MSS INC
ENGINEERING CONSULTANTS
SURVEYORS
PLANNERS

# HIEX HOTEL REMODEL & ADDITION

# REVISED STORM DESIGN REPORT

For

Amandeep Virk
8815 SW Sun Place
Wilsonville, OR 97070

By

**MSS Inc.**
215 NW 4th Street
Corvallis, OR 97330

REGISTERED PROFESSIONAL ENGINEER
60183PE
DIGITALLY SIGNED
OREGON
JULY 13, 2004
PETER J. SEADERS
RENEWAL: 6/30/2024

Prepared by Linsey McLane-Godwin
Reviewed by Peter Seaders

Job Number: 21156 ■ March 31, 2023

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# 1 Purpose of Report

The purpose of this report is to fulfill the required storm water report specified by Woodburn Development Ordinance Design Review application for the HIEX Hotel Remodel & Addition. The project includes the enlargement of the porta cochere, enclosure of an existing pool and the addition of floors above the enclosed pool. Additionally, the parking lot will be expanded to provide parking for the proposed additional hotel rooms. The drainage system is designed to collect the runoff created by the existing building and parking lot, proposed addition and parking lot expansion. The drainage system is private on-site and on the adjacent property to the west and north until it connects with the publicly owned system maintained by the Oregon Department of Transportation (ODOT). Water quality is not required per City of Woodburn standards. The runoff will drain into the existing storm drainage system.

All design analysis in this report has been performed in accordance with Woodburn Development Ordinance (WDO), the Woodburn Storm Drainage Master Plan (SDMP) Chapters 7 and 11 and the ODOT Hydraulics Manual. Results presented in this report are preliminary, and subject to refinement in final design.

# 2 Project Description

The new development applicable to this report includes the construction of:

- 0.28 acre of new impervious surface for the addition and increased parking area.
- Expansion of the storm drainage infrastructure.

The total impervious area is 1.38 acres.

# 3 Existing Conditions Summary

## 3.1 Existing Site Conditions

The HIEX Hotel Remodel & Addition development is a 1.76-acre site located at 120 N Arney Rd, Woodburn, Oregon. The site contains an existing hotel and parking lot with 1.1-acres of impervious surface and an existing onsite stormwater drainage system connected to the public stormwater system. The development is on the south and east side of N Arney Road, north of Hillsboro-Silverton Hwy NE and west of Interstate-5. The subject property is currently developed, see Appendix A.

The onsite slope ranges from 3-20%. The entire site generally slopes from the north to the south and southwest. There is a high point at the entrance to the existing hotel. From this high point the land gently slopes in all directions.

## 3.2 Soil Conditions

There are two soils identified on the subject property: 0.2% consists of Ba — Bashaw clay with an infiltration rate range of 0.00 to 0.06 inches per hour (in/hr) and 99.8% consists of WuA — Woodburn silt loam, 0 to 3 percent slopes with an infiltration rate range of 0.06 to 0.20 in/hr. Bashaw clay is classified as Hydrological Soil Group D, while Woodburn silt loam is classified as Hydrological Soil Group C. Refer to Appendix D, NRCS Soil Report, for the soil map and soil description.


## 3.3 Sensitive and Critical Areas

No wetlands or sensitive/critical areas were identified on the property. The Federal Emergency Management Agency (FEMA) Flood Insurance Map 41047C0119G, effective January 19, 2000, shows the subject property as not within a regulated floodplain.

# 4 Developed Conditions & Calculations Summary

## 4.1 Design Criteria & Calculations Summary

The on-site stormwater system is a private system that connects to Oregon Department of Transportation (ODOT) facilities in both N Arney Rd and the Hillsboro-Silverton Highway. Based on conversations with ODOT and City of Woodburn staff on June 13, 2022, the proposed stormwater system must meet the ODOT Hydraulics Manual storm detention requirements. Below are the stormwater criteria from the Woodburn Development Ordinance, the Woodburn Storm Drainage Master Plan and the ODOT Hydraulics Manual.

***4.1.1 Woodburn Development Ordinance (WDO) 3.05.02 General Provisions G. All vehicle parking, loading, and storage areas shall be graded and provide storm drainage facilities approved by the Director.***

***4.1.2 Woodburn Storm Drainage Master Plan (SDMP) Chapter 11 H. Detention Requirement for Small Developments:***

***Any new construction, or expansion of existing construction, for commercial, industrial, institutional, or multi-family uses which creates less than 2.5 acres of total impervious areas (not including public roads created as part of the development) may be required to provide on-site detention to address downstream system capacity limitations, satisfy requirements of other jurisdictions, or mitigate local conditions which preclude full discharge of stormwater. At a minimum, the following information will be required for City staff review:***

1. ***Calculations of the volume and rate of stormwater runoff prior to and following development, done in conformance with City policy and the Storm Drainage Master Plan.***
2. ***Identification of the closest public storm sewer or drainageway which will receive the runoff from the development.***
3. ***Calculations showing the peak flow rate of storm water which will be discharged to the public system including any deleterious hydraulic impacts of stormwater runoff on downstream facilities (pipes, culvert, ditches, etc.)***

***4.1.3 ODOT Hydraulics Manual 12.5.1 General Criteria***

***Detention may not be needed when it is not required by the local jurisdiction and any one of the following criteria is met:***

