Preliminary Geotechnical and Pavement Review Report

Outer Sandy Blvd. (NE 201st Avenue – NE 230th Avenue)

Multnomah County, Oregon

Multnomah County Project Number 24-162-1

Alta Project Number 2024.0002024.162

Prepared for:
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May 30, 2025
Project No. ALTA-2024-005

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TABLE OF CONTENTS

DRAFT

LIST OF TABLES

SUPPORTING DATA

Appendix A – Figures

Figure 1 Site Vicinity Map
Figures 2A-2P Site Exploration Plan

Appendix B – Interpreted Subsurface Conditions Supporting Information

Well Logs
Geotechnical Data Sheet

Appendix C – Pavement Distress Survey

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1.0 INTRODUCTION

This report presents Rhino One LLC (ROL) geotechnical and pavement review study for the Multnomah County's Outer Sandy Boulevard from SW 201st Avenue to SW 230th Avenue improvement Project located in East Multnomah County, Oregon. The project vicinity is shown on the *Site Vicinity Map* (Appendix A, Figure 1).

The Project goal is to perform planning phase activities to reconstruct NE Sandy Blvd to a multimodal facility consistent with a Complete Streets approach from the Gresham city limits at NE 201st Avenue to NE 230th Avenue in order to close an east-west gap in the regional active transportation network. A small portion of Gresham jurisdiction is included to complete the multimodal gap between Multnomah County right of way and 201st Avenue. Planned improvements will include sidewalk improvements, crosswalks, bike lanes, and drainage improvements, including two fish passage culverts.

The purpose of this study is to provide a desktop review of geotechnical and pavement conditions along the project alignment, complete a site reconnaissance and provide preliminary pavement design recommendations for new pavements, sidewalks and bike paths. We understand that there are no plans for grind and inlay of the existing pavements.

2.0 PROJECT DESCRIPTION

2.1 Project Background and Scope

NE Sandy Boulevard is an arterial facility located in East Multnomah County that connects Portland, Gresham, Fairview and Wood Village. It is a major arterial west of Fairview Parkway and a minor arterial from Fairview Parkway to 238th Drive. This facility serves as a regional freight corridor that travels through residential, commercial and industrial areas. It is also a transit corridor and a planned regional pedestrian and bicycle parkway. Multnomah County's jurisdiction on Sandy Boulevard begins at the Gresham city limits (a few blocks east of 201st Avenue) until it terminates east of NE 238th Boulevard.

The Project goal is to perform planning phase activities to reconstruct NE Sandy Boulevard to a multimodal facility consistent with a Complete Streets approach from the Gresham city limits to NE 230th Avenue in order to close an east-west gap in the regional active transportation network. A small portion of Gresham jurisdiction is included to complete the multimodal gap between Multnomah County right of way and 201st Avenue. Planned improvements will include sidewalk improvements, crosswalks, bike lanes, and drainage improvements, including two fish passage culverts. We understand that there are currently no plans for grind and inlay of the existing pavements.

2.2 Scope of Geotechnical and Pavement Review Services

The scope of services for ROL, as a subconsultant to ALTA Planning & Design, Inc. (ALTA), was completed in general accordance with our Professional Services Subcontract Number 2024.0002024.162 dated September 24, 2024. Generally, the services consisted of conducting a coordinated geotechnical and pavement review study to inform the planning process for the project area, and to summarize the findings in a report. The following is a list of the major subtasks for the project.

- Collect and review existing geologic and geotechnical literature in the project vicinity.
- Complete a geologic site walk, and a pavement distress survey.

- Review the pavement design based on Multnomah County Road Standards and 2019 ODOT Pavement Design Guide (State of Oregon, Department of Transportation, Pavement Services Unit, 2019) and the AASHTO Guide for Design of Pavement Structures (American Association of State Highway and Transportation Officials, 1993).
- Preparation of a Geotechnical and Pavement Review Report.

3.0 SUMMARY OF OFFICE STUDIES

The intent of this section is to document the geological and subsurface conditions along the project site based on our literature review and site reconnaissance. This section was prepared by, or under the direct supervision of, ROL's senior engineering geologist, Peter Hughes, who is registered as a Certified Engineering Geologist with the State of Oregon. Site geology and topographic conditions for the project location were evaluated based on a review of geologic and hazard mapping reports and site reconnaissance. Please note that no field exploration was performed for this study.

3.1 Regional Published Geology Summary

The greater Portland Metropolitan Area lies within the Portland Basin, a structural depression created by complex folding and faulting of the basement rocks. The Portland Basin is approximately 40 miles long and 20 miles wide with the long axis trending to the northwest. The most prevalent basement rock of the Portland Basin is a sequence of lava flows of the Columbia River Basalt Group (CRBG) which flowed into the area between about 17 million and 6 million years ago ((Beeson, Tolan, & Madin, 1991) and (Orr & Orr, 1999)).

The Columbia and Willamette Rivers converge within the Portland Basin. The rivers, along with their tributaries, have contributed to extensive sedimentary deposits which overlie the basement rock formations. The project lies within the Portland Quadrangle, where Beeson and others have mapped the Portland Basin ancient sediments as Sandy River Mudstone (SRM), overlain by Troutdale Formation. According to Beeson and others, the SRM consists of 200 to 300 feet of claystone, siltstone, and sandstone beds deposited in the Miocene to Pliocene epochs (about 10 million to 3.5 million years ago). Additional work by Evarts and others (Evarts, O'Connor, & Madin, 2009), indicates the SRM reflects an ancestral Columbia River similar to the low-gradient modern river of today, and like today, the fine-grained fluvial and lacustrine sediments were likely deposited near sea level of the time. In the Portland Basin, the Troutdale Formation occasionally interfingers with and overlies the SRM. Beeson and others indicate the Troutdale Formation consists of about 100 to 400 feet of well-consolidated friable to moderately well-cemented conglomerate and sandstone, deposited in the late Miocene to Pliocene epochs (about 12.5 million to 2.6 million years ago). Trimble, in his work in the Portland Basin (Trimble, 1963), further describes the Troutdale Formation conglomerate as a poorly stratified cobbly pebble conglomerate which is often well indurated or well cemented with clay minerals.

In addition to the river deposits, scores of extinct volcanoes are located across the greater Portland Metropolitan Area and, along with the Cascade volcanic arc, contributed deposits in the project area. Today, these Boring Volcanoes generally consist of cinder cones and lava flows. In parts of the Basin, the Troutdale Formation is overlain by Pliocene to Quaternary age basaltic lava flows of the Boring Volcanic Field (Evarts, O'Connor, & Madin, 2009).

The SRM, Troutdale Formation, and Pliocene to Quaternary age basaltic lava flows are overlain in places by a sequence of catastrophic flood deposits. During the late stages of the last great ice age, between about 18,000 and 15,000 years ago, a lobe of the continental ice sheet repeatedly blocked and dammed the Clark Fork River in western Montana forming the immense glacial lake, Lake Missoula. The lake grew until its depth was sufficient to buoyantly lift and rupture the ice dam,

allowing the entire lake to empty catastrophically. Once the lake emptied, the ice sheet again gradually dammed the Clark Fork Valley, and the lake refilled. Experts believe this sequence of catastrophic outburst floods repeated 40 or more times at intervals of decades (Allen, Burns, & Burns, 2009). These repeated floods are collectively referred to as the Missoula Floods.

During each short-lived Missoula Flood episode, floodwaters washed westward across the Idaho panhandle, westward and southwestward through eastern Washington's Scablands, and westward down the Columbia River Gorge. When the floodwater emerged from the western end of the gorge, it spread out over the Portland Basin and pooled to elevations of about 400 feet, depositing a tremendous load of sediment while flowing around the remaining Boring Volcanoes. Boulders, cobbles, and gravel were deposited nearest the mouth of the Gorge, and along the main channel of the Columbia River. Cobble-gravel bars reached westward across the Basin, grading to thick blankets of micaceous sand and silt (Allen, Burns, & Burns, 2009). Beeson and others divided the flood deposits into three facies: Fine-grained facies, Coarse-grained facies, and Channel facies. The Fine-grained facies consist of grain sizes from coarse sand to silt (map unit Qff). The Coarse-grained facies consist of gravel, cobbles, and boulders in a sand and silt matrix (map unit Qfc). The Channel facies consist of complexly interlayered Fine-grained facies and Coarse-grained facies materials formed by channeling of flood deposits into earlier and/or contemporaneous deposits. Because of the origin of the catastrophic floods, boulders and cobbles encased in the breached glacial ice were rafted or carried in the massive floods and dropped along the way as the ice melted. These glacial erratic boulders and cobbles are found throughout the Portland Basin and the Tualatin and Willamette Valleys. Therefore, it is possible for boulders and cobbles to be found in the Fine-grained facies unit and the Coarse-grained facies unit.

Since the time of the Missoula Floods, rivers and streams have reworked the landscape of the Portland Basin and deposited alluvium consisting of gravel, sand, and fine-grained sediments in modern river channels. Additionally, areas have been altered by humans, creating large grading cuts and fills for development of industry, transportation, and housing.

Mapping by Evarts (Russell C. Evarts, 2020) indicates the project site is underlain by coarse-grained Missoula Flood Deposits consisting of bouldery, cobbly, sandy gravel. The very east end of the project is mapped as the Hyaloclastic sandstone member of the Troutdale Formation consisting of coarse-grained basaltic sandstone and granule conglomerate. The Hyaloclastic sandstone likely dips below the flood deposits on the east portion of the project. A review of existing well logs suggests groundwater ranges between 5 and 65 feet below ground surface (bgs) along the alignment of the site.

3.2 Geologic Hazard Summary

A desktop study of potential geologic hazards was performed using the Oregon Department of Geology and Mineral Industries (DOGAMI) viewer (State of Oregon, Department of Geology and Mineral Industries, 2018). A summary of the geologic hazards based on this review are summarized in the Table 1 below. Please note, this information is for general information only and should not be used for design.

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Table 1. Geologic Hazards Summary

Potential Geologic Hazard Type	Project Site Summary
Cascadia Earthquake Hazard	Cascadia Earthquake Expected Shaking: Very strong
Flood Hazard	Outside Effective FEMA Flood Data: None to 500-Year Flood
Volcano Hazard	None to Moderate Mt Hood Hazard Zone
Earthquake Hazard	Expected Earthquake Shaking: Strong to Very Strong Active Faults: Very Strong to Severe Earthquake Liquefaction (Soft Soil) Hazard: Low
Landslide Hazard	None

Notes:
This information is for general information only and should not be used for design.

3.3 Review of USDA Soil Survey

The U.S. Department of Agriculture's (USDA) *Web Soil Survey* (U.S. Department of Agriculture, Natural Resources Conservation Service, 2019) describes the majority of near surface soils as Aloha silt loam, Latourell loam, and Quafeno loam which are suitable for road construction, Approximately 10 percent of the alignment is underlain by Woolent silt loam and Rafton silt loam which may need to be treated for proper street construction.

ODOT's Pavement Design Guide limits the effective modulus to less than 8,000 psi as "this value represents a strong subgrade, which is not commonly encountered in Oregon". Section 4.1 of the Multnomah County Design and Construction Manual uses a subgrade resilient modulus of 3,800 psi for design of "Pavement Standard Sections". Given our experience in the area, Web Soil Survey description, and existing well logs, the preliminary pavement section recommendations provided in Sections 4 uses an effective subgrade modulus of 4,000 psi.

3.4 Review of Well Logs and Subsurface Conditions

As discussed above, no field explorations were completed for this project. We reviewed relevant geotechnical well logs in the vicinity of the current project. The well logs are publicly available from the Oregon Water Resources Department Well Report Query Tool (Oregon Water Resources Department, 2024). The approximate locations of these well logs are shown on the *Site Exploration Plan* (Appendix A, Figure 2A-2P), and a copy of the well logs are attached in Appendix B. The subsurface interpretation considered the geologic information from published sources and the units were grouped based on their engineering properties, geologic origins, and distribution in the subsurface.

The materials encountered below the surface section are interpreted to represent three distinct geotechnical subsurface units of clay and silt, gravels and sandstone as described below. The specific terminology used in our soil descriptions and identifications is defined in Chapter 5 of the ODOT *Geotechnical Design Manual*, dated 2023. The following sections are intended to provide the reader with a general overview of subsurface conditions. Note that site-specific borings have not been completed for this study and therefore this information should be considered preliminary.

3.4.1 Clay, Silt, Silty Sand, and Sand with Silt

Clay, silty clay, silt, silt with sand or cobbles, and silty sand material was encountered in well logs MULT_001379, MULT_54748, MULT_133885, MULT_118138, MULT_128292, and MULT_139047 from below the surface section up to a depth of 16 feet bgs. Well log MULT_139047 was terminated

in these fine-grained soils at a depth of 16 feet bgs. Generally, these soils consisted of clay (CL), silty clay (CL-ML), silt (ML), silt with sand or cobbles (ML), and silty sand (SM).

3.4.2 Missoula Flood Deposits, Coarse-grained

Coarse-grained Missoula Flood Deposits were encountered below the fine-grained material in well logs MULT_001379, MULT_54748, MULT_133885, MULT_109328, MULT_118138, and MULT_128292 to depths between 34 to 317 feet bgs. Well logs MULT_109328, MULT_118138, and MULT_128292 were terminated in these soils at depths between 30 and 40 feet bgs. These soils generally consist of dense to very dense gravelly sand (SP), sandy gravel (GP), and gravel with cobbles (GP).

3.4.3 Hyaloclastic Sandstone of the Troutdale Formation

Sandstone was encountered below the fine-grained material in well log MULT_133885 at 7 feet bgs, and below the flood deposits in MULT_001379 and MULT_54748 at depths between 34 and 317 feet bgs.

3.4.4 Groundwater

When noted, groundwater was encountered between 55 and 61 feet bgs in the reviewed well logs. A review of the USGS Estimated Depth to Groundwater in the Portland, Oregon Area suggests groundwater is between 45 to 65 feet bgs west of NE 223rd Ave, and as shallow as 5 feet bgs east of NE 223rd Ave.

3.5 Review of Previous Project Plans

We reviewed project plans from two previous projects provided to us by ALTA Planning & Engineering. These plan sets are listed below:

- State of Oregon – Department of Transportation, Plans for Proposed Project, Grading, Drainage, Structures, Paving and Signing, NE Portland Highway at NE 201st Avenue and NE 223rd Avenue Section, Northeast Portland Highway, Multnomah County, June 1989, 13 sheets.
- State of Oregon – Department of Transportation, Plans for Proposed Project, Grading, Drainage, Structures, Paving and Signing, 223rd Undercrossing, Sandy Boulevard – Bridge Street, Bridge Number 20321, NE 223rd Avenue, Multnomah County, October 2008, 118 sheets.

NE 201st Avenue Intersection: Sta. 13+27 (MP 16.3) to Sta. 26+97 (MP 16.6)

The existing road was widened approximately 10 feet on both sides from Sta. 13+27 to 16+42, Sta. 16+42 to 17+45, Sta. 19+90 to 23+82, and from Sta. 23+82 to 26+97. The existing road was indicated to be constructed as 26 feet wide concrete slab. The concrete slab thickness was not reported. For the road widening sections, a 12-inch-thick cement treated base (CTB) capped with a 2-inch-thick asphalt concrete base course was indicated. The entire road was then capped with a 2-inch-thick nominal asphalt concrete wearing course. The asphalt concrete was reported to be class C mix.

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The existing road was widened approximately 26 feet on the south side and 4 feet on the north side from Sta. 17+25 to 18+45 and from Sta. 18+45 to 19+90. The existing road was indicated to be constructed as 26 feet wide concrete slab. The slab thickness was not reported. For the road widening sections, a 12-inch-thick cement treated base (CTB) capped with a 2-inch-thick asphalt concrete base course was indicated. The entire road was then capped with a 2-inch-thick nominal asphalt concrete wearing course. The asphalt concrete was reported to be class C mix.

