DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

October 8, 2024

Regulatory Branch
Corps No. NWP-2023-24-1

Mr. Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225
llister@portlandgolfclub.com

Dear Mr. Lister:

The U.S. Army Corps of Engineers (Corps) has received your request for a Department of the Army (DA) permit to temporarily discharge fill material for in-water work area isolation and dredged material dewatering and access activities associated with the hydraulic suction dredging (removal) of accumulated sediments. The project is proposed in Junor Lake (irrigation pond) and Wetland A located on Portland Golf Club property at 5900 SW Scholls Ferry Road in Portland, Washington County, Oregon at Latitude/Longitude: 45.472900°, -122.760619°. Your project has been assigned Corps No. NWP-2023-24-1. Please refer to this number in all future correspondence.

This letter is a provisional notification that your proposed project may qualify for authorization by Nationwide Permit (NWP) No. 33, Temporary Construction, Access, and Dewatering (Federal Register, December 27, 2021, Vol. 86, No. 245) and NWP 16, Return Water from Upland Contained Disposal Areas (Federal Register, December 27, 2021, Vol. 86, No. 245) provided you obtain a Clean Water Act Section 401 Water Quality Certification (WQC) decision from the Oregon Department of Environmental Quality (DEQ). You are not authorized to begin work in waters of the United States until: (1) you obtain and submit to our office a 401 WQC or the WQC requirement becomes waived and (2) you receive written verification from our office that the project is authorized by NWP 33 and NWP 16.

Your project requires a 401 WQC from DEQ. Please contact DEQ regarding this requirement at: 401 Water Quality Permit Coordinator, Oregon Department of Environmental Quality, 700 NE Multnomah Street, Suite 600, Portland, Oregon, 97232, by telephone at (503) 229-5623, or visit DEQ's website (https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Nationwide.aspx). If you do not request a 401 WQC within 30 days of the date of this letter, we may withdraw your permit application.

After obtaining a 401 WQC you must submit a copy of the 401 WQC to our office. The proposed work cannot be authorized by NWP if DEQ denies the 401 WQC. Please contact me if DEQ denies the 401 WQC for your project.

Upon receiving the 401 WQC, the Corps will notify the U.S Environmental Protection Agency (EPA). The EPA may take up to 30 days to review your project and to determine if the project may affect water quality in a neighboring jurisdiction. The 401 WQC process will be complete if EPA determines the project may not affect water quality in a neighboring jurisdiction or if EPA does not act within the 30 days. The EPA will notify you, the Corps and the neighboring jurisdiction if EPA determines the project may affect water quality in a neighboring jurisdiction.

In order for your project to be authorized by NWP, you will be required to comply with all of the NWP 33 and NWP 16 Terms and Conditions, the NWP Regional Conditions, the conditions of the 401 WQC if applicable, and any special conditions we add to the NWP verification. The full text of NWP 33 and NWP 16 and all conditions are available on our website (https://www.nwp.usace.army.mil/Missions/Regulatory/Nationwide/). For your information, Enclosure 1 lists the special conditions we are proposing to add to the NWP verification.

If you propose to modify the proposed project as a result of coordination with DEQ, you must submit a revised project description and revised project drawings for our review. Substantial changes may require additional evaluation of your permit application.

We recommend that you do not award construction contracts until you receive a written verification from our office that the project is authorized. Since a DA permit is necessary for this work, do not commence construction before obtaining our NWP verification letter. If you have any questions regarding the process described above or the proposed permit conditions, please contact me by telephone at (503) 808-4380 or by email at michael.t.neal@usace.army.mil.

Sincerely,

Michael Neal

Michael Neal
Project Manager, Regulatory Branch

Enclosure

cc:
Terra Science (Phil Scoles, pscoles@terrascience.com)
Oregon Department of State Lands (Mike DeBlasi, michael.deblasi@dsl.oregon.gov)
Oregon Department of Environmental Quality (401applications@deq.oregon.gov)

Corps No. NWP-2023-24

Proposed Nationwide Permit verification special conditions. Any enclosure numbers referenced below would pertain to the Nationwide Permit verification letter, as applicable.

a. Permittee shall dispose of excavated materials at a suitable upland location, and materials shall be adequately stabilized to minimize increases in turbidity levels and indirect impacts to wetlands and other aquatic systems. The material shall be placed in a location and manner that prevents its discharge into waterways or wetlands. In the event of spills, affected material shall be taken to an appropriate upland location (and properly disposed of in accordance with any state standards or requirements).