***a. The uncontrolled peak post-construction runoff rate during the design storm is less than 0.5 cubic feet per second, and the total contributing area after the proposed development is less than 0.25 acre.***

***4.1.4 ODOT Hydraulics Manual* 12.5.1.1:**

**A. For detention facilities which serve 5 acres or less and discharge directly to and are physically connected to storm sewers or which discharge to ditches which do not lead directly to cross culverts or inlets:**

• **10-year.**

The subject property contains less than 2.5 acres of total impervious areas. As described above, the on-site stormwater system does not discharge into a public storm sewer system or drainageway maintained by the City of Woodburn, but instead discharges into systems maintained by ODOT. As a result, the City of Woodburn is deferring to ODOT stormwater detention requirements. According to ODOT Hydraulics Manual Section 12.5.1.1.A, the proposed system calculations should be based on the rational method using the 10-year design storm. As shown in Appendix C, the pre-development peak runoff rate during the design storm is 2.38 cubic feet per second.

## 4.2 Proposed Stormwater System:

The proposed parking lot expansion, shown on Appendix B, *Preliminary Grading & Utility Plan sheet P210* may not qualify for the exception to detention. While the increase in uncontrolled peak post-construction runoff rate during the design storm is less than 0.5 cubic feet per second, the increase in pavement is exceeds the 0.25-acre threshold (the proposed development adds 0.28 acres of additional impervious area). To match the post-development peak runoff rate to pre-development conditions, a stormwater detention volume of at least 120 cubic feet will be needed, if required by ODOT. The storage will be provided in a 96-inch-diameter manhole with 2.39 vertical feet of storage between the inlet and the outlet elevations. The manhole will fitted with a 7.66-inch-diameter orifice, sized per Appendix C to limit the peak outflow to 2.38 cubic feet per second. Alternatively, the storage volume can be provided by oversized piping integrated into the proposed storm system, or other underground storage systems such as arch pipes or rock galleries.

The runoff from the proposed expansion will be collected in a series of catch basins which are to be piped into the existing private on-site stormwater infrastructure. The flow control manhole will be installed in-line with the existing infrastructure, downstream of the new catch basin connections. Below said manhole, the runoff from both the existing and proposed tributary area will follow the existing conveyance off the site and into the ODOT system to the southwest.

There is no stormwater treatment proposed for this site and none is required by either the City of Woodburn nor ODOT.

## 4.3 Analysis Results & Summary

Runoff analysis was performed following the ODOT Hydraulics Manual code requirements. The ODOT Rational Method was used for calculations.

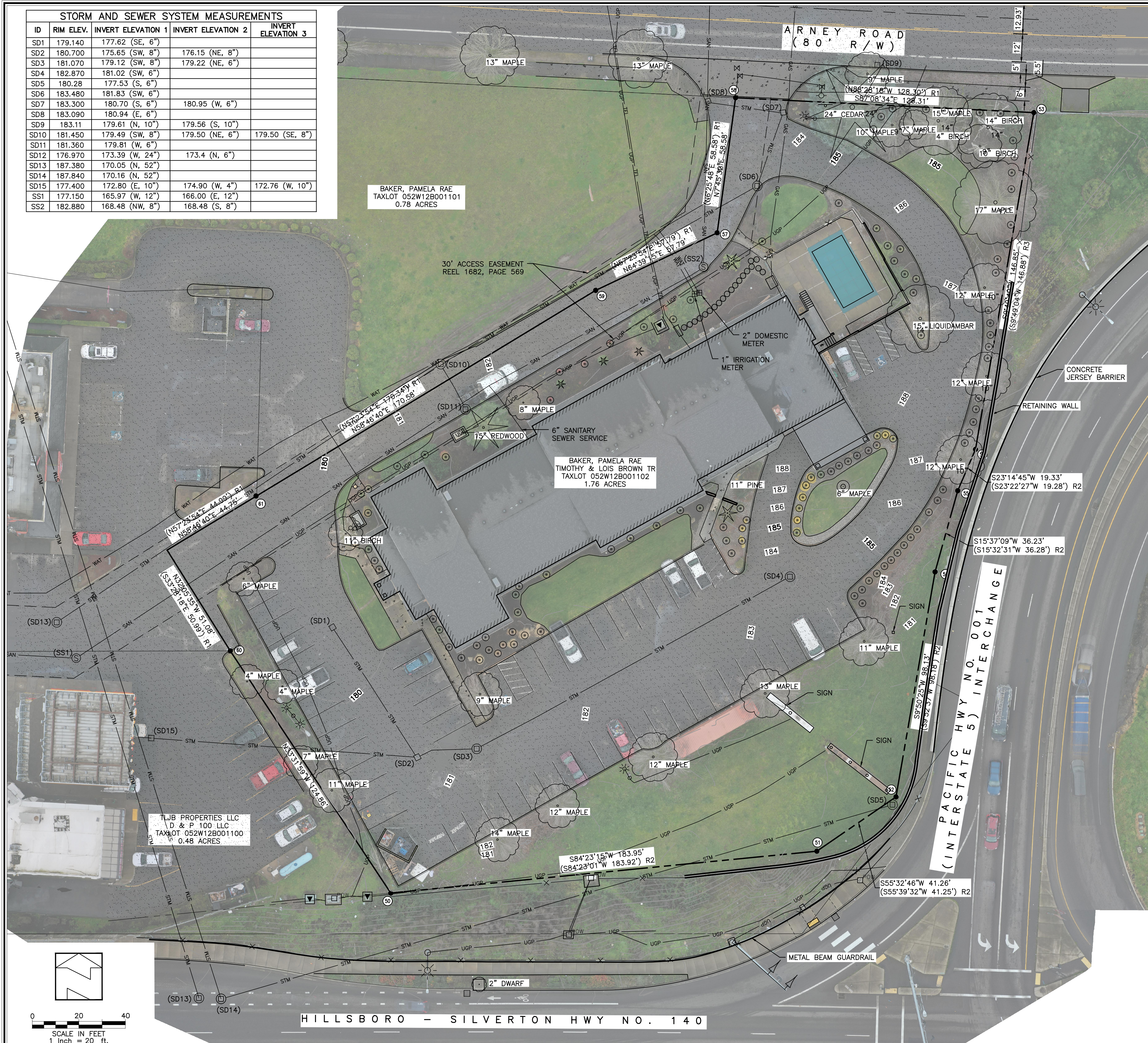
No water quality treatment of the stormwater runoff is required. The proposed stormwater infrastructure connects to the existing infrastructure at the required rate. Detention for 120 cubic feet of stormwater is provided on-site.