NE 223rd Avenue Intersection: Sta. 382+00 (MP 17.5) to Sta. 386+50 (MP 17.6)

The existing road was widened approximately 2- to 4- feet on the north side from Sta. 382+00 to 382+40, and Sta. 382+40 to 383+30. The existing road is indicated to be 30 feet wide asphalt concrete pavement. The asphalt concrete and base rock thickness was not reported. For the road widening sections, a 12-inch-thick cement treated base (CTB) capped with a 2-inch-thick asphalt concrete base course was indicated. The entire road was then capped with a 2-inch-thick nominal asphalt concrete wearing course. The asphalt concrete was reported to be class C mix.

The existing road was widened approximately 4 feet on the north side and 16 feet on the south side from 383+20 to 384+40, and Sta. 384+40 to 386+50. The existing road is indicated to be 30 feet wide asphalt concrete pavement. The asphalt concrete and base rock thickness was not reported. For the road widening sections, a 12-inch-thick cement treated base (CTB) capped with a 2-inch-thick asphalt concrete base course was indicated. The entire road was then capped with a 2-inch-thick nominal asphalt concrete wearing course. The asphalt concrete was reported to be class C mix.

NE 223rd Avenue from Bridge Street to NE Sandy Boulevard Plans:

The Sandy Boulevard – Bridge Street project plans show widening of NE 223rd Avenue form Bridge Street to NE Sandy Boulevard including the new railroad bridge over NE 223rd Avenue. The pavement section for NE 223rd Avenue south of its intersection with NE Sandy Boulevard consists of 6 inches of asphalt concrete over 15 inches of aggregate base rock. A subgrade geotextile is shown below the aggregate base rock above the native subgrade. A grind and inlay of 2 inches of asphalt concrete is also shown on the areas where full reconstruction was not used. The sidewalk sections are indicated to be per ODOT Standard Drawing RD720.

We also reviewed the Foundation Data for the bridge, Sheet 3 of 18 of the plan set (Drawing Number 72551). Test borings BH-1 and BH-2 were drilled, one near each abutment. Fill was encountered in each of the borings to a depth of 5 to 6 feet underlain by medium dense silty sand to a maximum depth of 10 feet below ground surface. Very dense silty gravel, sandy gravel and gravel with possible cobbles were encountered to a depth of approximately 40 feet bgs underlain by Troutdale formation to the depth of exploration (± 60 feet bgs). This Foundation Data sheet is attached in Appendix B.

4.0 PREMLIMINARY PAVEMENT DESIGN RECOMMENDATIONS

Planned improvements for this project includes sidewalk improvements, bike lanes, and drainage improvements. Any new pavement and/or grind and inlay will be incidental to these improvements. The new pavement design was completed in accordance with the procedures provided in 1993 AASHTO *Guide for Design of Pavement Structures* (AASHTO Guide) (American Association of State Highway and Transportation Officials, 1993), the 2019 Oregon *Pavement Design Guide* (ODOT Guide) (State of Oregon, Department of Transportation, Pavement Services Unit, 2019), and the Multnomah County Design and Construction Manual, Chapter 4. The NE Sandy Boulevard is classified as Arterial Street per Multnomah County. The following sections describe our understanding of the existing pavement, pavement distress survey and pavement design.

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4.1 Pavement Distress Survey

The existing pavement was visually surveyed to characterize surface distress, with specific attention given to identify areas of distress indicative of structural or subgrade failure. Table C1 of Appendix C summarizes the various failure modes of the pavement. Figures 2A through 2P shows the observed pavement distress. A summary of the pavement distress survey and photographs are also provided in Appendix C.

We also reviewed the Pavement Condition Index (PCI) data provided by Multnomah County from their GIS database. The PCI rating from 201st Avenue to 207th Avenue is 40.1 which indicates that the pavement is in poor condition. This area should be further evaluated by additional coring and testing to determine if a full reconstruction or pavement overlays are required. The PCI of the pavement from NE 207th Avenue to NE 223rd Avenue is indicated as 52.8 which is at the borderline between poor to fair. This area should also be further evaluated for overlays and/or full reconstruction. The PCI of the pavement from NE 223rd Avenue to NE 230th Avenue is indicated as 76.6 which is satisfactory and therefore no repairs are required.

4.2 Traffic Loading

Two-way Traffic counts were provided to us by ALTA as 12,423 for 201st Avenue to Fairview Parkway for the year 2023. Note that classification counts are not available. We therefore performed pavement design for several scenarios assuming truck percentages and the distribution of the truck axles. We also reviewed the current TriMet Bus Scheduled which indicates 31 buses per day on this section of NE Sandy Boulevard. The ESALs for arterial streets in Multnomah County is a minimum of 2.1 Million. Pavement design for these various scenarios are provided in the section below.

4.3 Subgrade Resilient Modulus

The definitive material property used to characterize the roadbed soil for pavement design is the resilient modulus (M_R). The resilient modulus is a measure of the elastic property of soil recognizing certain nonlinear characteristics. The resilient modulus is used directly for the design of flexible pavements. Given our experience in the area, Web Soil Survey description, and existing well logs, the preliminary pavement section recommendations uses an effective subgrade modulus of 4,000 psi. Section 4.1 of the Multnomah County Design and Construction Manual uses a subgrade resilient modulus of 3,800 psi for “Pavement Standard Sections”.

4.4 Pavement Design Parameters

The pavement design input parameters for Sandy Boulevard are summarized in Table 2.

Table 2. Pavement Design Input Parameters

Parameter	Value	Reference
Design Period (New Pavement)	20 Years	MultCo Design & Construction Manual
ESAL Loading (New Pavement)	Varies (1.8 to 7.2 Million)	MultCo Design & Construction Manual
ESAL Loading (Pavement Rehabilitation)	1,300,000	MultCo Design & Construction Manual
Design Reliability	90%	MultCo Design & Construction Manual
Flexible Pavement Standard Deviation	0.45	MultCo Design & Construction Manual
New AC Layer Coefficient	0.42	MultCo Design & Construction Manual
Aggregate Base Layer Coefficient	0.12	MultCo Design & Construction Manual
Initial Serviceability	4.2	MultCo Design & Construction Manual
Terminal Serviceability	2.5	MultCo Design & Construction Manual

Parameter	Value	Reference
Subgrade Resilient Modulus	4,000 psi	Assumed based on soil type
Aggregate Base Modulus	21,500 psi	MultCo Design & Construction Manual
Aggregate Drainage Coefficient	1	MultCo Design & Construction Manual

4.5 Recommended Pavement Section - Pavement Widening

The calculated structural numbers (SN) for the new pavement design scenario are presented below for Outer Sandy Boulevard in Table 3. This design is applicable for widening anywhere along the project alignment.

Table 3. Outer Sandy Boulevard Recommended New Pavement Section

Assumed Truck Percentage	Traffic ESALs	SN above Base Rock	SN above Soil Subgrade	Calculated ACP (inch)	Calculated Base Rock (inch)
5%	1,830,000	2.58	4.80	7	16
NA	2,100,000[1]	2.62	4.89	7	17
10%	3,170,000	2.80	5.19	8	16
15%	4,500,000	2.97	5.45	8.5	16
20%	5,900,000	3.11	5.65	9	16
25%	7,200,000	3.22	5.80	9	17

[1]: Minimum ESALs per Multnomah County
[2]: Number of trucks determined by multiplying AADT by percentage of trucks. The trucks are further divided into various axle classes using statistical provided by The Asphalt Institute. Thirty-one buses per day are also included in ESAL calculations.
[3]: Classification counts are recommended to evaluate the truck percentage and truck distribution for determining appropriate pavement design ESALs.

Based on the data presented in the above table, for the pavement on Sandy Boulevard we recommend the following pavement sections:

- 2.0-inch thick, Level 3, 1/2” Dense ACP PG 64-22 Wearing Course (One 2.0-inch lift)
- 5.0 to 7.0-inch thick, Level 3, 1/2” Dense ACP PG 64-22 Base Course (2.0-inch to 3.0-inch lifts)
- 16.0- to 17-inch thick, 1-inch-minus Dense-Graded Aggregate Base
- Subgrade Geotextile

4.6 Grind and Inlay Recommendations

We understand that cold plane pavement removal (CPPR)/milling and inlay is currently not planned for the project. We have, however, provided these preliminary recommendations for budget estimating only if some areas need grind and inlay for matching new pavement. For cost estimating purposes, a preliminary pavement inlay depth of 2 inches is recommended per Section 7.7 of ODOT’s *Pavement Design Guide*.

4.7 Subgrade Stabilization

If it is not feasible to compact the subgrade or if soft conditions or unsuitable soil are encountered due to wet weather, subgrade stabilization should be accomplished in lieu of subgrade compaction.

The subgrade stabilization should consist of a minimum of 12 inches of 1-inch-minus dense graded aggregate base over a subgrade geotextile.

4.8 Recommend Materials and Specifications

The recommendations listed in the table below pertain to the 2024 Oregon Standard Specification for Construction (ODOT-SS) (Oregon Department of Transportation, 2024).

Table 4. Recommended Pavement Material Specifications

Material	Specification
Subgrade Geotextile	Subgrade Geotextile with Level B certification. Geotextile must satisfy Section 02320 Table 02320-4
12-inch Subgrade Stabilization	Use Aggregate Subbase Material for backfill. Excavate using hoe type equipment with smooth cutting edges. Wheeled construction equipment shall not be allowed on the unprotected subgrade. Place subgrade geotextile on the excavated subgrade immediately after the subgrade is approved. Compact backfill material by non-vibratory rolling.
Aggregate Base	1-inch-minus Dense-Graded Aggregate Base. Refer to section 00641 (OPDOT SS)
Level 3, ½ inch Dense ACP	Lime or Latex Polymer treatment of aggregate is not required. Refer to Section 00745
Asphalt Binder	Use PG 64-22 Asphalt Binder
Tack Coat	CSS-1 or CSS-1h per section 00730

4.9 Pedestrian Sidewalks and Shared Use Paths Using Permeable Pavement

We understand that sidewalks, bicycle trails, and shared use paths may be included in the project. If permeable pavements are considered for construction of these assets, the following preliminary pavement design thickness recommendations should be used:

- 6.0-inch-thick permeable pavement
- 6.0-inch-thick permeable base

The concrete sidewalk can be specified using ODOT Standard Drawing RD 720. The minimum concrete and aggregate base rock shall be 4 inches and 6 inches respectively.

5.0 ADDITIONAL GEOTECHNCIAL / PAVEMENT INVESTIGATION

Note that this review is based on a desktop study only. The recommendations provided in this report should be considered preliminary. A geotechnical/pavement investigation program should be implemented for the final design of the project. This will include field investigation including pavement coring, borings, dynamic cone penetration tests and supporting laboratory testing. The collected data should be analyzed to develop pavement design recommendations and construction considerations.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of the addressee and engineers, and for aiding in the planning of the proposed alignment improvements. This report should not be used for final design of the project. The opinions, comments, and conclusions presented in this report were based upon information derived from our literature review. Additional field investigation should be completed before the final design of the project.

7.0 RESTRICTIONS

This report is for the exclusive use of the client for design of the development, as described in our proposal for this particular project, and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the client and ROL.

Sincerely,
Rhino One LLC

Peter Hughes, CEG
Engineering Geologist

Rajiv Ali, PE GE (OR)
Principal Geotechnical Engineer

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8.0 REFERENCES

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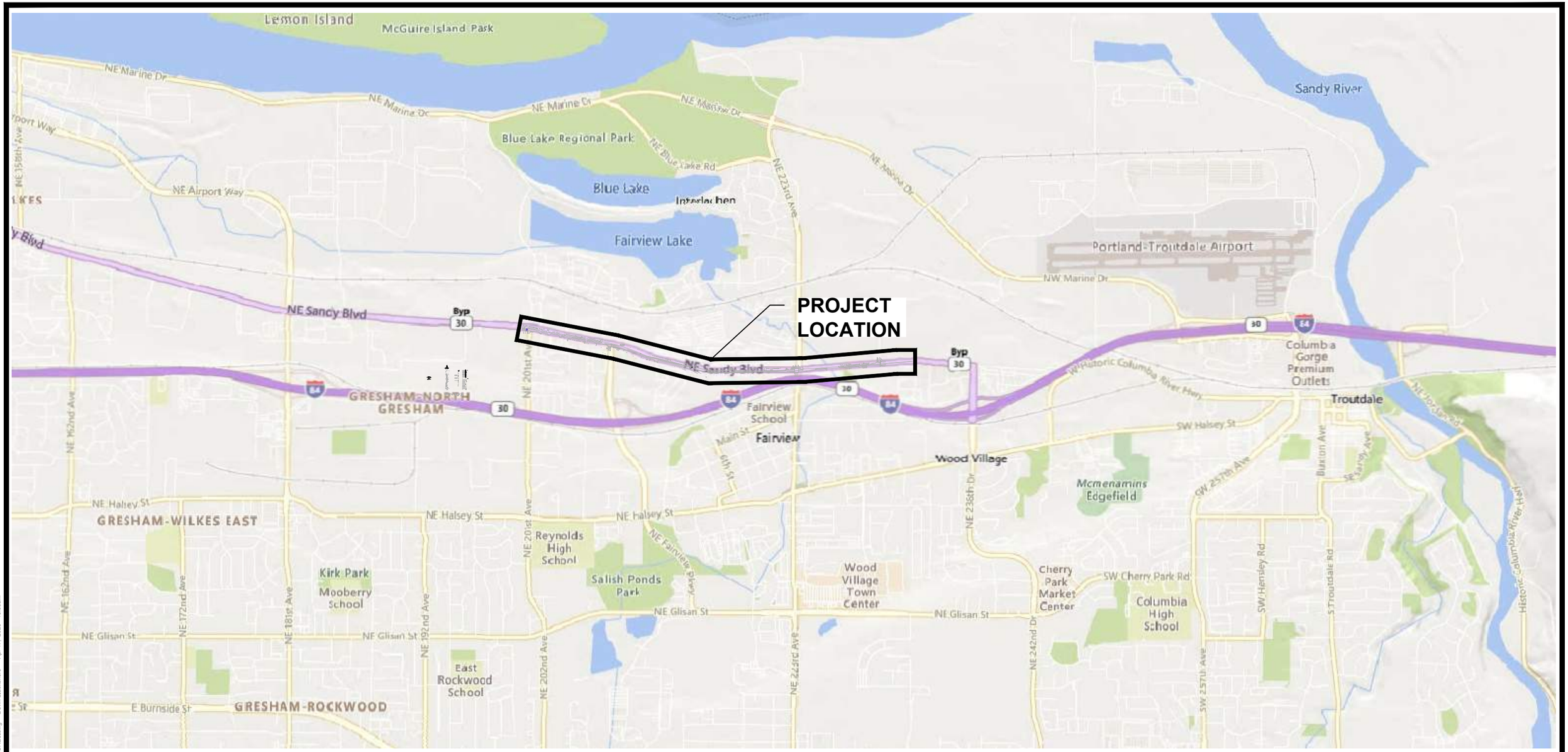
APPENDIX A