From: DEBLASI Michael * DSL
Sent: Tue, 10 Dec 2024 22:29:25 +0000
To: llister@portlandgolfclub.com
Cc: DSL Support Services * DSL; STERTZ Kevin A * ODFW; TEACH Haley * DEQ; Lindsey Obermiller; Campos, Brittney C CIV USARMY CENWP (USA); Phil Scoles
Subject: 63610-RF Complete Application

Dear Applicant:

The Department of State Lands has received your application for the proposed project in T. 01, R. 01W, Section 24BC, Tax Lot 1700, Beaverton, Washington County, 45.4729°; -122.760619°. You can view a copy of the application and check the status.

Application Complete, Fee Received
Your application will soon be circulated for the 30 day public comment period. You may view electronic comments and the status at http://www.statelandsonline.com. After the comment period ends, comments will be forwarded to you for an opportunity to address any concerns. A permit decision will be made within 60 days of the close of the comment period unless you otherwise request an extension.

Please call me if you have any questions.

Sincerely,
Michael De Blasi
Aquatic Resources Coordinator
Marion, Polk & Clackamas Counties

Oregon Department of State Lands
775 Summer St NE, Suite 100
Salem, Ore 97303
503-509-0460
http://www.oregon.gov/DSL/Pages/index.aspx

From: DEBLASI Michael * DSL
Sent: Wed, 25 Sep 2024 23:00:54 +0000
To: llister@portlandgolfclub.com
Cc: DSL Support Services * DSL; STERTZ Kevin A * ODFW; TEACH Haley * DEQ; Lindsey Obermiller; Campos, Brittney C CIV USARMY CENWP (USA); Phil Scoles
Subject: 63610-RF Incomplete Application
Attachments: 63610-RF CompletenessChecklist_20240925.docx

Dear Applicant:

The Department of State Lands has received your application for the proposed project T. 01, R. 01W, Section 24BC, Tax Lot 1700, Beaverton, Washington County, 45.4729°; -122.760619°.
You can view a copy of the application and check the status.

Your application has been reviewed (based on OAR 141-085-0550, et seq.) and determined to be **incomplete** because it is missing the items in the attached checklist.

To continue processing your application, please resubmit a **complete application package**, including all the items identified in the attached checklist. Please do not submit addenda or loose pages.

Please reference DSL file number 63610-RF on all future correspondence. Your resubmission will initiate a new 30-Day completeness review period.
To re-submit application online please see instructions here:
https://www.oregon.gov/dsl/wetlands-waters/Documents/uploadinstructions_removalfill.pdf

You are cautioned that conducting any of the proposed work before obtaining a removal-fill permit is a violation of state law that could result in an enforcement action. Also note that a permit from the U.S. Army Corps of Engineers does not replace the need to obtain a removal-fill permit from the Department of State Lands.

ADMINISTRATIVE CLOSURE

If a revised application is not resubmitted within 120 calendar days of an incompleteness or ineligible determination, the Department may administratively close the file. OAR 141-085-0555. If the Department closes the file for failure of the applicant to respond in a timely fashion to the request for additional information, the Department will retain the application fee. A subsequent application for the same or similar project will require submittal of a new application and payment of an application fee. (OAR 141-085-0555(4))

REQUEST FOR HEARING

An applicant may request a contested case proceeding if they object to an application incompleteness determination, permit decision or permit condition imposed by the Department. ORS 196.825(7). The request must be in writing and must be received by the Department within 21 calendar days of the decision. (OAR 141-085-0575). Pursuant to OAR 137-003-0550, any person requesting or participating in a hearing that is a corporation, partnership, limited liability company, unincorporated association, trust, or government body must be represented by an attorney licensed to practice in Oregon, including in its request for a hearing.

FINAL ORDER

If you fail to request or appear at a scheduled hearing, or withdraw your hearing request after it is made, this Notice will automatically become a final determination that the application is incomplete. The Department's file would serve as the record upon default.

NOTICE TO ACTIVE DUTY SERVICEMEMBERS

Active duty Servicemembers have a right to stay these proceedings under the federal Servicemembers Civil Relief Act. For more information contact the Oregon State Bar at 800-452-8260, the Oregon Military Department at 503-584-3571 or the nearest United States Armed Forces Legal Assistance Office through http://legalassistance.law.af.mil. The Oregon Military Department does not have a toll free telephone number.

Please contact me if you have any questions related to this correspondence.

