, OR	
	PROJECT NO. 21182 - 1	FIGURE A - 72

LOG OF AIR TRACK BORING



Date Drilled: 9/29/2021

Surface Elevation (fmsl):

Drilling Method: Air-Track

Logged By: KAK

Total Depth (feet): 21.5 ft

Driller: Quality Drilling

Reviewed By: LMS

Boring Diameter (inch): 3.0 in

& Blasting



Air-Track Boring AT-72
Early Bronco
Deschutes County, OR

PROJECT NO. 21182 - 1

FIGURE A - 73

APPENDIX B



Typical existing conditions during exploration.



Irrigation canal bisects the southern portion of the subject property.



Typical basalt outcrops were prevalent across the site.



Air-track drilling performed with Atlas Copco T-45 drilling rig.