Figure 1: Site Vicinity Map
Figures 2A-2P: Site Exploration Plans



RhinoOne GEOTECHNICAL

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OUTER SANDY BOULEVARD

SANDY BOULEVARD
PORTLAND, OREGON

FIGURE 1 - SITE VICINITY MAP

PROJECT
ALTA-2024-005

DATE
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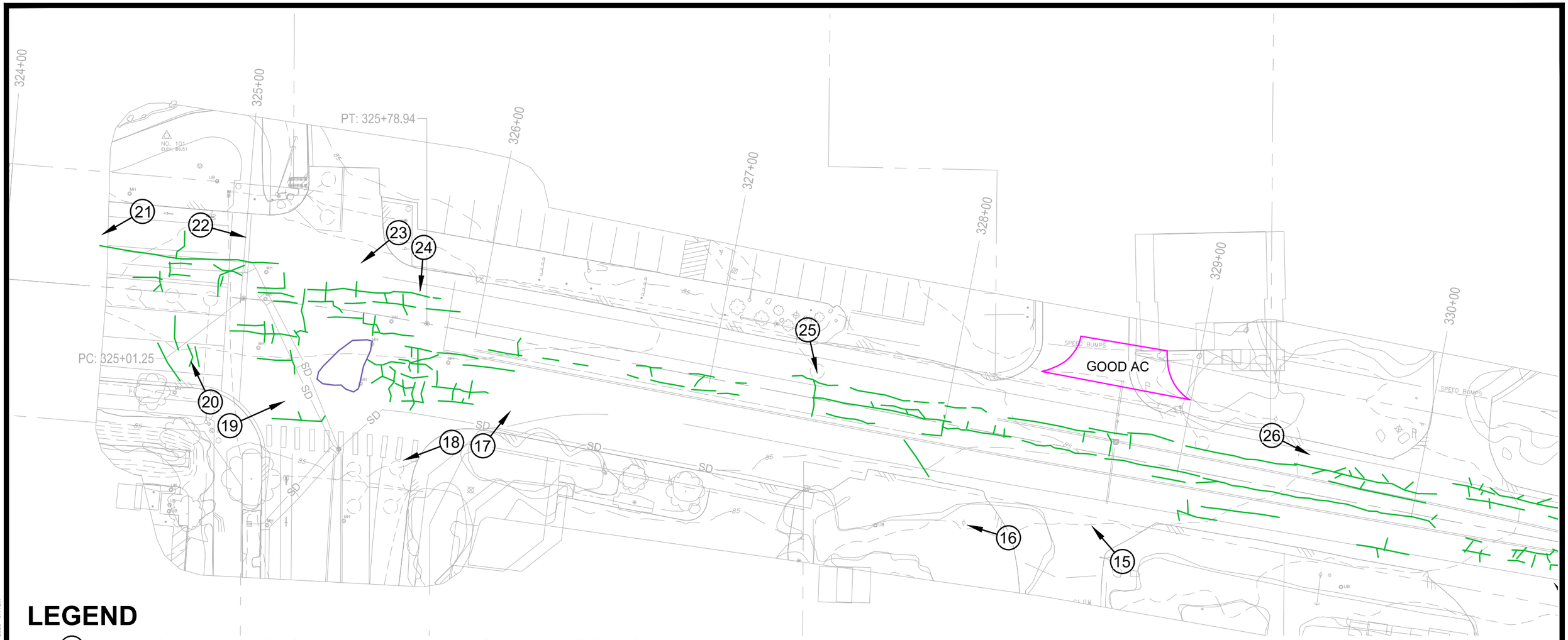

LEGEND

- (#) → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- & LONGITUDINAL AND TRANSVERSE CRACK
- CONCRETE PAVEMENT OR POTHOLE PATCH
- OLD ASPHALT PATCH
- SEALED ASPHALT CRACK
- TRANSVERSE JOINT
- NEW ASPHALT PAVEMENT

0 40 80 Feet

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Vancouver, WA 98683
360-258-1738

OUTER SANDY BOULEVARD

SANDY BOULEVARD
PORTLAND, OREGON

PROJECT
ALTA-2024-005

FIG 2A - SITE EXPLORATION PLAN

DATE
APR 2025

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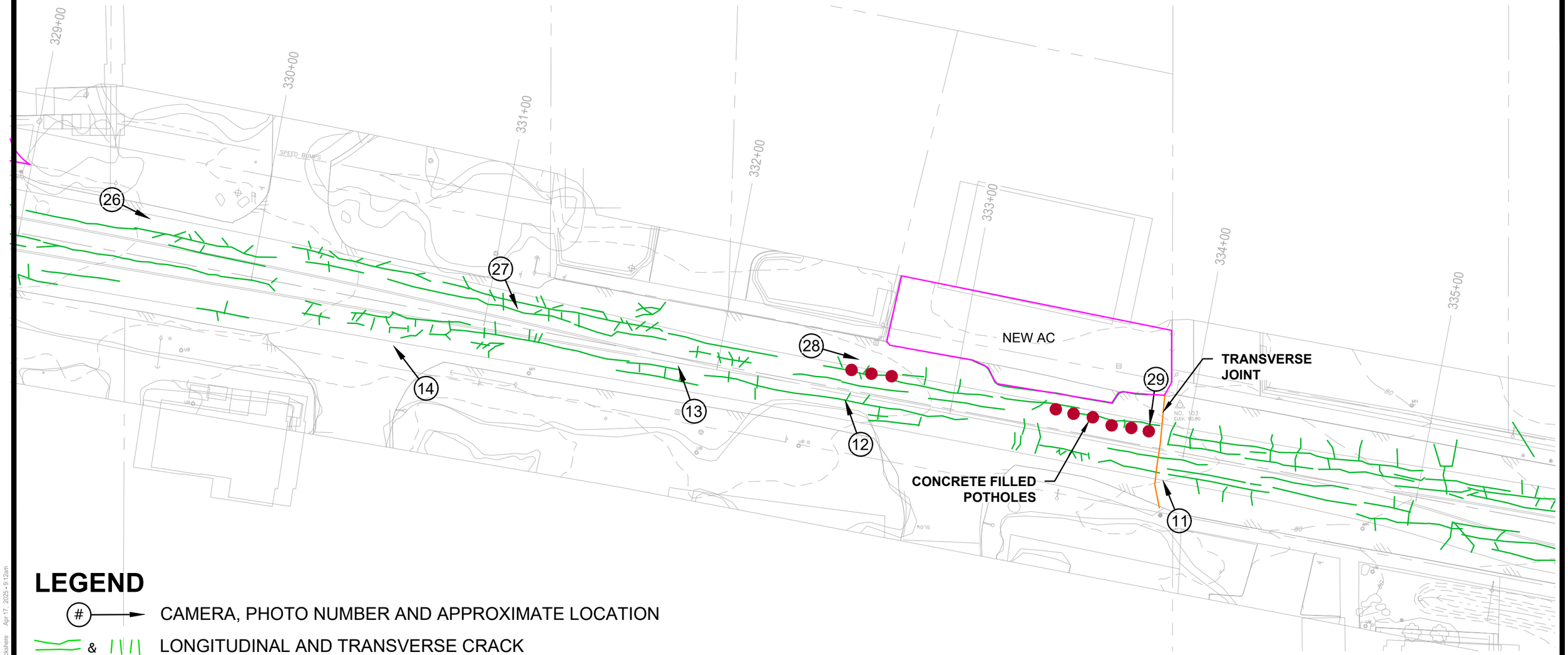

LEGEND

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- & LONGITUDINAL AND TRANSVERSE CRACK
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0 40 80 Feet

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FIG 2B - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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LEGEND

- (#) → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- & LONGITUDINAL AND TRANSVERSE CRACK
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- NEW ASPHALT PAVEMENT

0 40 80 Feet

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FIG 2C - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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LEGEND

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- & LONGITUDINAL AND TRANSVERSE CRACK
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FIG 2D - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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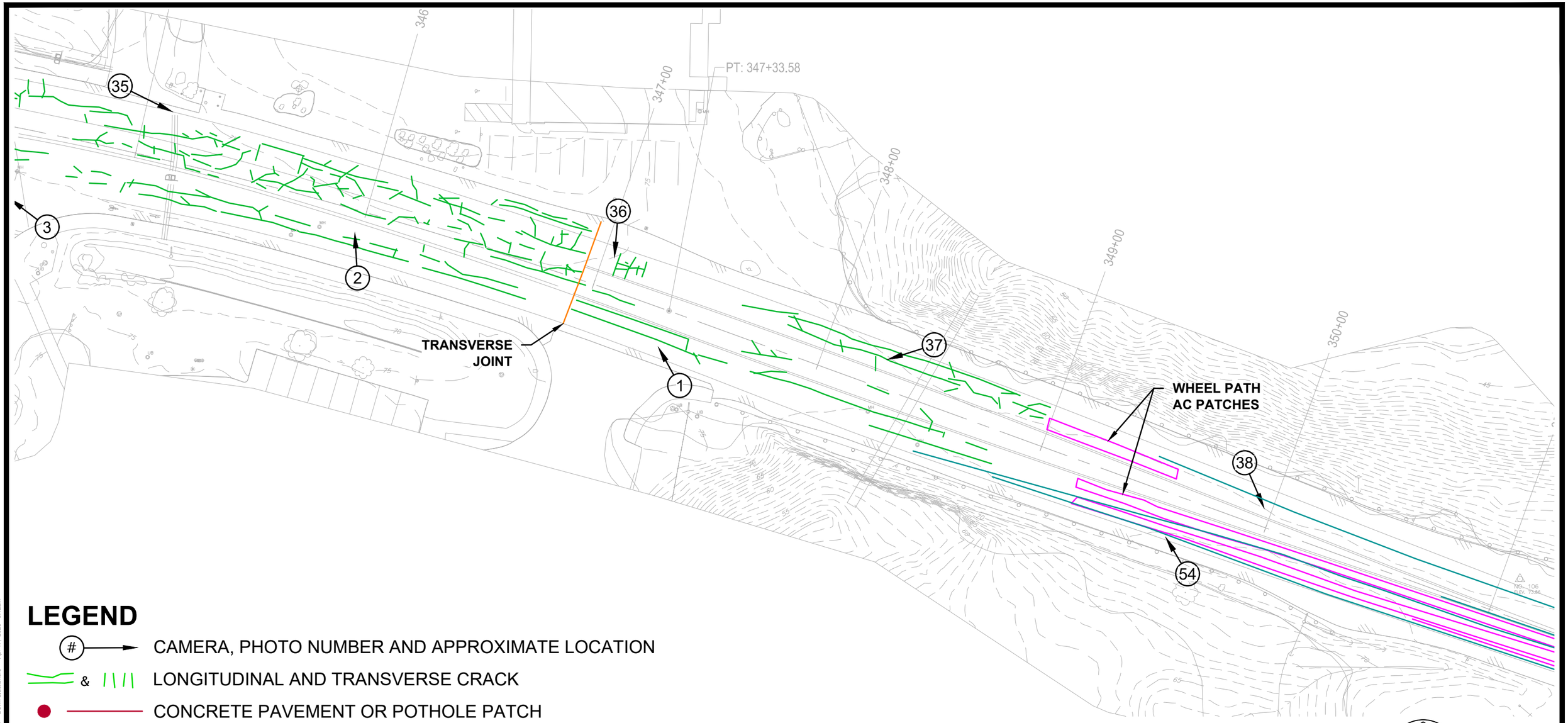

LEGEND

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- & LONGITUDINAL AND TRANSVERSE CRACK
- CONCRETE PAVEMENT OR POTHOLE PATCH
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- TRANSVERSE JOINT
- NEW ASPHALT PAVEMENT

0 40 80 Feet

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FIG 2E - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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PC: 351+51.91

352+00

353+00

354+00

355+00

356+00

39

53

52

UTILITY AC PATCH

WHEEL PATH AC PATCHES

TRANSVERSE JOINT

51

40

50

SD

SD

PT: 353+70.63

POSSIBLE UNDERGROUND FEATURE

LEGEND

- # → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- & LONGITUDINAL AND TRANSVERSE CRACK
- CONCRETE PAVEMENT OR POTHOLE PATCH
- OLD ASPHALT PATCH
- SEALED ASPHALT CRACK
- TRANSVERSE JOINT
- NEW ASPHALT PAVEMENT

B2 (Mult_132351)

0 40 80 Feet

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FIG 2F - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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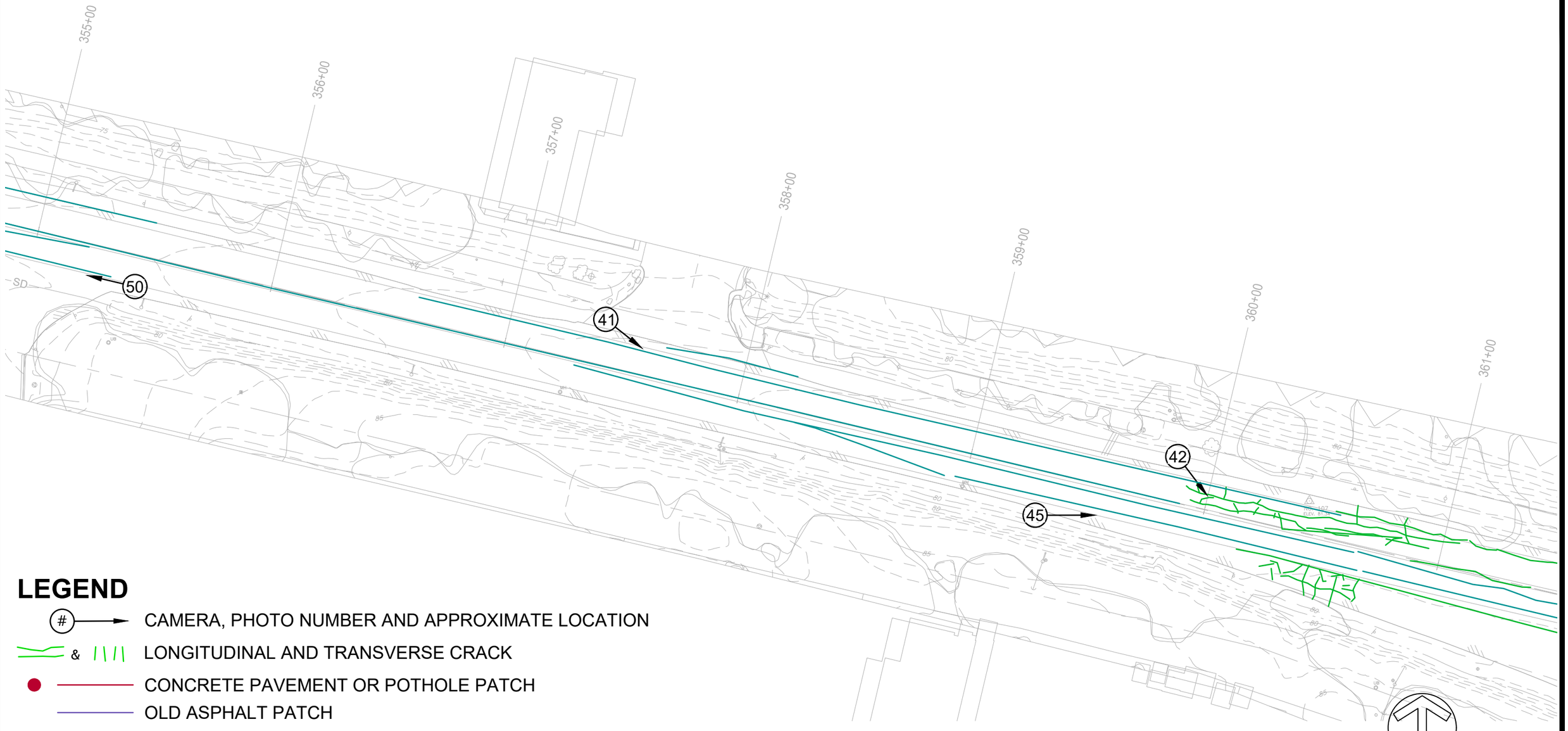

LEGEND

- (#) → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- LONGITUDINAL AND TRANSVERSE CRACK
- CONCRETE PAVEMENT OR POTHOLE PATCH
- OLD ASPHALT PATCH
- SEALED ASPHALT CRACK
- TRANSVERSE JOINT
- NEW ASPHALT PAVEMENT