Thank you,

Michael De Blasi
Aquatic Resources Coordinator
Washington & Clackamas Counties

Oregon Department of State Lands
775 Summer St NE, Suite 100
Salem, Ore 97303
503-509-0460
http://www.oregon.gov/DSL/Pages/index.aspx

Department of State Lands
Joint Application Completeness Checklist

Application No: 63610	☐ New or ☒ Re-submittal	Date Received: 8/14/2024
Reviewed By: M DeBlasi	Complete: ☐ Yes ☒ No	Date Reviewed: 9/9/2024

The following items are required for a complete application. (☒ Indicates information is NOT in the application or is deficient)	**Comments (Please provide additional information and/or address the issues)**
(Block 2) Applicant/property owner information	
☐ Name ☐ Address ☐ Phone ☐ Email ☐ Agent ☐ If applicant is a partnership or corporation or condemner: ☐ Certification of Incumbency ☐ Applicant name is consistent with the Corporation Division of the Secretary of State ☐ Filed eminent domain and deposited compensation	
(Block 3) Project information	
(A) Project Location ☐ Project name ☐ Tax lot ☐ Latitude/Longitude ☐ Street/descriptive location ☐ City ☐ County ☐ T.R.S ☐ ¼,¼ Section ☐ Brief directions to the site **(B)** Types of Waterbodies or Wetlands ☐ Type of Waters ☐ River mile **(C)** Project Category	
(Block 4) Proposed Project Description	
☐ **(A)** Brief Description of Whole Project	

☐ **(B)** Description of Work in Waters and Wetlands	In the Project Description, it reads the "project will not create any permanent impervious surfaces, but it will install a temporary gravel staging area on the east side of Wetland A". That can only be true with the removal of the access road at the upper end of Wetland A. The application reads it "may necessary to install a bypass pipe around Wetland A to minimize excess water pumped back to Junor Lake and to maintain the hydrologic continuum to wetlands downgradient of Wetland A". But you've written elsewhere that the bypass will happen. Is it definite or not? Another is that the Infiltration area is for when the water levels in the pond increase due to rain, the excess water can be "removed by opening one of the control gates if lake has background turbidity levels, or by turning on the irrigation system to disperse the water across large areas of the golf course. Alternatively, the excess water can be infiltrated at the designated infiltration area located east of Wetland A". But the drawing in Figure 6C shows water that would be diverted to the Infiltration Area to be coming from the location of the sump for water recovery in Wetland A.
☐ **(C)** Construction Methods ☐ Identification of measures to repair, rehabilitate or restore and further reduce or eliminate impacts during and after construction: May include but not be limited to: ☐ Specific erosion and sediment control methods or BMPs. ☐ Work area isolation (required for work in a waterway where migratory fish are present)	
☐ **(D)** Identification of sources of fill and disposal area locations	
☐ **(E)** Construction Timeline	
☐ **(F)(G)** Removal dimensions and volumes for individual impacts in wetlands/waters ☐ Area (acres) ☐ Volume (cubic yards) ☐ Duration	
☐ Stream miles	
☐ Types of material removed	
☐ **(H)(I)** Fill dimensions and volumes in wetlands/waters ☐ Area (acres) ☐ Volume (cubic yards) ☐ Duration	
☐ Stream miles	

☐ Types of fill material	
☐ Identify use of ODFW fish passage criteria	
☐ **In-water Work Period required**	
(Block 5) Project Purpose and Need	
☐ Defined project purpose ☐ Documented need	
(Block 6) Project site resource description ☐ **(A)** Description of existing biological and physical characteristics of the wetland/waterway ☐ Wetlands (include as appropriate): ☐ Type (eg. Cowardin and HGM class) ☐ Dominant plant species	
☐ Waterways (include as appropriate): ☐ Describe channel/bank conditions ☐ Type and condition of riparian vegetation ☐ Channel morphology ☐ Stream substrate	
☐ Fish and wildlife species and use	
☐ **(B)** Describe navigation, fishing and recreational use	
(Block 7) Alternatives Analysis	
☐ Project criteria	
☐ Alternative sites and designs that minimize impacts	
☐ Evaluation of each against criteria with reasons why alternatives are not practicable	
☐ Measures to avoid and minimize effects of the changes	
(Block 8) Additional Information	
☐ Known threatened/endangered species	
☐ Known Federal or State Scenic Waterway	
☐ Within the 100-year floodplain?	
☐ Within the Territorial Sea Plan (TSP)?	
☐ Within a Marine Reserve?	
☐ Dredged material been physically or chemically tested?	
☐ Known archeological information	
☐ Previous DSL or Corps of Engineers issues/permits ☐ Wetland delineation ☐ Delineation concurrence	
(Block 9) Impacts, Restoration/Rehabilitation, and Compensatory Mitigation	