# 5 APPENDICES

# APPENDIX A – EXISTING CONDITIONS MAP

## STORM AND SEWER SYSTEM MEASUREMENTS

| ID | RIM ELEV. | INVERT ELEVATION 1 | INVERT ELEVATION 2 | INVERT ELEVATION 3 |
|---|---|---|---|---|
| SD1 | 179.140 | 177.62 (SE, 6") | | |
| SD2 | 180.700 | 175.65 (SW, 8") | 176.15 (NE, 8") | |
| SD3 | 181.070 | 179.12 (SW, 8") | 179.22 (NE, 6") | |
| SD4 | 182.870 | 181.02 (SW, 6") | | |
| SD5 | 180.28 | 177.53 (S, 6") | | |
| SD6 | 183.480 | 181.83 (SW, 6") | | |
| SD7 | 183.300 | 180.70 (S, 6") | 180.95 (W, 6") | |
| SD8 | 183.090 | 180.94 (E, 6") | | |
| SD9 | 183.11 | 179.61 (N, 10") | 179.56 (S, 10") | |
| SD10 | 181.450 | 179.49 (SW, 8") | 179.50 (NE, 6") | 179.50 (SE, 8") |
| SD11 | 181.360 | 179.81 (W, 6") | | |
| SD12 | 176.970 | 173.39 (W, 24") | 173.4 (N, 6") | |
| SD13 | 187.380 | 170.05 (N, 52") | | |
| SD14 | 187.840 | 170.16 (N, 52") | | |
| SD15 | 177.400 | 172.80 (E, 10") | 174.90 (W, 4") | 172.76 (W, 10") |
| SS1 | 177.150 | 165.97 (W, 12") | 166.00 (E, 12") | |
| SS2 | 182.880 | 168.48 (NW, 8") | 168.48 (S, 8") | |




SCALE IN FEET
1 Inch = 20 ft.

### HORIZONTAL DATUM & PROJECTION:
THE HORIZONTAL DATUM FOR THIS SURVEY IS NAD 83 (2011) EPOCH 2010.00. THIS MAP USES GROUND COORDINATES IN A LOCAL DATUM PLANE (LDP) RELATIVE TO THE STATE PLANE COORDINATE SYSTEM, OREGON NORTH ZONE 3601. UNITS ARE IN INTERNATIONAL FEET. SCALE FACTOR IS 0.9999466.

### BENCHMARK & VERTICAL DATUM:
THE ELEVATIONS ON THIS MAP ARE BASED ON GNSS CONTROL TIES TO THE OREGON REAL–TIME GEODETIC NETWORK (ORGN) STATION 235 (NEWBERG). THEY WERE POST–PROCESSED USING NGS OPUS. THE VERTICAL DATUM IS NAVD–88.

### BASIS OF BEARINGS:
THE BASIS OF BEARINGS IS BASED ON THE STATE PLANE COORDINATE SYSTEM USING GEODETIC CONTROL TIES TO THE OREGON REAL–TIME GEODETIC NETWORK (ORGN) CORS STATION 235 (NEWBERG).

### SURVEY DATE:
THIS SURVEY REFLECTS GROUND CONDITIONS AS OF 11/01/2021.

### TITLE REPORT, BOUNDARY & EASEMENTS:
THE BOUNDARY ON THIS MAP IS APPROXIMATE BASED ON RECORD INFORMATION AND THE FOUND SURVEY MONUMENTS AS SHOWN. THIS IS NOT A BOUNDARY SURVEY.

A LOT BOOK SERVICE (ORDER NUMBER 7089–3911483 DATED MARCH 10, 2022 PREPARED BY FIRST AMERICAN TITLE INSURANCE COMPANY) WAS PROVIDED IN PREPARATION OF THIS MAP.

THE 30' ACCESS EASEMENT (REEL 1682 PAGE 569) LOCATION IS APPROXIMATE BASED ON THE FOUND MONUMENTS 57–58, WHICH PROVIDED A GOOD FIT WITH EXISTING CURBS AT THE WEST CORNER OF THE PROPERTY. NO OTHER PLOTTABLE ENCUMBERANCES WERE DISCLOSED.