0 40 80 Feet

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FIG 2G - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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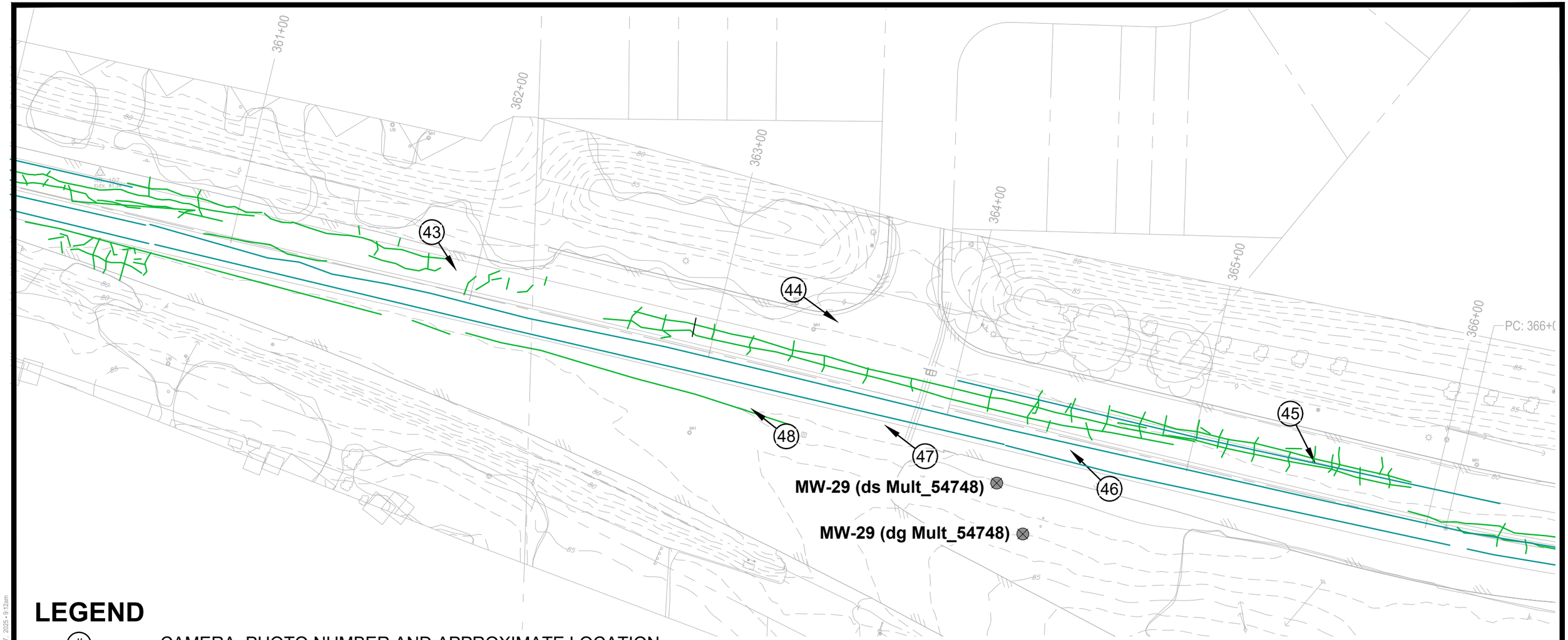

LEGEND

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0 40 80 Feet

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PROJECT
ALTA-2024-005

FIG 2H - SITE EXPLORATION PLAN

DATE
APR 2025

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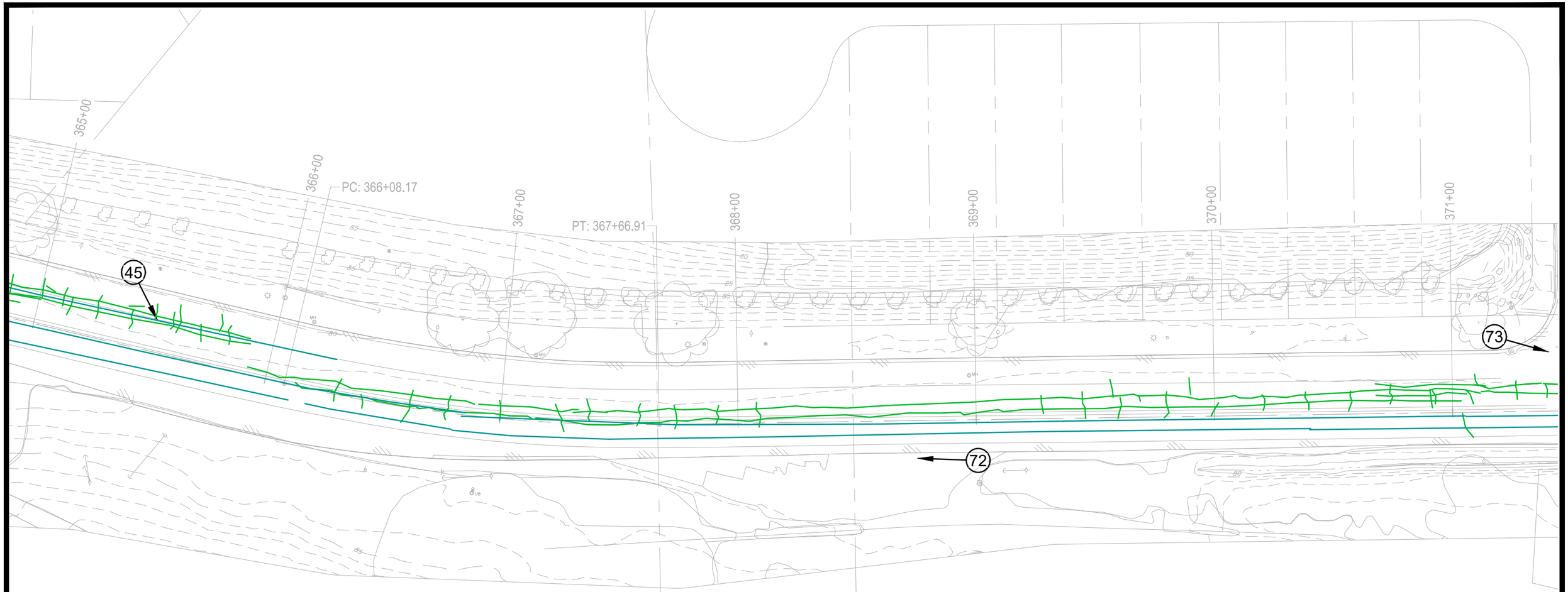

LEGEND

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- NEW ASPHALT PAVEMENT

0 40 80 Feet

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PORTLAND, OREGON

PROJECT
ALTA-2024-005

FIG 2I - SITE EXPLORATION PLAN

DATE
APR 2025

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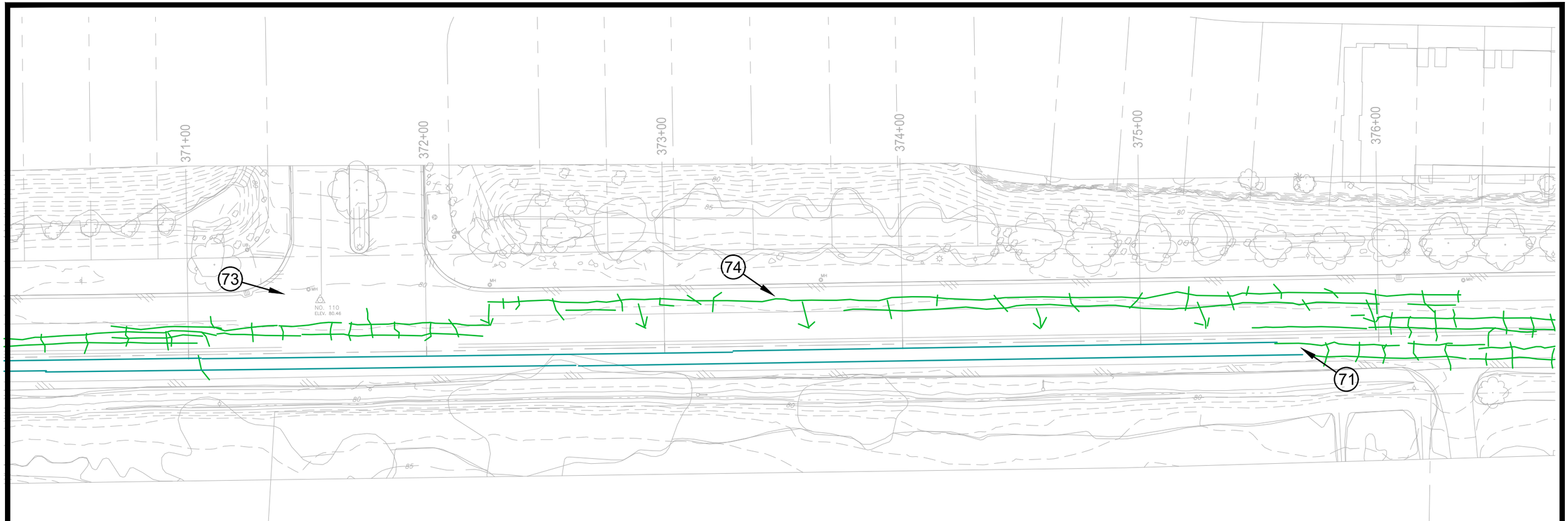

LEGEND

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0 40 80 Feet

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FIG 2J - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
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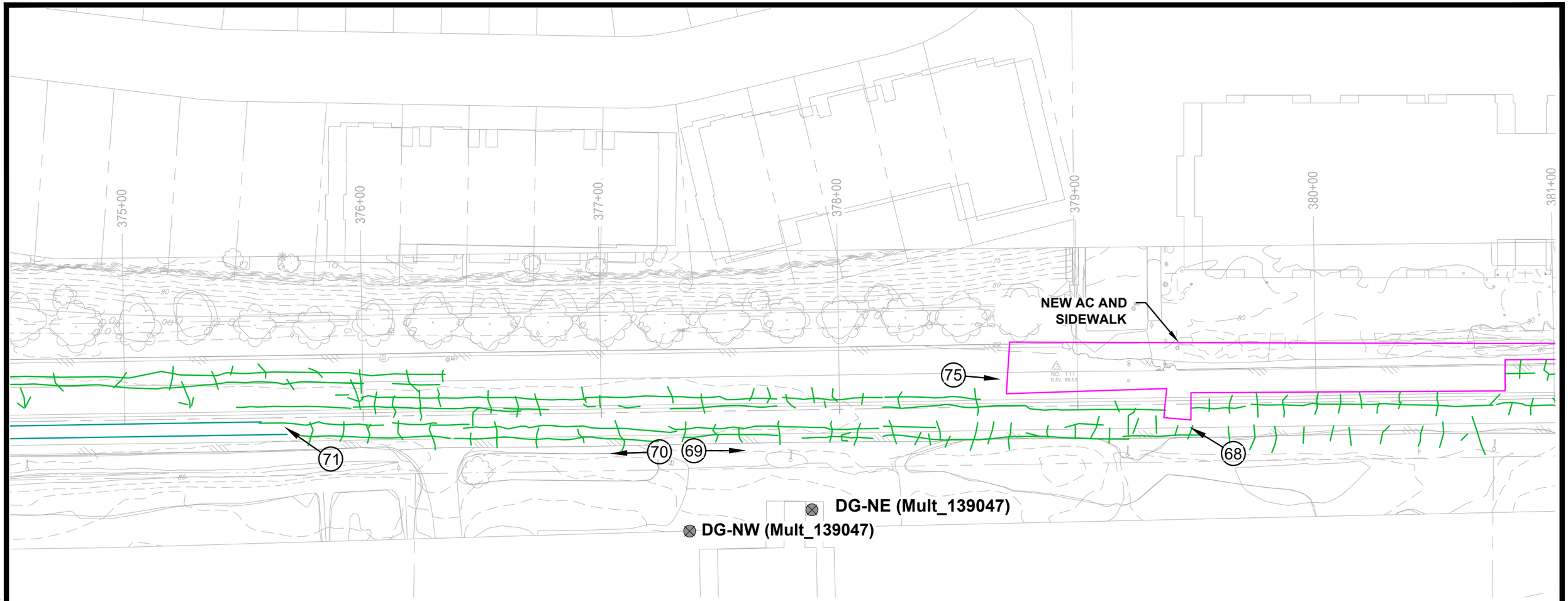

LEGEND

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0 40 80 Feet

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FIG 2K - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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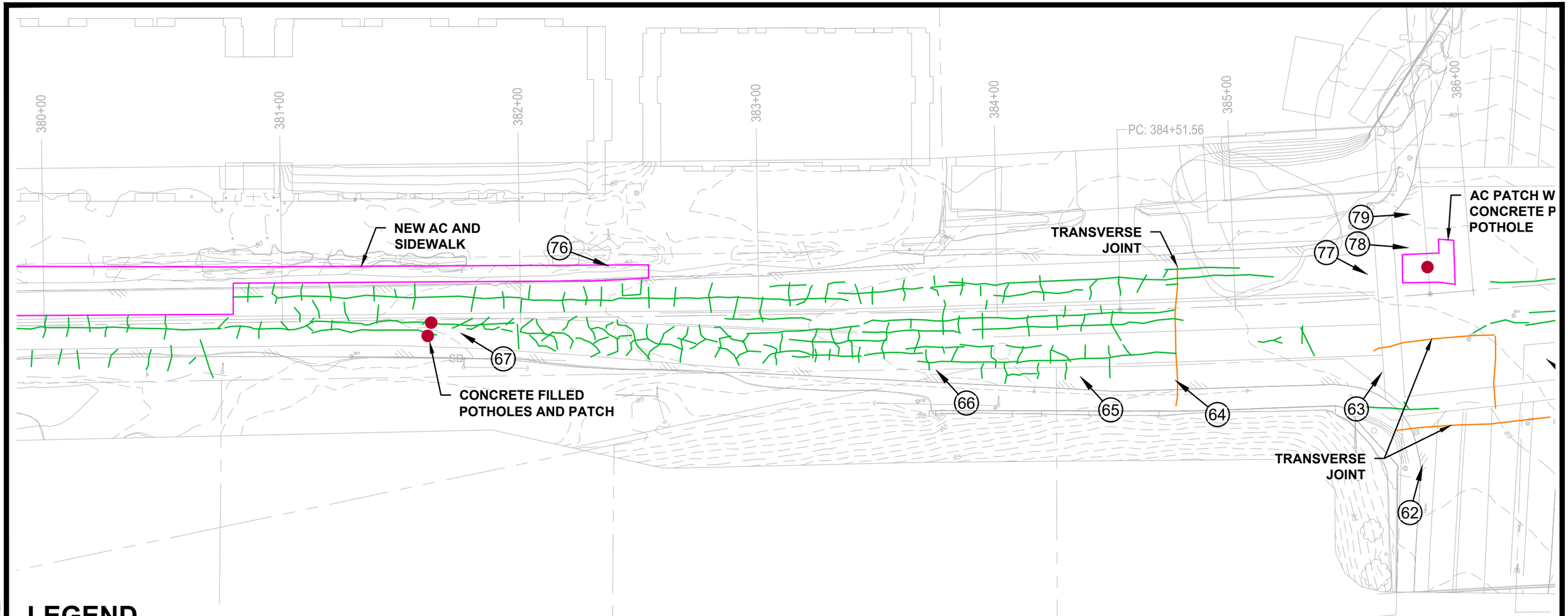

LEGEND

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0 40 80 Feet

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FIG 2L - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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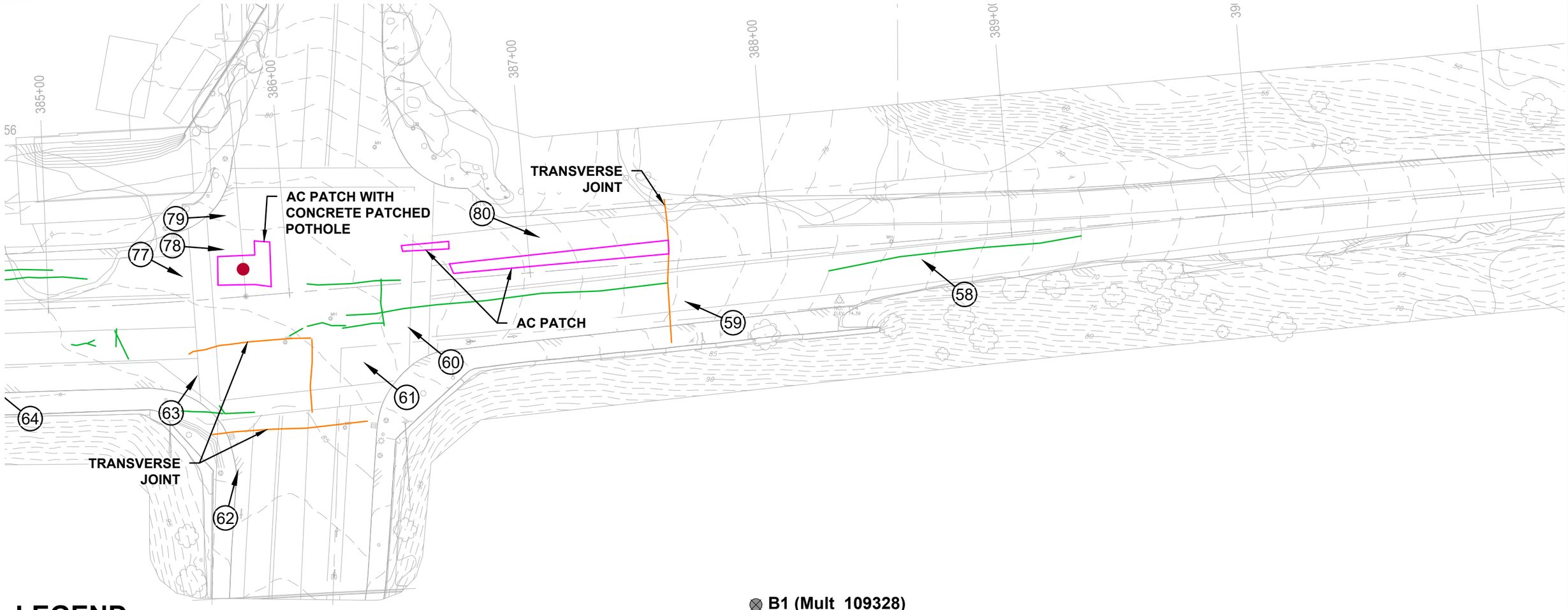