☒ **(A)** Description of Impacts	The bypass will keep the irrigation pond water recycling separated from the natural flow of water. If that is correct, then I assume that you are still going to remove the access road fill because otherwise the wetland would be "starved" of water once the project is completed. Have you determined if the water entering the wetland from the spoils is equal to the water that would naturally be flowing through the wetland? I need to see that this is equal or slightly greater to the existing amount of water in wetland A. Otherwise, you risk dewatering wetland A during the project or overwatering the wetland only to cut off the water once the project is done and if the access road isn't removed.
☐ Analysis of hydrologic changes and measures taken to avoid or minimize any adverse effects 085-0550(5)(h)	
☐ **(B)** Work site rehabilitation plan for temporary impact	
Compensatory Mitigation	
☐ **(C)(D)** Proposed Mitigation Approach and Rationale ☐ Mitigation meets eligibility criteria ☐ Mitigation meets mitigation size/ratio requirement ☐ Correct functional assessment used for project impacts and proposed mitigation ☐ SFAM (wadable non-tidal streams/rivers) ☐ Stream BPJ (non-wadable, tidal) ☐ Vernal Pool Assessment (agate desert only) ☐ ORWAP (Wetland impacts ≥0.2 ac) ☐ BPJ (option for wetland impacts <0.2 ac, other waters not covered by assessments above) ☐ see ORWAP/SFAM verification at the bottom of checklist if applicable	
☐ Permittee-responsible mitigation ☐ Compensatory mitigation plan (see Mitigation Plan Checklist) ☐ Defined performance standards ☐ Site monitoring and reporting consistent with DSL guidance ☐ Administrative protection of mitigation site ☐ Department approved financial security	
☐ Bank credit purchase, FIL or PIL ☐ Description of how credit purchase meets principal objectives ☐ Payment Calculator for FIL or PIL	

(Block 10) Adjacent Property Owners for Project and Mitigation Sites	
☐ Adjoining property owners' names and addresses for the RF site or, for new linear facilities, landowners whose land is within or adjacent along the entire alignment ☐ Mailing labels (required if more than five for hard copy submittal or more than 30 for electronic portal submittal)	
☐ Adjoining property owners name and address to the wetland mitigation site, if applicable ☐ Mailing labels (required if more than five)	
(Block 11) City/County Planning Department Land Use Affidavit	
☐ City &/or county planner review and signature (All appropriate jurisdictions)	
(Block 12) Coastal Zone Certification	
☐ Applicant signature	
(Block 13) Signatures and Fees	
☐ Application Fees	
☐ Signature of applicant	
☐ Signature of agent	
☐ For IPs: signature of property owner where RF proposed; For GPs or projects for new linear facilities: no signature required	
☐ Signature of Mitigation Site Owner	
☐ Land Management Signature- required for all RF impacts or mitigation proposed on state-owned s/s tidal land and waters, navigable waterways, range lands and other property. RC must have signature prior to completeness.	
(Block 14) Attachments - Drawings and Figures	
☐ Location map (with project site, roads, disposal site and mitigation site indicated, as applicable to project)	
☐ Tax Lot map(s) for Project and mitigation, as applicable) with tax lots highlighted	
☐ Plan view drawing: ☐ Entire project and r/f activities identified ☐ Existing and proposed contours ☐ OHW or HMT and/or wetland boundaries ☐ Proposed temporary impacts identified ☐ Proposed permanent impacts identified ☐ Staging areas ☐ Construction access ☐ Location of cross section(s) ☐ Mitigation area, if applicable	