### FLOOD ZONE:
THIS PROPERTY IS NOT IN A FLOOD ZONE ACCORDING TO THE MARION COUNTY LAND USE PLANNING AND ZONING DIVISION.

### UTILITY STATEMENT:
THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

### FOUND MONUMENT REFERENCE: (50)
50 IRON ROD, HELD
51 5/8" IRON ROD W/YPC, MARKED "ODOT R/W," HELD
52 5/8" IRON ROD W/YPC, MARKED "ODOT R/W," HELD
53 5/8" IRON ROD W/YPC, MARKED "ODOT R/W RESET," HELD
54 5/8" IRON ROD W/YPC, MARKED "ODOT R/W," HELD
55 5/8" IRON ROD W/YPC, MARKED "ODOT R/W," HELD
56 5/8" IRON ROD W/YPC, MARKED "ODOT R/W," HELD
57 5/8" IRON ROD W/YPC, UNREADABLE, HELD
58 5/8" IRON ROD W/YPC, UNREADABLE, HELD
61 5/8" IRON ROD NO CAP, DOWN 0.1, HELD

### SURVEY REFERENCES:
R1 C.S. 35102
R2 C.S. 28688
R3 MCSR 38320

### LEGEND
- PROPERTY BOUNDARY
- ADJACENT PROPERTY LINES
- CENTERLINE
- RIGHT OF WAY
- BUILDING
- CURB
- SIDEWALK
- FENCE
- WALL
- STM — STORM DRAIN LINE
- SAN — SANITARY SEWER
- WAT — WATERLINE
- UGP — UNDERGROUND POWER
- GAS — NATURAL GAS LINE
- UT — UTILITY TRENCH
- CONCRETE PAVING
- ASPHALT PAVING
- 30 — EXISTING MAJOR CONTOURS
- 30 — EXISTING MINOR CONTOURS
- PROPERTY CORNER
- STORM CATCHBASIN
- SEWER MANHOLE
- STORM MANHOLE
- DECIDUOUS TREE
- CONIFER TREE
- SHRUB
- POW — POWER VAULT / JUNCTION BOX
- STREET LIGHT
- TRAFFIC SIGNAL
- TRANSFORMER