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LEGEND

- (#) → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- & LONGITUDINAL AND TRANSVERSE CRACK
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0 40 80 Feet

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FIG 2M - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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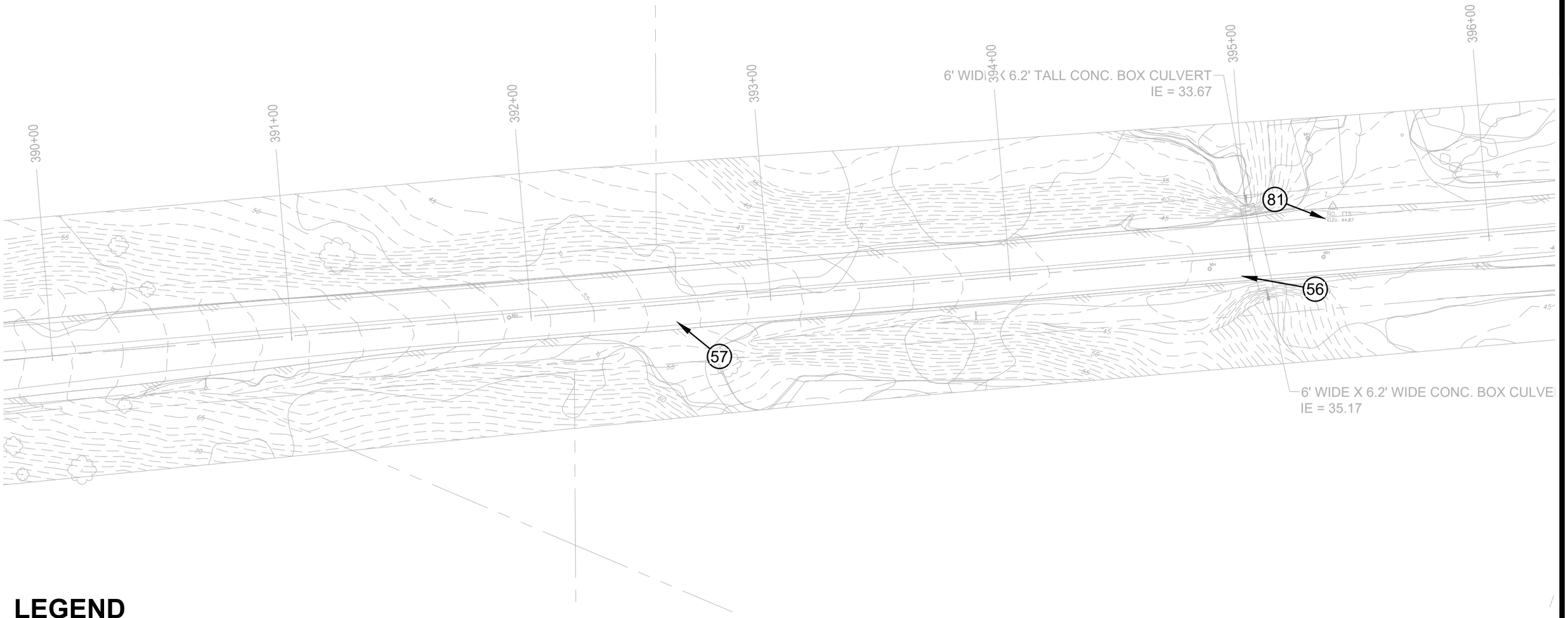

LEGEND

- (#) → CAMERA, PHOTO NUMBER AND APPROXIMATE LOCATION
- & LONGITUDINAL AND TRANSVERSE CRACK
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FIG 2N - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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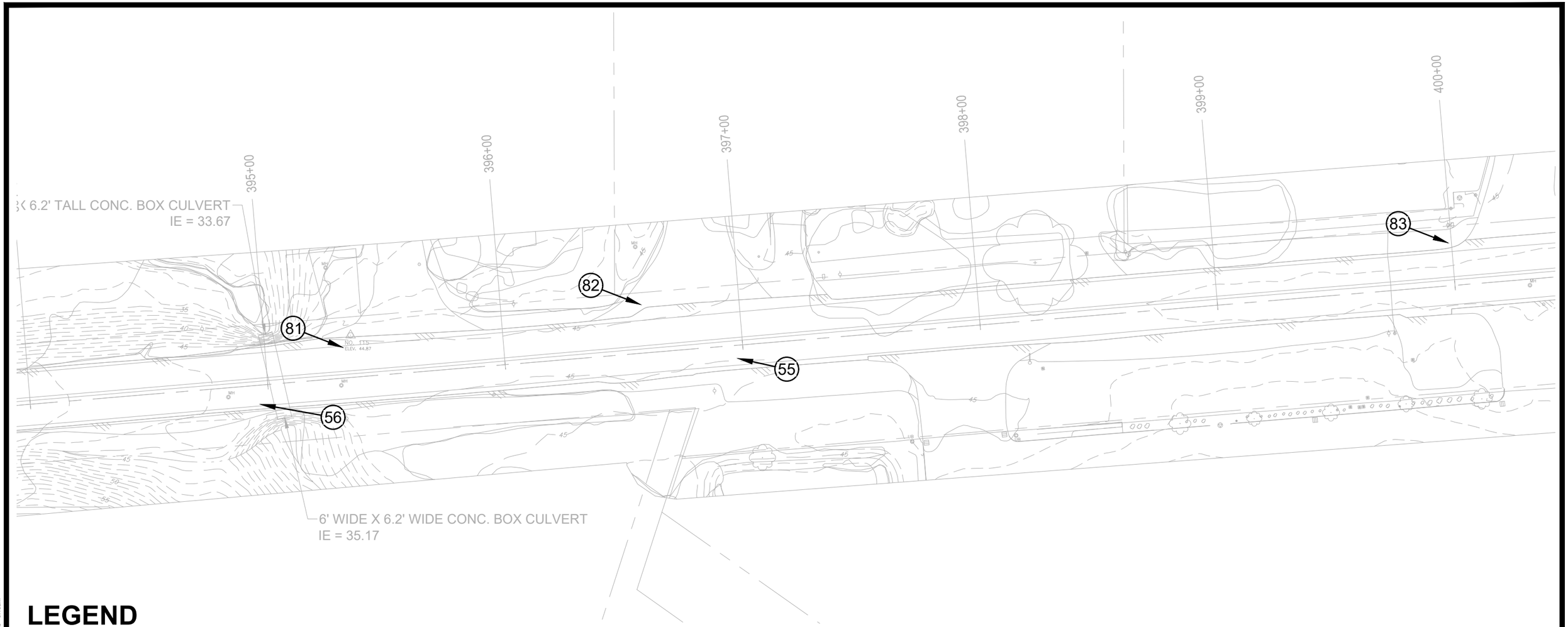

LEGEND

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0 40 80 Feet

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PROJECT
ALTA-2024-005

FIG 2O - SITE EXPLORATION PLAN

DATE
APR 2025

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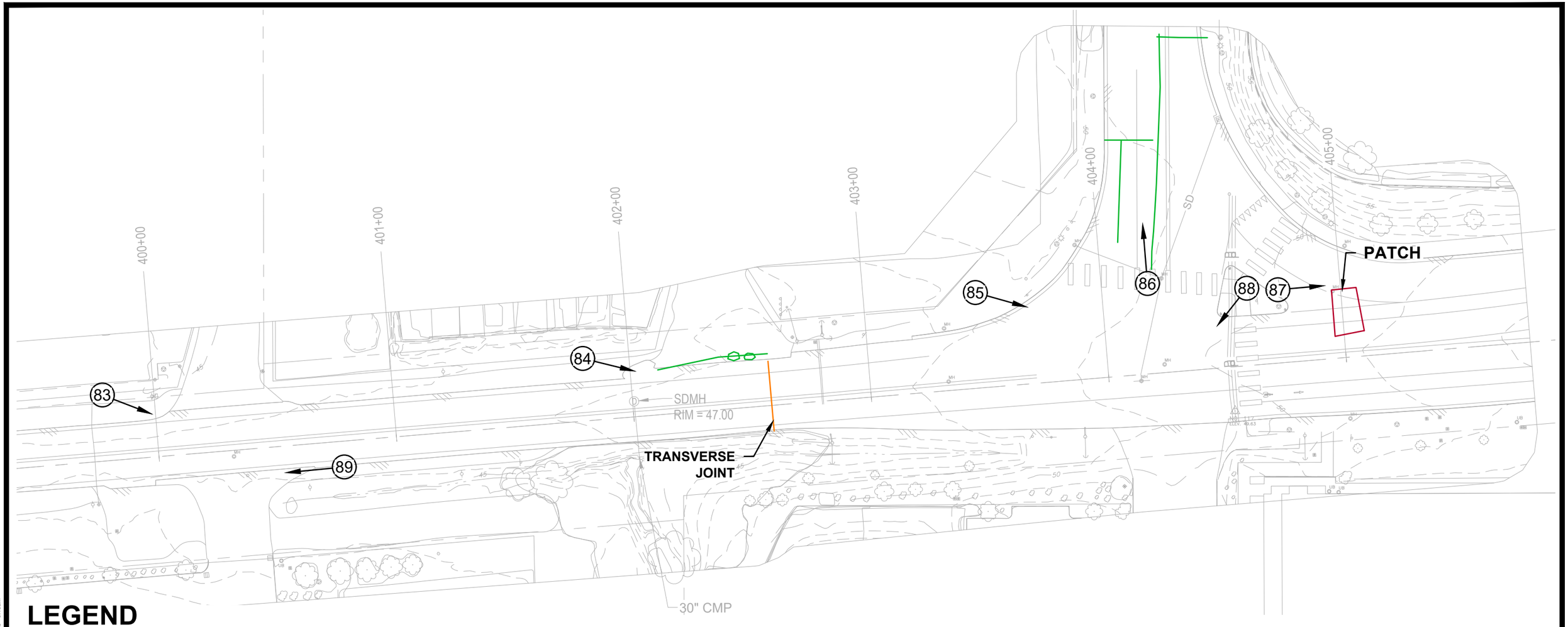

LEGEND

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0 40 80 Feet

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FIG 2P - SITE EXPLORATION PLAN

PROJECT
ALTA-2024-005

DATE
APR 2025

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DRAFT

APPENDIX B

Well Logs
Foundation Data Sheet

RIGINAL
le Original and
uplicate with the
STATE ENGINEER,
SALEM, OREGON

RECEIVED
JAN 12 1960
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

MUL 06139

State Well No. ~~4~~ 1N/3E-28

State Permit No. .....

(1) OWNER:
Name Wil-O-Dell
Address RT 2 BOX 362
Troutdale, Oregon

(2) LOCATION OF WELL:
County Multnomah Owner's number, if any—
¼ ¼ Section T. 1N R. 3E W.M.
Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☑ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☑ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☑
10" Diam. from 0 ft. to 354 ft. Gage STD
..." Diam. from ... ft. to ... ft. Gage ...
..." Diam. from ... ft. to ... ft. Gage ...

(7) PERFORATIONS:
Perforated? ☐ Yes ☑ No
Type of perforator used
SIZE of perforations in. by in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

(8) SCREENS:
Well screen installed ☑ Yes ☐ No
Manufacturer's Name Johnson & Cook
Type Wire wound Model No. ...
Diam. 10" Slot size .50 Set from 353 ft. to 358 ft.
Diam. 10 Slot size .40 Set from 358 ft. to 368 ft.

CONSTRUCTION:
Was well gravel packed? ☐ Yes ☑ No Size of gravel: ...
Gravel placed from ... ft. to ... ft.
Was a surface seal provided? ☑ Yes ☐ No To what depth? 9 ft.
Material used in seal— Drill cuttings dumped outside
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 55 ft. below land surface Date 12-11-59
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] E. P. Wade (Owner) Date Dec. 14, 1959

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☑ Yes ☐ No If yes, by whom? Driller
Yield: 450 gal./min. with 62 ft. drawdown after 4 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG:
Diameter of well 10 inches.
Depth drilled 368 ft. Depth of completed well 368 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	2
Clay	2	4
Cemented gravel & Sand	4	29
Cemented gravel	29	65
Cemented sand & gravel	65	71
Cemented gravel	71	86
gravel & water Water at 309 ft.	86	93
Cemented gravel	93	135
Cemented black sand	135	198
Cemented brown gravel	198	201
Cemented Sand	201	213
Cemented gravel	213	232
Cemented sandy gravel & clay	232	241
Sandstone	241	252
brown cemented gravel	252	265
" " Sand	265	285
Cemented gravel	285	309
Sandy clay	309	317
black sandstone	317	336
Sandy clay	336	340
black Sandstone	340	347
Sand & water	347	368
Most of this formation below 86 ft Yields some water		

Work started 11-2 1959 Completed 12-12 1959

(13) PUMP:
Manufacturer's Name ...
Type: ... H.P. ...

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME George Zent & Son (Person, firm, or corporation) (Type or print)
Address 4305 NE 44th St. Vancouver Wash.
Driller's well number ...
[Signed] George Zent (Well Driller)
License No. 228 Date 11-12, 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

STATE OF OREGON

MONITORING WELL REPORT

(as required by ORS 537.765 & OR 690-240-095) MULT 54748 Page 1 of 2

RECEIVED WELL ID # N/A

Start Card # 65307

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

(1) OWNER/PROJECT: WELL NO. MW-29 dg

Name Cascade Corp

Address P.O box 20187

City Portland State OR Zip 97220

(2) TYPE OF WORK:

RECEIVED

FEB 17 1998

WATER RESOURCES DEPT SALEM, OREGON

[X] New construction [ ] Alteration (Repair/Recondition)

[ ] Conversion [ ] Deepening [ ] Abandonment

(3) DRILLING METHOD

[X] Rotary Air [ ] Rotary Mud [ ] Cable

[ ] Hollow Stem Auger [ ] Other

(6) LOCATION OF WELL By legal description

Well Location: County Mult.

Township 1N (N or S) Range 3E (E or W) Section 28

1. S.E. 1/4 of N.E. 1/4 of above section.

2. **Either** Street address of well location Sandy blvd

or Tax lot number of well location N/A

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

(7) STATIC WATER LEVEL:

63 Ft. below land surface. Date 3-20-95

Artesian Pressure _____ lb/sq. in. Date _____

(4) BORE HOLE CONSTRUCTION

Special Standards [ ] Yes [X] No Depth of completed well 217 ft.

Land surface

Vault 0 ft. TO 1.5 ft.

Seal 1.5 ft. TO 199 ft.

Filter pack 207 ft. TO 217 ft.

Water-tight cover

Surface flush vault

Locking cap

Casing diameter 4 in. material sch 40 PVC

Welded [ ] Threaded [X] Glued [ ]

Liner diameter N/A in. material _____

Welded [ ] Threaded [ ] Glued [ ]

Well seal: Material bent grout Amount 136 sacks Grout weight 9.5 lbs

Borehole diameter 9 in.

Bentonite plug at least 3 ft. thick

Screen material sch 40 PVC interval(s): From 205 To 215 From _____ To _____

Slot size 0.010 in.