☐ Cross-section drawings: ☐ Existing and proposed elevations to scale ☐ OHW or HMT and/or wetland boundaries ☐ Impacts: temporary, permanent, direct, indirect ☐ scale bar (horizontal and vertical scale)	
☐ Recent aerial photo	
☐ Mitigation Documents: ☐ Mitigation plan ☐ Functional assessment(s) ☐ Score sheet(s) ☐ Cover page ☐ Maps ☐ Excel file emailed to ARC ☐ Eligibility and accounting documentation ☐ Matching quick guide(s) ☐ CM Eligibility and Accounting sheet	
DELETE what is not applicable, content review is always required. A full review includes the spot review. Refer to staff verification guide for instructions. ☐ **SFAM Content Review** ☐ Workbook (Excel file) ☐ Cover Page Tab ☐ Values Tab ☐ Functions Tab ☐ Scores Tab ☐ Subscores Tab ☐ Site Layout Form Tab ☐ PAA Field Form Tab ☐ EAA Field Form Tab ☐ SFAM report (lat/long) and StreamStats report ☐ Aerial Photo with correct PA, PAA, EAA boundaries ☐ Topo maps with PA, PAA, EAA ☐ Site Photos and Videos (Optional) ☐ Site Photos and Videos (Optional)	
☐ **ORWAP Content Review** ☐ Workbook (Excel file) ☐ Cover Pg Tab ☐ OF Tab ☐ F Tab (non-tidal) ☐ T Tab (tidal) ☐ S Tab ☐ Scores Tab ☐ ORWAP report (with correct lat/long) ☐ Aerial Photo with correct AA boundaries ☐ Topo maps with correct RCA and SCA ☐ Site Photos and Videos (Optional) ☐ Site Photos and Videos (Optional)	

☐ **SFAM Spot Review** ☐ Bankfull Width ☐ (F1) Natural Cover ☐ (F3) Native Woody Vegetation ☐ (F6) Fish Passage Barriers ☐ (F11) Wetland Vegetation ☐ (F12) Side Channels ☐ (F17) Channel Bed Variability ☐ Wetted Width ☐ Thalweg Depth ☐ (V1) Rare Species ☐ (V3) Protected Areas ☐ (V5) Riparian Area ☐ (V6) Extent of Downstream Floodplain Infrastructure ☐ (V7) Zoning ☐ (V10) Fish Passage Barriers ☐ (V11) Water Source ☐ **SFAM Full Review** ☐ (F4) Large Trees ☐ (F5) Vegetated Riparian Corridor Width ☐ (F7) Floodplain Exclusion ☐ (F8) Bank Armoring ☐ (F13) Lateral Migration ☐ (F14) Wood	

- ☐ **ORWAP Spot Non-Tidal Review**
  - ☐ (OF1) Distance to Extensive Perennial Cover
  - ☐ (OF3) Distance to Ponded Water
  - ☐ (OF8) Wetland Type Local Uniqueness
  - ☐ (OF16) Conservation Designations
  - ☐ (OF17) Non-anadromous Fish Species
  - ☐ (OF18) Amphibian or Reptile
  - ☐ (OF19) Feeding Waterbird Species
  - ☐ (OF20) Nesting Waterbird Species
  - ☐ (OF21) Songbird, Raptor, Mammal Species
  - ☐ (OF22) Invertebrate Species
  - ☐ (OF23) Plant Species
  - ☐ (OF28) Input Water Recognized Quality Issues
  - ☐ (OF29) Duration of Connection
  - ☐ (OF32) Drinking Water Source
  - ☐ (OF41) Upland Edge Shape Complexity
  - ☐ (OF42) Zoning
  - ☐ (OF43) Growing Degree Days
  - ☐ (F3) Water Regime
  - ☐ (F31) Outflow Duration
  - ☐ (F36) Internal Gradient
  - ☐ (F37) Groundwater Strength of Evidence
  - ☐ (F52) Upland Perennial Cover % of Perimeter
  - ☐ (S1) Aberrant Timing of Water Inputs
- ☐ **ORWAP Full Non-Tidal Review**
  - ☐ (OF4) Distance to Lake
  - ☐ (OF5) Distance to Herbaceous Open Land
  - ☐ (OF6) Distance to Nearest Busy Road
  - ☐ (OF7) Size of Largest Nearby Patch of Perennial
  - ☐ (OF9) Perennial Cover Percentage
  - ☐ (OF10) Forest Percentage
  - ☐ (OF11) Herbaceous Open Land Percentage
  - ☐ (OF12) Landscape Wetland Connectivity
  - ☐ (OF13) Local Wetland Connectivity
  - ☐ (OF14) Wetland Number and Diversity Uniqueness
  - ☐ (OF15) Landscape Functional Deficit
  - ☐ (OF24) River Proximity
  - ☐ (OF25) Floodable Property
  - ☐ (OF26) Type of Flood Damage
  - ☐ (OF27) Hydrologic Landscape
  - ☐ (OF30) Downslope Water Quality Issues
  - ☐ (OF31) Duration of Connection Between AA
  - ☐ (OF34) Relative Elevation in Watershed
  - ☐ (OF35) Runoff Contributing Area
  - ☐ (OF37) Transport From Upslope
  - ☐ (OF38) Upslope Soil Erodibility Risk
  - ☐ (OF39) Streamflow Contributing Area
  - ☐ (OF40) Unvegetated % in the SCA
  - ☐ (F4) Flooded Persistently % of AA
  - ☐ (F9) Cattail or Tall Bulrush Cover
  - ☐ (F16) All Ponded Water as a Percentage
  - ☐ (F17) Ponded Open Water Area
  - ☐ (F21) Width of Vegetated Zone
  - ☐ (F24) Ice-Free
  - ☐ (F27) Salinity Alkalinity Conductance
  - ☐ (F28) Fish and Waterborne Pests
  - ☐ (F29) Non-native Aquatic Animals