VARITONE ARCHITECTURE
231 SW 2ND AVE
ALBANY, OREGON
(541) 497-2954

REVISIONS | DATE | BY

# HIEX WOODBURN ADDITION
*WOODBURN, OREGON*

## EXISTING CONDITIONS
120 NORTH ARNEY ROAD, WOODBURN, OR, 97071

REGISTERED PROFESSIONAL LAND SURVEYOR
OREGON
MAY 26, 2015
PETER J. SEADERS
60183PLS
RENEWS: 06/30/24


MSS INC
ENGINEERING CONSULTANTS AND PLANNERS
215 NW 4th STREET
CORVALLIS, OR 97330
(541) 753-1320 FAX:(541) 753-5956

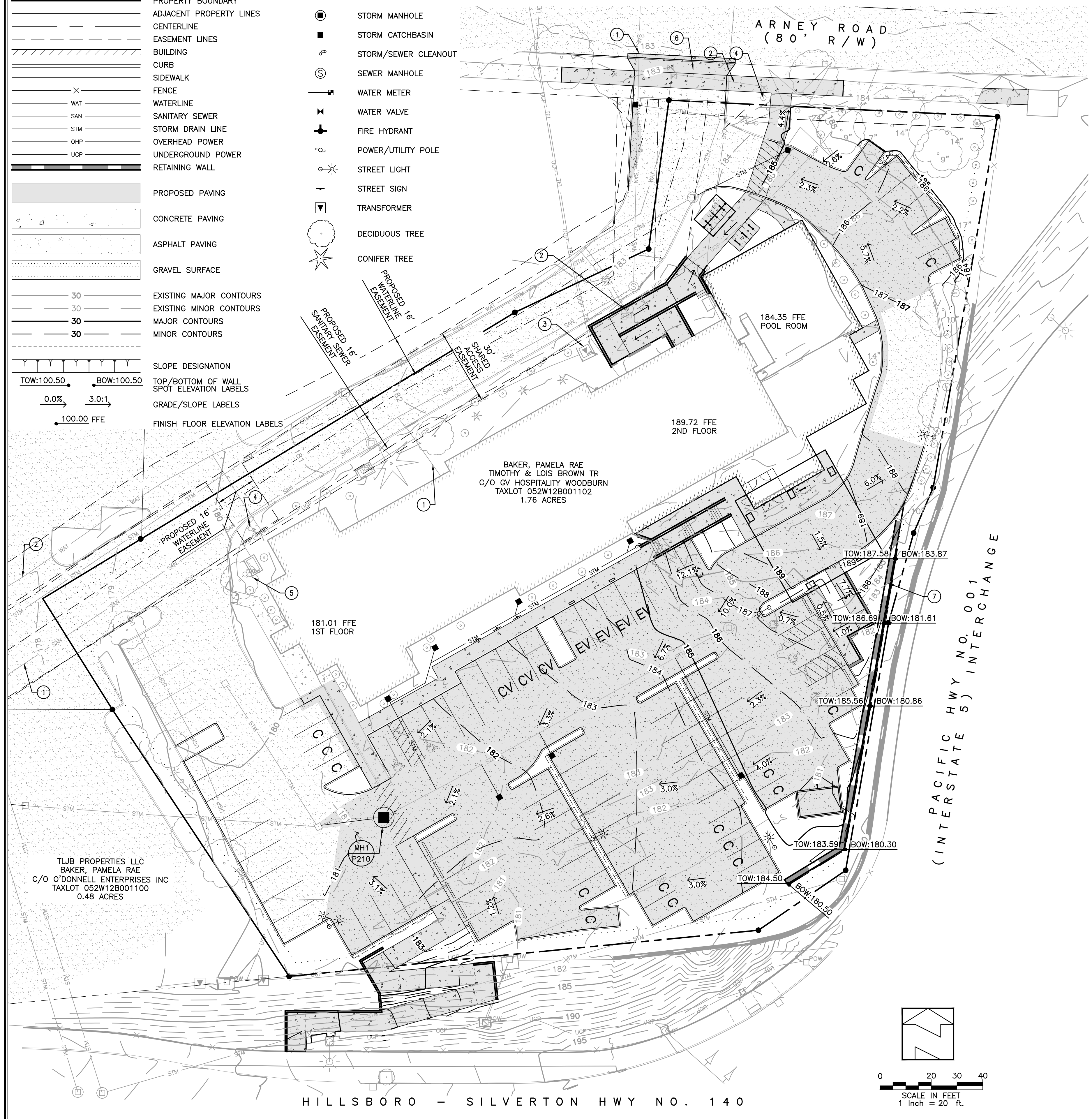

| JOB # | FILE | DRAWN |
|---|---|---|
| 21156 | P-EXIST | SJG |
| SCALE | DATE | |
| 1" = 20' | 4/4/23 | |

**P100**
# 2 OF 6 SHEETS

## APPENDIX B – PRELIMINARY GRADING & DRAINAGE PLAN

## GRADING & UTILITY LEGEND (EXISTING FEATURES SHOWN IN GRAY)

- PROPERTY BOUNDARY
- ADJACENT PROPERTY LINES
- CENTERLINE
- EASEMENT LINES
- BUILDING
- CURB
- SIDEWALK
- FENCE
- WAT — WATERLINE
- SAN — SANITARY SEWER
- STM — STORM DRAIN LINE
- OHP — OVERHEAD POWER
- UGP — UNDERGROUND POWER
- RETAINING WALL
- PROPOSED PAVING
- CONCRETE PAVING
- ASPHALT PAVING
- GRAVEL SURFACE
- 30 — EXISTING MAJOR CONTOURS
- 30 — EXISTING MINOR CONTOURS
- 30 — MAJOR CONTOURS
- 30 — MINOR CONTOURS
- SLOPE DESIGNATION
- TOW:100.50 BOW:100.50 — TOP/BOTTOM OF WALL SPOT ELEVATION LABELS
- 0.0% 3.0:1 — GRADE/SLOPE LABELS
- 100.00 FFE — FINISH FLOOR ELEVATION LABELS
- PROPERTY CORNER
- CONTROL POINT
- STORM MANHOLE
- STORM CATCHBASIN
- STORM/SEWER CLEANOUT
- SEWER MANHOLE
- WATER METER
- WATER VALVE
- FIRE HYDRANT
- POWER/UTILITY POLE
- STREET LIGHT
- STREET SIGN
- TRANSFORMER
- DECIDUOUS TREE
- CONIFER TREE




## GENERAL NOTES

- *ALL ELEVATIONS ARE FG PAVING U.N.O.*
- *SLOPES SHALL HAVE A MAXIMUM CONSTRUCTED SLOPE OF 2:1 AFTER STABILIZATION.*
- *GRADE AT LANDSCAPED AREAS TO BE 6" MIN BELOW BUILDING FINISH FLOOR ELEVATION.*
- *ADA PARKING SPACES & LOADING AREA SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.*
- *SIDEWALK CROSS SLOPE SHALL BE 1.5% TYP U.N.O., BUT SHALL NOT EXCEED 2%. LONGITUDINAL SLOPES SHALL NOT EXCEED 5%. U.N.O. PROVIDE HANDRAILS FOR SLOPES BETWEEN 5% & 8.33%. NO SLOPES WITHIN AN ADA PATH OF TRAVEL MAY EXCEED 8.33% FINAL CONSTRUCTED SLOPE.*
- *NO NEW SEWER OR WATER SERVICE IS REQUIRED, EXISTING SERVICES TO BE MAINTAINED*
- *NO NEW STREET LIGHTS ARE REQUIRED. EXISTING STREET LIGHTS MEET THE ILLUMINATING ENGINEERING SOCIETY (IES) OF NORTH AMERICA RECOMMENDED PRACTICE 8, ROADWAY LIGHTING (RP-8) STANDARDS.*

### GRADING & UTILITY KEYNOTES #

1 EXISTING SEWER SERVICE TO BE REUSED, SIZING TO BE CONFIRMED BY MEP AT BUILDING PERMIT.

2 EXISTING WATER METERS TO BE RELOCATED AND REUSED (OR REPLACED, IF NEEDED), SIZING TO BE CONFIRMED BY MEP AT BUILDING PERMIT.