Filter pack: Material CSSI Size 10-20 in.

Sump 215-217

(8) WATER BEARING ZONES:

Depth at which water was first found 90

From	To	Est. Flow Rate	SWL
90	217	400 gpm	63

(9) WELL LOG: Ground elevation N/A

Material	From	To	SWL
Silt & Cobbles	0	12	
Sandy gravel yel/brown	12	30	
Sandy gravel gray	30	34	
Sandstone gray/brown	34	45	
Siltstone drk brown	45	52	
Sandstone green	52	78	
Siltstone light gray	78	90	
Sandstone gray/brown	90	103	
Sandstone yel/brown	103		
with gravel		164	
Cong. gray/blk	164	176	
Sand drk green/gray	176	183	
Sandy gravel olive	183		
gray to drk gray		213	
gravelly sand olive	213	217	
Sand olive/gray	217	249	
Sandy gravel drk	249		
olive gray		259	
Cont. on Page 2 of 2			

Date started 2-7-95 Completed 3-24-95

(5) WELL TEST: N/A

[ ] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Permeability _____ Yield _____ GPM

Conductivity _____ PH _____

Temperature of water 57 °F/C Depth artesian flow found _____ ft.

Was water analysis done? [X] Yes [ ] No

By whom? Emcon N.W.

Depth of strata to be analyzed. From _____ ft. to _____ ft.

Remarks: _____

Name of supervising Geologist/Engineer Emcon N.W.

(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 well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number _____

Signed Robert Stadeli Date _____

(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 well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10096

Signed John R. Stadeli Date 11-25-97

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

STATE OF OREGON
MONITORING WELL REPORT
(as required by ORS 537.765 & OR 690-240-095)

page 2 of 2
Mult
54748

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WELL ID # N/A

Start Card # 65307

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

(1) OWNER/PROJECT:

WELL NO. MW-29 dg

Name Cascade Corp

Address PO box 20187

City Portland State OR Zip 97220

(2) TYPE OF WORK:

☐ New construction ☐ Alteration (Repair/Recondition)
☐ Conversion ☐ Deepening ☐ Abandonment

(6) LOCATION OF WELL By legal description

Well Location: County Mult

Township 1N (N or S) Range 3E (E or W) Section 28

1. S.E. 1/4 of N.E. 1/4 of above section.

2. **Either** Street address of well location Sandy blvd

or Tax lot number of well location N/A

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

(3) DRILLING METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable
☐ Hollow Stem Auger ☐ Other

(7) STATIC WATER LEVEL:

_____ Ft. below land surface. Date _____

Artesian Pressure _____ lb/sq. in. Date _____

(4) BORE HOLE CONSTRUCTION

Special Standards ☐ Yes ☐ No

Depth of completed well _____ ft.

Land surface

Vault

_____ ft.

TO

_____ ft.

Water-tight cover

Surface flush vault

Locking cap

Casing diameter _____ in.

material _____

Welded ☐ Threaded ☐ Glued

Liner

diameter _____ in.

material _____

Welded ☐ Threaded ☐ Glued

Seal

_____ ft.

TO

_____ ft.

Well seal:

Material _____

Amount _____

Grout weight _____

Borehole diameter _____ in.

Bentonite plug at least 3 ft. thick

Screen

material _____

interval(s):

From _____ To _____

From _____ To _____

Slot size _____ in.

Filter pack

_____ ft.

TO

_____ ft.

Filter pack:

Material _____

Size _____ in.

(8) WATER BEARING ZONES:

Depth at which water was first found _____

From	To	Est. Flow Rate	SWL

(9) WELL LOG:

Ground elevation _____

Material	From	To	SWL
Cong. olive gray	259	271	
Sandstone olive gray	271	288	
Cong. olive gray	288	299	
Sand olive gray	299	302	
Sandy gravel grayish brown	302	308	
Cong. yel/brown/ olive gray	308	340	
Well was backfilled From 340' to 217' with pure gold bent grout			
well has 2' pvc sump on bottom of screen			

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FEB 17 1998
WATER RESOURCES DEPT.
SALEM, OREGON

Date started 2-7-95 Completed 2-8-95

(5) WELL TEST:

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Permeability _____ Yield _____ GPM

Conductivity _____ PH _____

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

Was water analysis done? ☐ Yes ☐ No

By whom? _____

Depth of strata to be analyzed. From _____ ft. to _____ ft.

Remarks: _____

Name of supervising Geologist/Engineer _____

(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 well construction standards. Materials used and information reported above are true to the best knowledge and belief.

MWC Number _____

Signed Robert Stadeli Date _____

(bonded) Monitor Well Constructor Certification:

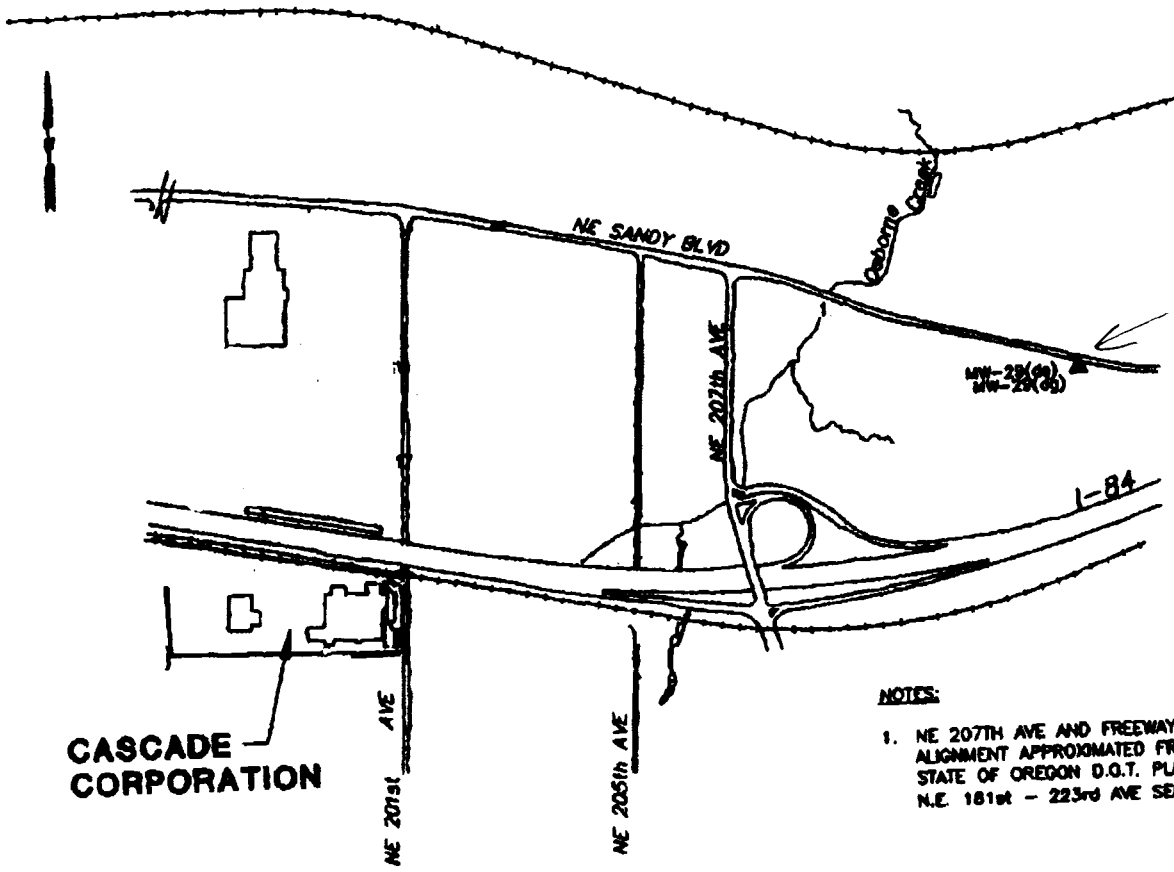
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

MWC Number 10096

Signed John R. Stadeli Date 11-25-97

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

RECEIVED
FEB 17 1998
WATER RESOURCES DEPT
SALEM, OREGON



mw-29 (ds)
mw-29 (dg)

NOTES:

1. NE 207TH AVE AND FREEWAY ALIGNMENT APPROXIMATED FROM STATE OF OREGON D.O.T. PLANS: N.E. 181st – 223rd AVE SECTION.

emcon

DATE 8/97
DWN EK
APP CT
REV
PROJECT NO.
40683.008.032

FIGURE
CASCADE CORPORATION

SITE MAP

amended 4-14-20

MULT 133885

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

WELL I.D. LABEL# L 128832
START CARD # 216485
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name Last Name
Company Townsend Farms Inc.
Address 23400 Townsend Way
City Fairview State OR Zip 97024

(2) TYPE OF WORK

[x] New Well [ ] Deepening [ ] Conversion [ ] Alteration (complete 2a & 10) [ ] Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

[ ] Rotary Air [x] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE

[ ] Domestic [ ] Irrigation [ ] Community
[x] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION

Special Standard [ ] (Attach copy)
Depth of Completed Well 523 ft.

BORE HOLE

Dia	From	To
16	0	398
10	398	528

SEAL

Material	From	To	Amt	sacks/lbs
Chip Bentonite	0	6	16	sks
		Calculated	6	
Cement	6	342	164	sks
		Calculated	144	

How was seal placed: Method [ ] A [ ] B [x] C [ ] D [ ] E
[x] Other Pour and probe bentonite chips
Backfill placed from ft. to ft. Material
Filter pack from 290 ft. to 528 ft. Material premier sand Size 8x12
Explosives used: [ ] Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	10	+	1	342	.250	◉	○	x	
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

Shoe [ ] Inside [x] Outside [ ] Other Location of shoe(s) 342
Temp casing [ ] Yes Dia From To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type v-shaped wire wrap Material 304SS (see comments)

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
blank		6	290	325				
screen		6	325	330	.040			PS
blank		6	330	345				
screen		6	345	375	.040			PS
blank		6	375	380				

(8) WELL TESTS: Minimum testing time is 1 hour

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
400	46		8

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Temperature 58 °F Lab analysis [ ] Yes By
Water quality concerns? [ ] Yes (describe below) TDS amount 65

JAN 21 2020

From	To	Description	Amount	Units

OWRD

(9) LOCATION OF WELL (legal description)

County Multnomah Twp 1 N N/S Range 3 E E/W WM
Sec 27 SW 1/4 of the NE 1/4 Tax Lot 701
Tax Map Number IN 3E 27A Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ○ Nearest address
23303 NE Sandy Blvd, Fairview, OR 97024

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration				
Completed Well	1/13/2020			61

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
1/13/2020	345	528*	400+			61
	*except	clay				

(11) WELL LOG

Ground Elevation

Material	From	To
Top soil, brown	0	1
Clay, brown, silty, soft	1	7
Sand, brown, medium w/cementation	7	10
Sandstone, brown, medium w/some pea gravel, medium-hard	10	17
Sandstone, brown, medium w/some pea gravel, medium-hard	17	20
Sandstone, brown w/green, medium-coarse, medium-hard	20	64
Sand, brown & grey w/cobbles & pea gravel, cemented	64	73
Gravel, small, brown & grey w/sand, compacted	73	102
Gravel, multi-colored, large to small w/sand, medium	102	264
Sand, brown, medium-fine w/mica & gravel, small, black	264	322
Sand, black, medium-coarse w/gravel, small, black	322	336
Gravel, multi-colored & cobbles/bldrs w/sand, blk, med-fine, hard	336	343
Gravel & sand, multi-colored, med-fine, cem. w/mica & occ clay	343	358
Gravel, multi-colored, med-small & sand, med-coarse w/mica	358	363
Sand, black, med-coarse w/mica & gravel, med., multi-colored	363	415
Clay, grey, medium w/soft lenses, sandy (more sandy w/depth)	415	440
Gravel, multi-colored w/sand, black, coarse-fine	440	455
Sand, grey, medium-coarse	455	490
Gravel, multi-colored w/sand, black, coarse-fine	490	528

Date Started 10/25/19 Completed 1/13/2020

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, 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.

License Number 2033 Date 1/15/2020
Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, 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.

License Number 649 Date 1/15/2020
Signed
Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK. Form Version: 0.95

MULT 118138

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

1/9/2015

(1) OWNER/PROJECT

Hole Number B22

PROJECT NAME/NBR: 5-498/PGE BLUE LAKE

First Name _____ Last Name _____

Company PGE

Address 121 SW SALMON ST

City PORTLAND State OR Zip 97204

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment
☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☐ Hollow stem auger
☒ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent
○ Uncased Permanent ○ Slope Stablity
○ Other
Other: _____

(5) USE OF HOLE

GEOTECHNICAL

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 35.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
3.87	0	35	Bentonite Chips	0	35	4	S

Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below) TDS amount _____ _____

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 3.00 E E/W WM
Sec 28 NW 1/4 of the SE 1/4 Tax Lot 1500
Tax Map Number _____ Lot _____
Lat ° ' " or 45.54056200 DMS or DD
Long ° ' " or -122.44397800 DMS or DD
○ Street address of hole ◉ Nearest address
NE FALCON & NE QUAIL FAIRVIEW, OR 97204

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐
Depth water was first found _____

WATER BEARING ZONES

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Silt & Some Sand	0	11
Very Dense Gravels, Cobbles & Some Sand	11	35

Date Started 12/30/2014 Completed 12/30/2014

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Chips	0	35	4	S

Date Started 12/30/2014 Completed 12/30/2014

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

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

License/Registration Number 10607 Date 1/9/2015

First Name ADONIS Last Name PABLO

Affiliation WESTERN STATES SOIL CONSERVATION, INC.

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:


Hawk
Falcon
B22
MULT 118138
84
257 ft
1990
©2015 Google
Imagery Date: 7/14/2014 45°32'25.66" N 122°26'35.03" W elev 100 ft

AMENDED 6/10/19

MULT 128292

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MULT 128292

(1) OWNER/PROJECT Hole Number B-1

PROJECT NAME/NBR: Todd Albert Const.

First Name ____ Last Name ____

Company City of Fairview

Address 1300 NE Village St.

City Fairview State OR Zip 97204

(2) TYPE OF WORK [X] New [ ] Deepening [ ] Abandonment [ ] Alteration (repair/recondition)

(3) CONSTRUCTION
[ ] Rotary Air [ ] Hand Auger [ ] Hollow stem auger
[ ] Rotary Mud [ ] Cable [ ] Push Probe
[ ] Other Sonic

(4) TYPE OF HOLE:
( ) Uncased Temporary ( ) Cased Permanent
( ) Uncased Permanent ( ) Slope Stablity
( ) Other
Other: Cased test

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FEB 20 2018
OWRD

(5) USE OF HOLE

Filtration test

(6) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy)
Depth of Completed Hole 40 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/lbs
6"	0	40					

Backfill placed from 3 ft. to 40 ft. Material Bent chips
Filter pack from ____ ft. to ____ ft. Material ____ Size ____

(7) CASING/SCREEN N/A

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
( )	( )						( )	( )		
( )	( )						( )	( )		
( )	( )						( )	( )		
( )	( )						( )	( )		
( )	( )						( )	( )		

(8) WELL TESTS N/A
( ) Pump ( ) Bailer ( ) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature ____ °F Lab analysis [ ] Yes By ____

Supervising Geologist/Engineer ____

Water quality concerns? [ ] Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)
County Multnomah Twp 1 (N) S Range 3 (E) W WM
Sec 28 SW 1/4 of the NW 1/4 Tax Lot ____
Tax Map Number ____ Lot ____
Lat ____ ° ____ ' ____ " or ____ DMS or DD
Long ____ ° ____ ' ____ " or ____ DMS or DD
(X) Street address of hole ( ) Nearest address
Intersection – NE Sandy Blvd and NE 205th Ave

(10) STATIC WATER LEVEL N/A

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well				

Flowing Artesian? [ ]
WATER BEARING ZONES Depth water was first found ____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) SUBSURFACE LOG Ground Elevation ____

Material	From	To
Silt	0	10
silty gravels / some cobbles and sands	10	40

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JUN 10 2019
OWRD

Date Started 11-29-17 Completed 11-29-17

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/lbs
Bent chips	4	40		10
Asphalt Concrete	0	4		3

Date Started 11-29-17 Completed 11-29-17

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

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

License/Registration Number 10609 Date 12-5-17

First Name Jeff Last Name Jones

Affiliation Holt Services Inc.