☐(F30) Shorebird Feeding Habitats ☐(F32) Outflow Confinement ☐(F33) Tributary or Overbank Inflow ☐(F38) Unshaded Herbaceous Vegetation ☐(F42) Mowing Grazing Fire ☐(F44) Moss Wetland ☐(F45) Woody Extent ☐(F47) Snags ☐(F53) Upland Perennial Cover Width ☐(F54) Upland Trees as % of All Perennial Cover ☐(F59) Cliffs or Banks ☐(F61) Ownership ☐(F62) Special Protected Area Designation ☐(F63) Conservation Investment ☐(F64) Compensation Wetland ☐(F65) Sustained Scientific Use ☐(F66) Visibility ☐(F67) Non-consumptive Uses Actual or Potential ☐(F69) Core Area 2 ☐(F71) Domestic Wells ☐(F72) Wetland Type of Conservation Concern ☐(S2) Accelerated Inputs of Nutrients ☐(S3) Accelerated Inputs of Contaminants and/or Salts ☐(S4) Excessive Sediment Loading from RCA ☐(S5) Soil or Sediment Alteration Within the AA	

- ☐ **ORWAP Spot Tidal Review**
  - ☐ (OF1) Distance to Extensive Perennial Cover
  - ☐ (OF6) Distance to Nearest Busy Road
  - ☐ (OF16) Conservation Designations
  - ☐ (OF17) Non-anadromous Fish Species
  - ☐ (OF18) Amphibian or Reptile
  - ☐ (OF19) Feeding Waterbird Species
  - ☐ (OF21) Songbird, Raptor, Mammal Species
  - ☐ (OF36) Unvegetated % in the RCA
  - ☐ (OF39) Streamflow Contributing Area
  - ☐ (OF42) Zoning
  - ☐ (T1) Estuarine Position
  - ☐ (T2) Salinity
  - ☐ (T4) Width of Vegetated Zone at Daily High Tide
  - ☐ (T5) Width of Vegetated Zone at Daily Low Tide
  - ☐ (T9) Blind Channels – Total Length and Branching
  - ☐ (T18) Vegetation Form-Predominant
  - ☐ (T21) Emergent Plants -- Area
  - ☐ (T31) Mowing or Grazing
  - ☐ (T42) Ownership
  - ☐ (T47) Wetland Type of Conservation Concern
  - ☐ (S1) Aberrant Timing of Water Inputs
  - ☐ (S2) Accelerated Inputs of Nutrients
- ☐ **ORWAP Full Tidal Review**
  - ☐ (OF1) Distance to Extensive Perennial Cover
  - ☐ (OF3) Distance to Ponded Water
  - ☐ (OF6) Distance to Nearest Busy Road
  - ☐ (OF7) Size of Largest Nearby Patch of Perennial
  - ☐ (OF8) Wetland Type Local Uniqueness
  - ☐ (OF9) Perennial Cover Percentage
  - ☐ (OF10) Forest Percentage
  - ☐ (OF12) Landscape Wetland Connectivity
  - ☐ (OF13) Local Wetland Connectivity
  - ☐ (OF15) Landscape Functional Deficit
  - ☐ (OF16) Conservation Designations of AA/Local Area
  - ☐ (OF17) Non-anadromous Fish Species
  - ☐ (OF18) Amphibian or Reptile
  - ☐ (OF19) Feeding Waterbird Species
  - ☐ (OF21) Songbird, Raptor, Mammal Species
  - ☐ (OF23) Plant Species
  - ☐ (OF27) Hydrologic Landscape
  - ☐ (OF28) Input Water Recognized Quality Issues
  - ☐ (OF29) Duration of Connection
  - ☐ (OF36) Unvegetated % in the RCA
  - ☐ (OF37) Transport From Upslope
  - ☐ (OF38) Upslope Soil Erodibility Risk
  - ☐ (OF40) Unvegetated % in the SCA
  - ☐ (OF42) Zoning
  - ☐ (T1) Estuarine Position
  - ☐ (T2) Salinity
  - ☐ (T4) Width of Vegetated Zone at Daily High Tide
  - ☐ (T5) Width of Vegetated Zone at Daily Low Tide
  - ☐ (T6) Internal Gradient
  - ☐ (T7) Outflow Duration
  - ☐ (T8) Outflow Confinement
  - ☐ (T9) Blind Channels – Total Length and Branching