3 EXISTING POWER TRANSFORMER TO BE REUSED, SIZING TO BE CONFIRMED BY MEP AT BUILDING PERMIT.

4 EXISTING FIRE HYDRANTS TO BE REUSED. SEE FIRE FLOW REPORT FOR FLOW RATES.

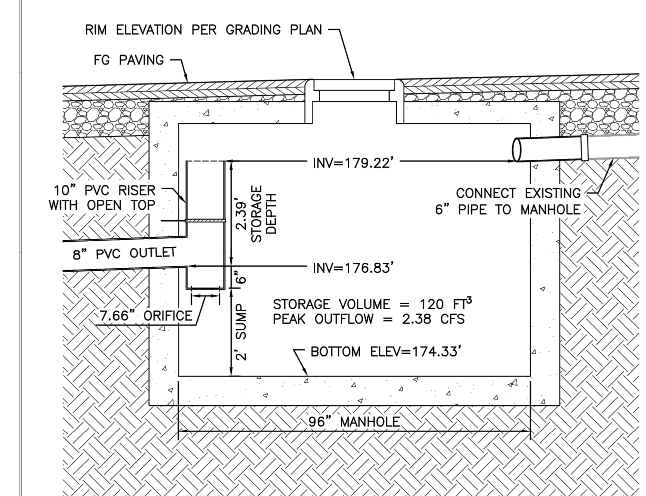
5. EXISTING FDCS TO BE REUSED. FDCS SHALL BE CLEARLY LABELED TO INDICATE THEIR PURPOSE (ONE FOR SPRINKLERS AND ONE FOR STANDPIPES).

6. ARNEY RD DRIVEWAY TO BE RECONSTRUCTED PER CITY OF WOODBURN PUBLIC WORKS STANDARD DRAWING NO. 4150-4.

7. WALL EXTENTS MAY BE REDUCED IF GRADING INTO R/W IS APPROVED BY ODOT.

### STORMWATER NOTES

- TOTAL IMPERVIOUS AREA IS 1.32 ACRES OF THE 1.76 ACRES SITE.
- NEW IMPERVIOUS SURFACE FOR THE ADDITION AND INCREASED PARKING AREA TOTAL 0.24 ACRE AND AN EXPANSION OF THE STORM DRAINAGE INFRASTRUCTURE.
- THE EXISTING STORMWATER SYSTEM SERVING THE SITE IS A PRIVATE SYSTEM THAT FEEDS INTO AN OREGON DEPARTMENT OF TRANSPORTATION (ODOT) SYSTEM. AS A RESULT, THE STORM WAS DESIGNED TO ODOT HYDRAULICS MANUAL STANDARDS.
- UNDER EXISTING CONDITIONS, THE TOTAL TRIBUTARY IMPERVIOUS AREA TO THE OUTFALL FOR THIS PROJECT IS 1.10 ACRES, AND THE PEAK OUTFLOW IS 2.38 CFS. THE DEVELOPMENT PROPOSES 0.28 ACRES OF ADDITIONAL IMPERVIOUS AREA. BASED ON THE ODOT STANDARDS FOR STORMWATER DETENTION, WHICH USE THE RATIONAL METHOD FOR A 10-YEAR DESIGN STORM, A STORAGE VOLUME OF 120 $FT^3$ MAY BE REQUIRED. THE PROPOSED STORAGE SYSTEM IS A 96" MANHOLE WITH A MAXIMUM STORAGE DEPTH OF 2.39' AND A 7.66" ORIFICE. ALTERNATE STORAGE SYSTEMS MAY BE USED TO MEET DESIGN REQUIREMENTS AT TIME OF PERMIT IF DETENTION IS REQUIRED BY ODOT.
- NO WATER QUALITY FACILITIES ARE REQUIRED BY EITHER ODOT OR THE CITY OF WOODBURN.




| | | |
|---|---|---|
| DATE 03/24/2023 | MH1 P210 — STORMWATER DETENTION & FLOW CONTROL MANHOLE | SHEET 1 OF 1 SHEETS |
| SCALE NTS | | |
| DRAWN NMT | | |
| FILE FLOW_CONTR... | | |

VARITONE ARCHITECTURE
231 SW 2ND AVE
ALBANY, OREGON
(541) 497-2954

| REVISIONS | DATE | BY |
|---|---|---|
| . | . | . |
| . | . | . |
| . | . | . |
| . | . | . |



# HIEX WOODBURN ADDITION
*WOODBURN, OREGON*

## PRELIMINARY GRADING & UTILITY PLAN

120 NORTH ARNEY ROAD, WOODBURN, OR, 97071

REGISTERED PROFESSIONAL ENGINEER 60183PE
OREGON JULY 13, 2004
PETER J. SEADERS
RENEWAL: 6/30/2024

MSS INC
ENGINEERING CONSULTANTS AND PLANNERS
215 NW 4th STREET
CORVALLIS, OR 97330
(541) 753-1320 FAX (541) 753-5956

| JOB # | FILE | DRAW |
|---|---|---|
| 21156 | P-GRAD | LMG |
| SCALE | DATE | |
| AS SHOWN | 4/5/23 | |

**P210**

# 4 OF 6 SHEETS

# Appendix C – Rational Method Analysis Results

# Detention Storage - Rational Method

Project: HIEX Hotel Remodel & Addition

Prepared By: LMG/NT/PS

**Hydrologic Zone** 7
**Storm Frequency (yrs)** 10

**Before Development Conditions**

| | C | A | **CA** | Tc | I (inches/hr) | **$Q_{outflow}$** |
|---|---|---|---|---|---|---|
| Pervious | 0.22 | 0.66 | 0.15 | | | |
| Impervious | 0.9 | 1.1 | 0.99 | | | |
| Total / Weighted | 0.65 | 1.76 | 1.1 | 5 | 2.1 | **2.38** |