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version 0.95

MULT 139047

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

10/19/2022

(1) OWNER/PROJECT

Hole Number DG-NW

PROJECT NAME/NBR: NE SANDY BLVD 22020

First Name DAVID Last Name AQUINO
Company
Address 22020 NE SANDY BLVD
City FAIRVIEW State OR Zip 97024

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment
☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☒ Hand Auger ☐ Hollow stem auger
☐ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent
○ Uncased Permanent ○ Slope Stablity
○ Other
Other:

(5) USE OF HOLE

SOIL AND GROUNDWATER SAMPLING

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Hole 16.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
3	0	16					

Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature °F Lab analysis ☐ Yes By
Supervising Geologist/Engineer
Water quality concerns? ☐ Yes (describe below) TDS amount

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County MULTNOMAH Twp 1.00 N N/S Range 3.00 E E/W WM
Sec 28 SE 1/4 of the NE 1/4 Tax Lot 300
Tax Map Number 1N3E28AD 300 Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of hole ○ Nearest address
22020 NE SANDY BLVD, FAIRVIEW, OR 97024

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐
Depth water was first found 14.00

WATER BEARING ZONES

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation

Material	From	To
SANDY SILT WITH GRAVEL	0	6
SAND WITH TRACE SILT	6	16

Date Started 10/13/2022 Completed 10/13/2022

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Chips	0	16	50	P

Date Started 10/13/2022 Completed 10/13/2022

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

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

License/Registration Number G1861 Date 10/19/2022
First Name JINSUK Last Name PARK
Affiliation ENVIRONMENTAL WORKS

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version:

GEOTECHNICAL HOLE REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

MULT 139047

10/19/2022

Map of Hole

MULT 109328

03-26-2012

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

(1) OWNER/PROJECT

Hole Number B1

PROJECT NAME/NBR: 4-537/OR99 Sherwood ITS

First Name _____ Last Name _____

Company GeoDesign (Owner's Rep)

Address 15575 SW Sequoia Pkwy #100

City Portland State OR Zip 97224

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment

☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☒ Hollow stem auger

☐ Rotary Mud ☐ Cable ☐ Push Probe

☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent

○ Uncased Permanent ○ Slope Stablity

○ Other

Other: _____

(5) USE OF HOLE

Geotechnical

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 30.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
8	0	30	Bentonite Chips	0	30	12	S

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County Multnomah Twp 1.00 N N/S Range 3.00 E E/W WM

Sec 27 SW 1/4 of the NW 1/4 Tax Lot ROW

Tax Map Number _____ Lot _____

Lat 45 ° 32 ' 31.670 " or 45.54213056 DMS or DD

Long -122 ° 25 '57.600 " or -122.43266667 DMS or DD

○ Street address of hole ○ Nearest address

I-84 North Shoulder, 150' East of NE 223rd Ave Fairview, OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

Flowing Artesian? ☐

Depth water was first found _____

WATER BEARING ZONES

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Gravelly Silt & Some Sand	0	30

Date Started 03-23-2012 Completed 03-23-2012

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Chips	0	30	12	S

Date Started 03-23-2012 Completed 03-23-2012

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor,Oregon registered geologist or professional engineer).

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

License/Registration Number 10607 Date _____

Electronically Submitted

First Name Adonis Last Name Pablo

Affiliation Western States Soil Conservation, Inc.

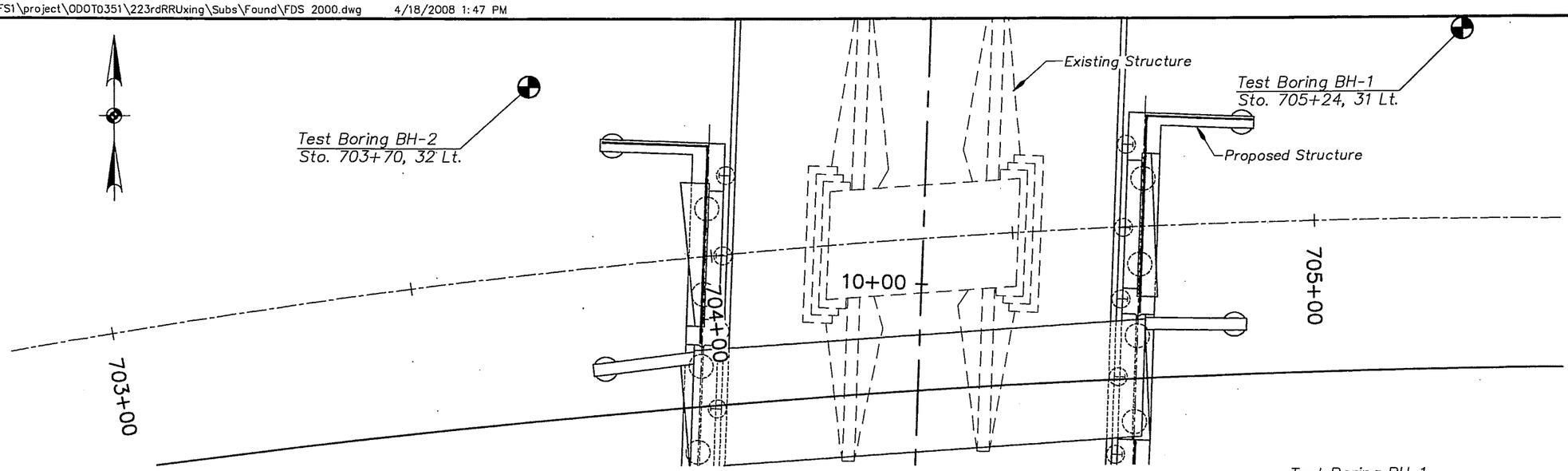
ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.95

Map of Hole

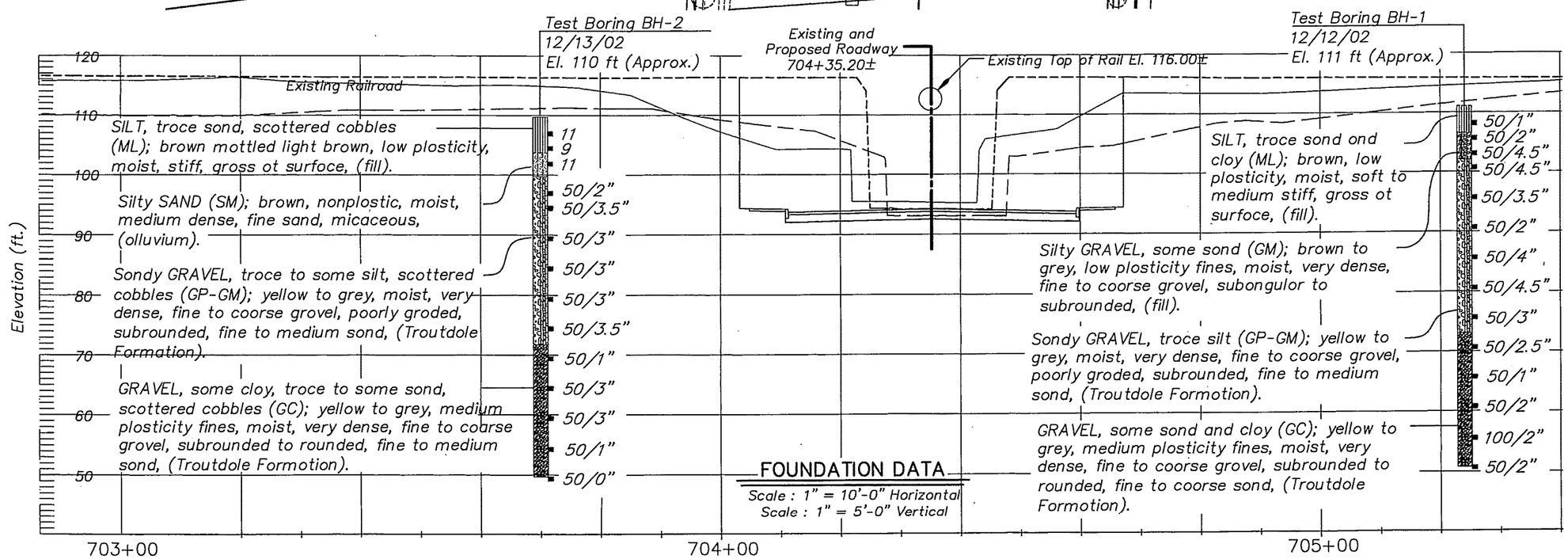

Palisade Dr
NE 223rd Ave
NE Sandy Blvd
B1
Columbia River Hwy
30
Curve St
Depot St
440 ft
© 2012 Google
Crestwood St
Google earth
Earth Point
Imagery Date 8/20/2011
1990
45°32'31.46" N 122°25'57.10" W elev 120 ft
Eye alt 2022 ft



LEGEND OF MATERIALS

- SILT
- Silty SAND
- Sandy GRAVEL, some silt
- GRAVEL, some sand & clay
- Silty GRAVEL

U-1 — Sample Number; Undisturbed Sample
14 — Standard Penetration Test. N value.



FOUNDATION DATA
Scale : 1" = 10'-0" Horizontal
Scale : 1" = 5'-0" Vertical

Foundation data shown on this drawing may be a consolidation of information and/or revision in terminology from the Soils and Geological Exploration Logs. The Soils and Exploration Logs used in compiling this drawing are available upan request.

DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS. INDICATED SCALES CORRECT ONLY FOR FULL SIZE SHEET (22"x34").

FOUNDATION ENGINEERING, INC.
PROFESSIONAL GEOTECHNICAL SERVICES
820 N.W. CORNELL AVENUE
CORVALLIS, OREGON 97330
BUS. (541) 757-7645 FAX (541) 757-7650

DAVID EVANS AND ASSOCIATES, INC.
530 Center Street N.E., Suite 605
Salem Oregon 97301
Phone: 503.381.8635

△	DATE	REVISION	BY

DRAFTER: Nick Clark, P.E.
CHECKER: Mitch Schaub, P.E.

GEOTECHNICAL ENGINEER
REGISTERED PROFESSIONAL ENGINEER 16,088 OREGON JULY 21, 1995 TIMOTHY J. PFEIFFER
EXPIRES: 12/31/2008

CONNECTING COMMERCE AND COMMUNITY
MULTNOMAH COUNTY BRIDGES
TRANSPORTATION DIVISION

OREGON DEPARTMENT OF TRANSPORTATION
BRIDGE ENGINEERING SECTION

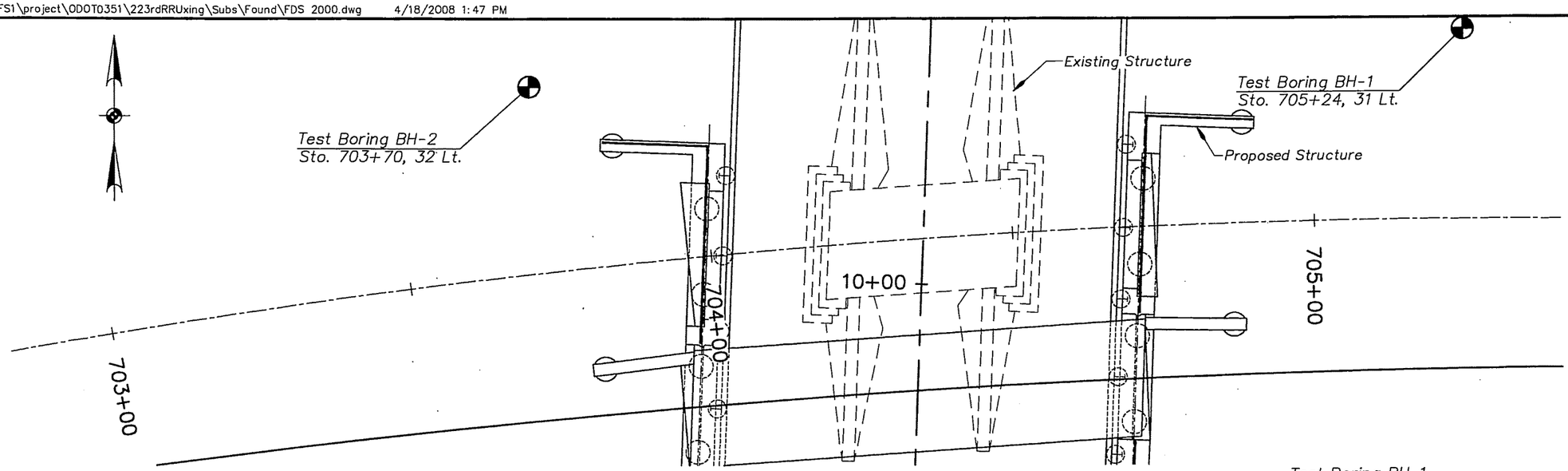
STRUCTURE NO.	DATE	CALC. BOOK
20321	April 2008	

RR BRIDGE REPLACEMENT AND ROAD WIDENING
SANDY BLVD.-BRIDGE ST. (UPRR U'XING) SECTION
NE 223RD AVE.-MULTNOMAH COUNTY
UPRR BR. #13.34, (PORTLAND SUB.)

FOUNDATION DATA

SHEET 3 OF 18
DRAWING NO. 72551

Xrefs: 223_MST_DES.dwg 223rd-Plan.dwg TIM_PFEIFFER_OR.dwg Odotlin.dwg



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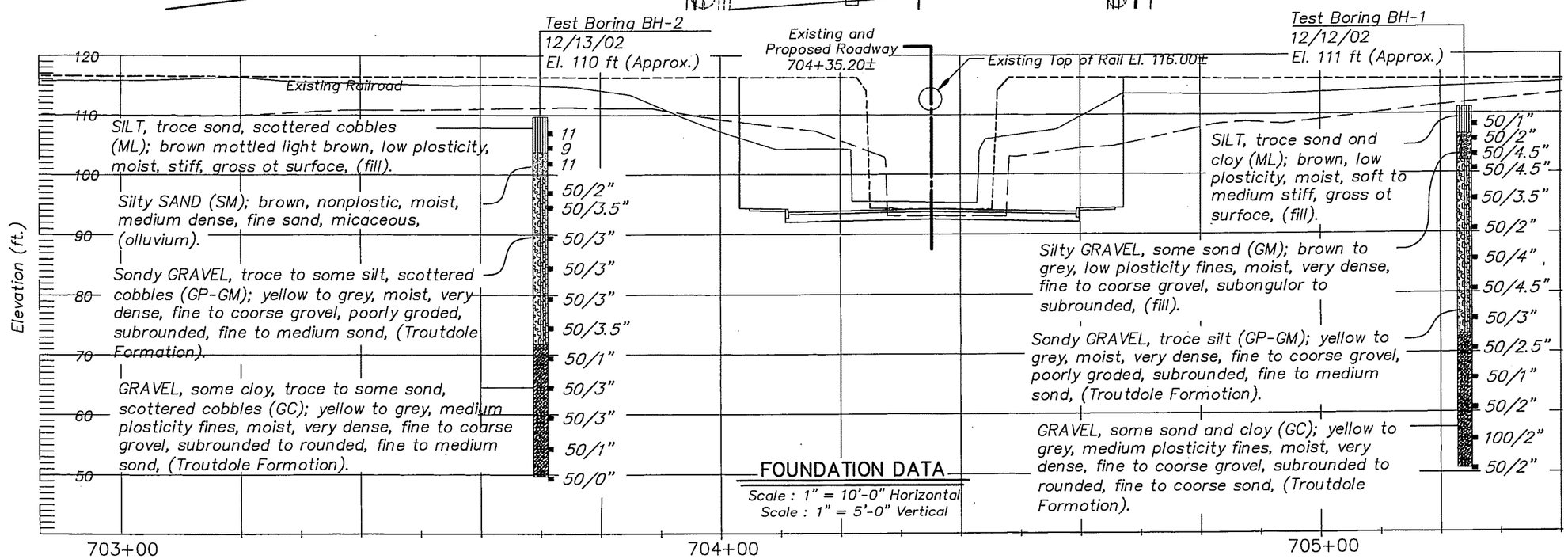