☐(T10) Tidal-Nontidal Hydro-connectivity ☐(T14) Waterborne Pests ☐(T17) Vegetation Forms Significantly Present ☐(T18) Vegetation Form-Predominant ☐(T19) Vegetation Form Diversity ☐(T21) Emergent Plants - Area ☐(T27) Upland Perennial Cover - % of AA's Edge ☐(T28) Upland Perennial Cover - Width (Buffer) ☐(T29) Type of Non-Perennial Cover in Buffer ☐(T30) Slope from Disturbed Lands ☐(T31) Mowing or Grazing ☐(T35) Restored Wetland ☐(T36) Cliffs or Banks ☐(T38) Non-consumptive Uses - Actual or Potential ☐(T40) Core Area 2 ☐(T43) Special Protected Area Designation ☐(T44) Conservation Investment ☐(T45) Compensation Wetland ☐(T46) Sustained Scientific Use ☐(T47) Wetland Type of Conservation Concern ☐(S1) Aberrant Timing of Water Inputs ☐(S2) Accelerated Inputs of Nutrients ☐(S3) Accelerated Inputs of Contaminants and/or Salts ☐(S4) Excessive Sediment Loading from RCA ☐(S5) Soil or Sediment Alteration Within the AA	

From: Neal, Michael T CIV USARMY CENWP (USA)
Sent: Mon, 9 Sep 2024 21:10:06 +0000
To: 401applications * DEQ
Subject: Corps New Permit Application NWP-2023-24-1

The U.S. Army Corps of Engineers (Corps) has recently received a new application for a Department of the Army permit. We are providing the following based on our review of the permit application:

1. Corps number: NWP-2023-24-1
2. Applicant Name: Portland Golf Club
3. Waterway and Location: The project is proposed in wetlands and Woods Creek at 5900 S.W. Scholls Ferry Rd. near Portland, Washington County, Oregon at Latitude/Longitude: 45.472900°, -122.760619°.
4. Permit Type: The project is likely a Nationwide Permit No. 42
5. If NWP, PCN required: Yes
6. Permitting Authority: Section 404

Please notify me of the date DEQ receives a request for water quality certification (i.e., receipt date).

Sincerely,

Michael Neal, PWS
Regulatory Project Manager
U.S. Army Corps of Engineers – Portland District
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Customer survey: https://regulatory.ops.usace.army.mil/customer-service-survey/

APPENDIX D – LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATE (LEDPA) ANALYSIS

UPDATED ALTERNATIVES ANALYSIS FRAMEWORK FOR PORTLAND GOLF CLUB IRRIGATION POND DREDGING PORTLAND, WASHINGTON COUNTY, OREGON

Prepared for

OREGON DEPARTMENT OF STATE LANDS
775 Summer Street N.E., Suite 100
Salem, Oregon 97301-1279
(DSL Application 63610-RF)

and

U.S. ARMY CORPS OF ENGINEERS
Portland District, Eugene Field Office
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Eugene, Oregon 97401-2763
(USACE Application NWP 2023-0024)

Prepared by

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5900 S.W. Scholls Ferry Road
Portland, Oregon 97225

NOVEMBER 2024 (Updated)

Introduction

On behalf of Portland Golf Club, the following is an updated alternative analysis framework document for Section 7 of PCG's Joint Permit Application (JPA), USACE Application NWP 2023-0024 and DSL Application 63610-RF. This document itemizes the project criteria and alternatives analysis for the proposed Irrigation Pond (aka Junor Lake) Sediment Removal-Disposal project located on PGC property in southwest Portland, Washington County, Oregon Based on agency discussions, the proposed sediment bag placement will occur on upland west of Wetland A and all of the wetland impact will be temporary. The dredging portion of the project is only slightly modified with the change of sediment bag placement. Information herein addresses U.S. Army Corps of Engineers' (USACE's) permit program requirements under the National Environmental Policy Act (NEPA) and the Clean Water Act, Section 404(b)(1) guidelines. This analysis also addresses the Department of State Lands' (DSL's) alternatives analysis requirements under OAR 141-085-0550(5)(o). This document supersedes the previous alternatives analysis submitted with the JPA in August, 2024.