**After Development Conditions**

| | C | A | **CA** | Tc |
|---|---|---|---|---|
| Pervious | 0.22 | 0.38 | 0.08 | |
| Impervious | 0.9 | 1.38 | 1.24 | |
| Total / Weighted | 0.75 | 1.76 | **1.33** | 5 |

**Max Depth @ orifice** 2.39 **ft**
**Single Orifice Size =** 7.66 **inches**

| **Time** Min. | **CA** Acres | **Rain Inten.** in/hr | **Inflow Rate** cfs | **Inflow Vol** $ft^3$ | **Outflow Rate** cfs | **Outflow Vol** $ft^3$ | **REQ'd Storage** $ft^3$ |
|---|---|---|---|---|---|---|---|
| 5 | 1.3 | 2.10 | 2.8 | 835 | 2.38 | 715 | 120 |
| 10 | 1.3 | 1.62 | 2.1 | 1,288 | 2.38 | 1,430 | - - - |
| 15 | 1.3 | 1.38 | 1.8 | 1,646 | 2.38 | 2,146 | - - - |
| 20 | 1.3 | 1.20 | 1.6 | 1,909 | 2.38 | 2,861 | - - - |
| 25 | 1.3 | 1.06 | 1.4 | 2,108 | 2.38 | 3,576 | - - - |
| 30 | 1.3 | 0.96 | 1.3 | 2,291 | 2.38 | 4,291 | - - - |
| 35 | 1.3 | 0.87 | 1.2 | 2,422 | 2.38 | 5,006 | - - - |
| 40 | 1.3 | 0.80 | 1.1 | 2,545 | 2.38 | 5,721 | - - - |
| 45 | 1.3 | 0.74 | 1.0 | 2,649 | 2.38 | 6,437 | - - - |
| 50 | 1.3 | 0.68 | 0.9 | 2,704 | 2.38 | 7,152 | - - - |
| 55 | 1.3 | 0.66 | 0.9 | 2,887 | 2.38 | 7,867 | - - - |
| 60 | 1.3 | 0.60 | 0.8 | 2,863 | 2.38 | 8,582 | - - - |
| 65 | 1.3 | 0.58 | 0.8 | 2,999 | 2.38 | 9,297 | - - - |
| 70 | 1.3 | 0.55 | 0.7 | 3,062 | 2.38 | 10,012 | - - - |
| 80 | 1.3 | 0.51 | 0.7 | 3,245 | 2.38 | 11,443 | - - - |
| 90 | 1.3 | 0.48 | 0.6 | 3,436 | 2.38 | 12,873 | - - - |
| 100 | 1.3 | 0.46 | 0.6 | 3,659 | 2.38 | 14,304 | - - - |
| 120 | 1.3 | 0.42 | 0.6 | 4,009 | 2.38 | 17,164 | - - - |
| 150 | 1.3 | 0.39 | 0.5 | 4,653 | 2.38 | 21,455 | - - - |
| 200 | 1.3 | 0.34 | 0.5 | 5,408 | 2.38 | 28,607 | - - - |
| 250 | 1.3 | 0.31 | 0.4 | 6,164 | 2.38 | 35,759 | - - - |
| 300 | 1.3 | 0.29 | 0.4 | 6,920 | 2.38 | 42,911 | - - - |

Required Storage = 120 $ft^3$

# Appendix D – NRCS Soil Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

# Custom Soil Resource Report for

# Marion County Area, Oregon

## Woodburn Hotel Remodel


June 1, 2022

# Preface

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

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

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

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

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

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

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# Contents

# How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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

# Soil Map


Map Scale: 1:907 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 10, 20, 40, 60

Feet: 0, 40, 80, 160, 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 19, Oct 27, 2021

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

Date(s) aerial images were photographed: Aug 19, 2015—Sep 13, 2016

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

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| Ba | Bashaw clay | 0.0 | 0.2% |
| WuA | Woodburn silt loam, 0 to 3 percent slopes | 1.8 | 99.8% |
| **Totals for Area of Interest** | | **1.8** | **100.0%** |

# Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

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

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

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

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

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

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

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

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

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

# Marion County Area, Oregon

## Ba—Bashaw clay

**Map Unit Setting**

*National map unit symbol:* 24nt
*Elevation:* 100 to 400 feet
*Mean annual precipitation:* 40 to 45 inches
*Mean annual air temperature:* 52 to 54 degrees F
*Frost-free period:* 200 to 210 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Bashaw and similar soils:* 85 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Bashaw**

**Setting**

*Landform:* Flood plains
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave, linear
*Across-slope shape:* Linear
*Parent material:* Alluvium

**Typical profile**

*H1 - 0 to 14 inches:* clay
*H2 - 14 to 48 inches:* clay
*H3 - 48 to 60 inches:* clay