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DRAFT

APPENDIX C

Pavement Distress Survey and Photographs

Outer Sandy Boulevard (NE 201st Avenue to NE 230th Avenue)

Multnomah County 24-162-1

ALTA Project Number: 2024.0002024.162

Table C1: Summary of Pavement Distress Survey

Street	Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd		Sandy Blvd	
Station	324+30 - 332+30		332+30 - 334+00		334+00 - 347+60		347+60 - 353+00		353+00 - 360+50		360+50 - 375+40		375+40 - 384+75		384+75 - 387+50		387+50 - 402+60		402+60 - 405+40	
Distress Mode	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane	EB Lane	WB Lane
Rutting	zero	low	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero	zero
Fatigue Crack Severity	Low to Moderate	Low to Moderate	Low to Moderate	Moderate to High	Low to Moderate	Low to Moderate	Moderate	Moderate	Moderate	Moderate	Sealed	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low
Longitudinal Crack Severity	Moderate	Moderate	Low to Moderate	Moderate to High	Low to Moderate	Low to Moderate	Sealed	Sealed	Sealed	Sealed	Sealed	Sealed	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low
Transverse & Block Crack Severity	Low	Low	Moderate	Moderate	Low to Moderate	Low to Moderate	Sealed	Sealed	Sealed	Sealed	Sealed	Sealed	Low	Low	Low	Low	Low	Low	Low	Low
Patching Severity	Low to Moderate	Low to Moderate	Moderate	High	Low to Moderate	Low to Moderate	Moderate to High	Moderate to High	Low	Low	Low	Low	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low
Pothole Severity	Low	Moderate	Moderate	High	Low to Moderate	Low to Moderate	Moderate	Moderate	None	None	None	None	Low	Low	Low	Low	None	None	None	None
Raveling Severity	Low to Moderate	Low to Moderate	Moderate	Moderate to High	Low to Moderate	Low to Moderate	Moderate	Moderate	Low to Moderate	Low to Moderate	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Bleeding	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
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High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

332+30 → 334+00

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
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Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
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Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

334+00 → 347+60

Summary of ACP Distress

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Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

EB WB

EB WB

EB WB

EB WB

EB WB

EB WB

347+60 → 353+00

EB + WB

Summary of ACP Distress

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Bleeding – Record as either **existing or not existing** (Yes or No).	
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353+00 → 360+50
EB + WB

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High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

N/A

360.5→ 375.40

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

EB Sealed
WB to WB Low, Moderate
EB WB Sealed
EB WB Sealed
WB + EB Low
EB N/A WB N/A
EB WB Low

375+40 → 384+75

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

384+75 -> 387+50

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

387+50 → 402+60

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing** or **not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

N/A

402+60 → 405+40

Summary of ACP Distress

Fatigue Cracking – Measure **Length of Affected Lane Zone** (max. 1,056 ft. in wheel paths).	
Sealed	Cracks having the characteristics of low severity fatigue cracks (as defined below) that are sealed with sealant material in good condition. Interconnected crack patterns are rated as moderate or high severity fatigue cracks regardless of presence of sealant. Includes sealed Wheel Path Longitudinal Cracks.
Low	An area of cracks with no or only a few connecting cracks. Cracks are not spalled. Cracks may be unsealed or sealed but have opened back up. No pumping is evident. Includes unsealed Wheel Path Longitudinal Cracks.
Moderate	An area of interconnected cracks forming a complete pattern. Cracks may be slightly spalled or sealed. No pumping is evident.
High	An area of moderately or severely spalled interconnected cracks forming a complete pattern. Pieces may move when subjected to traffic. Cracks may be sealed. Pumping may be evident.
Longitudinal Cracking – Non-Wheel Path – Measure **Length of Affected Non-Wheel Path Lane Zones** (max. 1,584 ft.).	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Transverse Cracking – Count **Number of Cracks** spanning at least ½ way across the lane (max. 44). Rate entire transverse crack at highest severity level present over 10% of the crack.	
Sealed	A well-sealed crack with sealant material in good condition and a width that cannot be determined.
Low	An unsealed crack with a mean width of ≤ 0.25"; or a sealed crack that has opened with a mean width of ≤ 0.25".
Moderate	Any crack with a mean width > 0.25" and ≤ 0.75"; or any crack with a mean width < 0.75" in and adjacent low severity random cracking.
High	Any crack with a mean width > 0.75"; or any crack with a mean width ≤ 0.75" and adjacent moderate to high severity random cracking.
Patches – Measure **Patch Area** (max. 6,336 sf.). **Also measure all cracking inside the Patch.**	
Low	A well-constructed patch with good to fair riding qualities. The patch may have distress but it is mostly low severity with very little moderate or high; rutting or deformation < 0.25"; pumping is not evident.
Moderate	The patch is moderately deteriorated or has extensive moderate severity distress; or rutting or deformation from 0.25" to 0.5"; pumping may be evident. Ride quality is fair to poor. Also includes non-smooth irregular-shaped patches with uneven edges.
High	The patch is severely deteriorated, or has extensive high severity distress; or rutting or deformation > 0.5"; or the patch has additional different patch material within it. Ride quality is fair to poor. Pothole patches are rated as high severity, regardless of ride quality.
Potholes – Count **Number of Potholes** (max. 44). A continuous pothole or multiple potholes within a 12-ft. long zone shall be counted as one pothole.	
Low	Depth < 1" (Typically delamination of thin patch or seal coat creating a shallow pothole.)
Moderate	1" ≤ Depth ≤ 2" (Remains within top lift of wearing course.)
High	Depth > 2" (Extends beyond top lift of wearing course.)
Raveling – Measure **Length of Affected Wheel Path and Center Lane Zones** (max. 1,584 ft.).	
Low	Aggregate has worn away resulting in noticeably rough or pitted pavement surface texture in the left wheel path, right wheel path, or center lane zone.
Moderate	Surface texture is moderately rough and/or pitted with moderate loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Loose aggregate particles may be present outside the traffic area.
High	Surface texture is very rough and/or pitted with severe loss of pavement surface aggregate in the left wheel path, right wheel path, or center lane zone. Flat bottom potholes may be present where complete loss of aggregate has occurred.
Bleeding – Record as either **existing or not existing** (Yes or No).	
Y or N	None, record bleeding if multiple (2 or more) locations ≥ 25 ft. are present.

N/A

Photo 1: App Station 347+50 NE Sandy Boulevard East Bound Looking Northwest

Photo 2: App Station 346+00 NE Sandy Boulevard East Bound looking North

Photo 3: App Station 344+75 NE Sandy Boulevard East Bound looking Northwest

Photo 4: App Station 343+75 NE Sandy Boulevard East Bound Looking North

Photo 5: App Station 343+75 NE Sandy Boulevard East Bound Looking Southeast

Photo 6: App Station 341+75 NE Sandy Boulevard East Bound Looking North

Photo 7: App Station 340+75 NE Sandy Boulevard East Bound Looking North

Photo 8: App Station 339+20 NE Sandy Boulevard East Bound Looking West

Photo 9: App Station 337+75 NE Sandy Boulevard East Bound Looking North

Photo 10: App Station 337+50 NE Sandy Boulevard East Bound Looking North

Photo 11: App Station 334+00 NE Sandy Boulevard East Bound Looking Northwest


Photo 12: App Station 332+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 13: App Station 331+90 NE Sandy Boulevard East Bound Looking Northwest

Photo 14: App Station 330+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 15: App Station 328+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 16: App Station 328+50 NE Sandy Boulevard East Bound Looking West

Photo 17: App Station 326+10 NE Sandy Boulevard East Bound Looking Northeast

Photo 18: App Station 325+90 NE Sandy Boulevard East Bound Looking West

Photo 19: App Station 325+00 NE Sandy Boulevard East Bound Looking Northeast


Photo 20: App Station 324+90 NE Sandy Boulevard East Bound Looking North

Photo 21: App Station 324+60 NE Sandy Boulevard West Bound Looking West

Photo 22: App Station 324+80 NE Sandy Boulevard West Bound Looking East

Photo 23: App Station 325+60 NE Sandy Boulevard West Bound Looking Southwest

Photo 24: App Station 325+70 NE Sandy Boulevard West Bound Looking South

Photo 25: App Station 327+30 NE Sandy Boulevard West Bound Looking South

Photo 26: App Station 329+30 NE Sandy Boulevard West Bound Looking East

Photo 27: App Station 331+00 NE Sandy Boulevard West Bound Looking Southeast

Photo 28: App Station 332+50 NE Sandy Boulevard West Bound Looking East

Photo 29: App Station 333+90 NE Sandy Boulevard West Bound Looking South

Photo 30: App Station 335+75 NE Sandy Boulevard West Bound Looking East

Photo 31: App Station 337+40 NE Sandy Boulevard West Bound Looking Southeast

Photo 32: App Station 339+00 NE Sandy Boulevard West Bound Looking South

Photo 33: App Station 341+80 NE Sandy Boulevard West Bound Looking South

Photo 34: App Station 343+90 NE Sandy Boulevard West Bound Looking Northeast

Photo 35: App Station 344+90 NE Sandy Boulevard West Bound Looking Southeast

Photo 36: App Station 347+00 NE Sandy Boulevard West Bound Looking South

Photo 37: App Station 348+50 NE Sandy Boulevard West Bound Looking Southeast

Photo 38: App Station 349+80 NE Sandy Boulevard West Bound Looking Southeast

Photo 39: App Station 351+40 NE Sandy Boulevard West Bound Looking South

Photo 40: App Station 354+20 NE Sandy Boulevard West Bound Looking Southeast

Photo 41: App Station 357+40 NE Sandy Boulevard West Bound Looking Southeast

Photo 42: App Station 359+80 NE Sandy Boulevard West Bound Looking Southeast

Photo 43: App Station 361+80 NE Sandy Boulevard West Bound Looking Southeast

Photo 44: App Station 363+25 NE Sandy Boulevard West Bound Looking Southeast

Photo 45: App Station 365+25 NE Sandy Boulevard West Bound Looking East

Photo 46: App Station 364+50 NE Sandy Boulevard East Bound Looking Northwest

Photo 47: App Station 363+80 NE Sandy Boulevard East Bound Looking Northwest

Photo 48: App Station 363+25 NE Sandy Boulevard East Bound Looking Northwest

Photo 49: App Station 359+25 NE Sandy Boulevard East Bound Looking Northwest

Photo 50: App Station 355+25 NE Sandy Boulevard East Bound Looking West

Photo 51: App Station 353+25 NE Sandy Boulevard East Bound Looking West

Photo 52: App Station 352+00 NE Sandy Boulevard East Bound Looking West

Photo 53: App Station 351+25 NE Sandy Boulevard East Bound Looking Northwest

Photo 54: App Station 349+50 NE Sandy Boulevard East Bound Looking Northwest

Photo 55: App Station 397+250 NE Sandy Boulevard East Bound Looking West

Photo 56: App Station 395+25 Sandy Boulevard East Bound Looking West

Photo 57: App Station 392+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 58: App Station 388+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 59: App Station 387+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 60: App Station 388+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 61: App Station 388+60 NE Sandy Boulevard East Bound Looking West

Photo 62: App Station 385+60 NE 223rd Avenue South Bound Looking North

Photo 63: App Station 385+50 NE Sandy Boulevard East Bound Looking Northwest

Photo 64: App Station 384+75 NE Sandy Boulevard East Bound Looking Northwest

Photo 65: App Station 384+30 NE Sandy Boulevard East Bound Looking Northwest

Photo 66: App Station 383+70 NE Sandy Boulevard East Bound Looking Northwest

Photo 67: App Station 381+90 NE Sandy Boulevard East Bound Looking Northwest

Photo 68: App Station 379+80 NE Sandy Boulevard East Bound Looking Northwest

Photo 69: App Station 377+40 NE Sandy Boulevard East Bound Looking East

Photo 70: App Station 377+25 NE Sandy Boulevard East Bound Looking East

Photo 71: App Station 375+90 NE Sandy Boulevard East Bound Looking Northwest

Photo 72: App Station 369+00 NE Sandy Boulevard East Bound Looking West

Photo 73: App Station 371+20 NE Sandy Boulevard West Bound Looking Southeast

Photo 74: App Station 373+30 NE Sandy Boulevard West Bound Looking Southeast

Photo 75: App Station 378+50 NE Sandy Boulevard West Bound Looking East

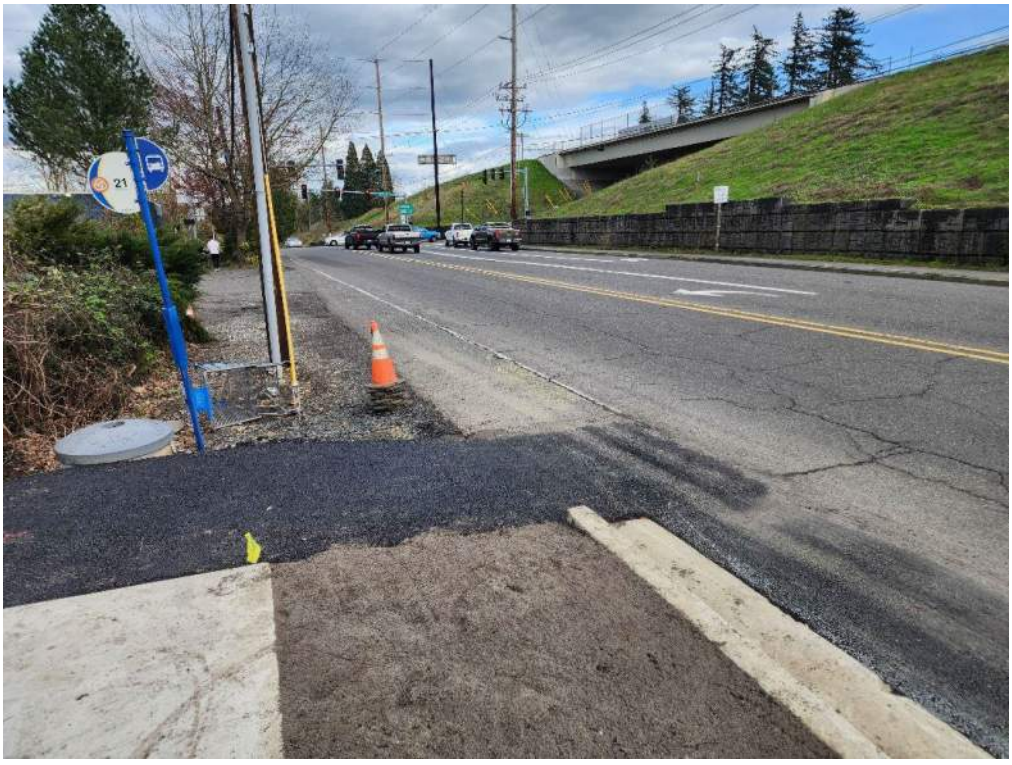

Photo 76: App Station 382+25 NE Sandy Boulevard West Bound Looking Southeast

Photo 77: App Station 385+50 NE Sandy Boulevard West Bound Looking Southeast

Photo 78: App Station 385+60 NE Sandy Boulevard West Bound Looking East

Photo 79: App Station 385+60 NE Sandy Boulevard West Bound Looking East

Photo 80: App Station 386+80 NE Sandy Boulevard West Bound Looking East

Photo 81: App Station 395+20 NE Sandy Boulevard West Bound Looking East

Photo 82: App Station 396+40 NE Sandy Boulevard West Bound Looking East

Photo 83: App Station 399+75 NE Sandy Boulevard West Bound Looking Southeast

Photo 84: App Station 401+80 NE Sandy Boulevard West Bound Looking Southeast

Photo 85: App Station 403+50 NE Sandy Boulevard West Bound Looking Southeast

Photo 86: App Station 404+20 NE Sandy Boulevard West Bound Looking North

Photo 87: App Station 404+60 NE Sandy Boulevard West Bound Looking East

Photo 88: App Station 404+50 NE Sandy Boulevard South West Looking Southwest

Photo 89: App Station 400+75 NE Sandy Boulevard East Bound Looking West