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 0 to 12 inches
*Frequency of flooding:* NoneFrequent
*Frequency of ponding:* Frequent
*Available water supply, 0 to 60 inches:* Moderate (about 9.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4w
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* D
*Ecological site:* R002XC005OR - High Floodplain Group
*Forage suitability group:* Poorly Drained (G002XY006OR)
*Other vegetative classification:* Poorly Drained (G002XY006OR)
*Hydric soil rating:* Yes

## WuA—Woodburn silt loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 24s3
*Elevation:* 150 to 350 feet
*Mean annual precipitation:* 40 to 45 inches
*Mean annual air temperature:* 52 to 54 degrees F
*Frost-free period:* 200 to 210 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

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

### Description of Woodburn

#### Setting

*Landform:* Terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Silty alluvium and mixed mineralogy loess

#### Typical profile

*H1 - 0 to 17 inches:* silt loam
*H2 - 17 to 32 inches:* silty clay loam
*H3 - 32 to 68 inches:* silt loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 25 to 32 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 12.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2w
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* C
*Ecological site:* R002XC008OR - Valley Terrace Group
*Forage suitability group:* Moderately Well Drained < 15% Slopes (G002XY004OR)
*Other vegetative classification:* Moderately Well Drained < 15% Slopes (G002XY004OR)
*Hydric soil rating:* No

### Minor Components

**Aquolls, somewhat poorly drained**

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

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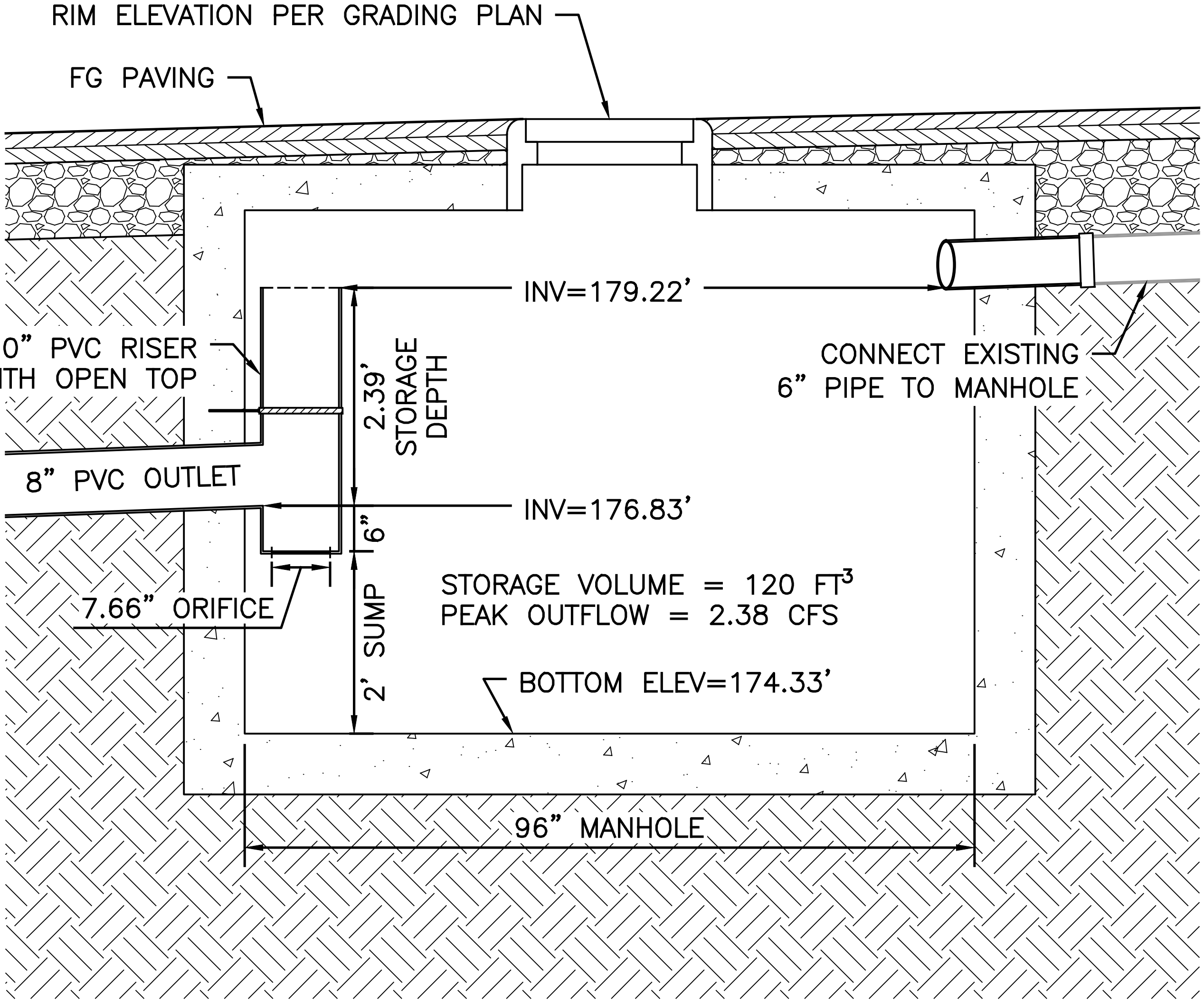
## APPENDIX E – STORMWATER DETENTION & FLOW CONTROL MANHOLE DETAIL

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| DATE 03/24/2023 | MH1 / P210 | STORMWATER DETENTION & FLOW CONTROL MANHOLE | SHEET 1 |
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