Background

Portland Golf Club (PGC, Applicant) is a premier golf course located in eastern Washington County, Oregon located at 5900 S.W. Scholls Ferry Road. PGC was established in 1914, when no roads existed to the property, and the golf course was accessed by the Oregon Electric railroad. PGC's golf course was designed by world-renowned golf course architect, Robert Trent Jones and is highly regarded throughout the golfing world for combining magnificent design with extreme speed. PGC is listed in the National Register of Historic Places by the National Park Service under the National Historic Preservation Act of 1966 to protect PGC as one of America's historic resources.

Over the years, PGC hosted seven Portland Opens, five Portland Classics, the 1969 Alcan Championship, and the 1982 U.S. Senior Open. PGC hosts thousands of golf plays each year as well as local, regional and national tournaments, such as the Western Amateur, Women's Western Open, Oregon Amateur, U.S. Senior Amateur, PGA Championship, Ryder Cup, PNGA Men, PNGA Women, U.S. Women's Amateur Championship, and Fred Meyer Challenge. Such events each bring 100 or more out-of-state amateur and professional golfers to each event who stay locally for lodging, food services, and entertainment.

The PGC property is 147 acres, which is very compact for a modern day golf course. Approximately 95 acres are irrigated and mowed turf, while the remainder of the property consists of a clubhouse, parking lots, maintenance facilities, recreational uses (pool and tennis courts), and natural spaces (such as creeks, forest, and shrub land). The property is a peaceful oasis only minutes from downtown Portland, with two creeks, Woods Creek and Fanno Creek, winding through the golf course, mature tree-lined fairways, manicured greens, wildlife, and floral configurations. PGC offers active open space within the urban environment of the Portland metro area. The PGC property also provides needed floodplain storage when Fanno Creek floods.

Donald Junor, born in Aberdeenshire Scotland in 1889, came to Portland Golf Club in 1920, and at that time he was the most experienced greens keeper (golf professional) on the Pacific Coast. In the 1920s, he dredged a reservoir on the golf course property using horses, which is named " Junor Lake" in his honor. Junor Lake stores water for irrigation, which water is essential to PGC's operations, but the lake is much more than an irrigation reservoir. Junor Lake is essential to PGC's operations (in-ground water reservoir), as well as a golfing hazard for 2 fairways, and open water feature that attracts waterfowl and small mammals that inhabit nearby forest and open spaces, contributing to the overall design, function, and enjoyment of the property.

Project Overview

Junor Lake is 1.77 acres, receives year-round flows from Woods Creek, and, in turn, seasonally overflows into Fanno Creek. Fanno Creek bisects the golf course, with half of the fairways to the north (front 9 holes) and other half to the south (mostly back 9 holes). Woods Creek bisects the southern portion of the

property, flowing from the east boundary to the Junor Lake, then overflows to Fanno Creek via gate valves to the northwest and southwest. Fanno Creek flows several miles from the golf course to the southwest and is tributary to the Tualatin River.

Woods Creek watershed extends west and south (almost to Interstate 5 near Capitol Highway). The watershed continues to urbanize with in-fill lots being converted to residences, streets widened for sidewalks, and construction of higher density developments (duplexes, apartments, backyard cottages, etc.). Consequently, this increased amount of upgradient (offsite) stormwater has eroded upgradient creek channels and ditches, then washing such dirt onsite via Woods Creek. The nature of this urban watershed now has flashy flows that carry sediments to Junor Lake. While improved sediment trapping from the Woods Creek watershed is beyond the scope of this project, PGC is supportive of mutually beneficial restoration projects that improve water quality. PGC welcomes opportunities to work with Clean Water Services to improve water quality and stream habitat.

PGC minimizes erosion potential within the golf course by facilitating infiltration and having very little impervious cover. Additional measures to reduce onsite runoff include continued maintenance of forest and tree corridors that intercept rainfall and facilitate subsurface water movement. PGC also closes a gate valve to prevent sediment-laden water from being deposited in Junor Lake when Fanno Creek carries sediments from rain events. Thus, the loss water storage potential in Junor Lake is due to sediment imported by Woods Creek. Given the urbanizing nature of the Woods Creek watershed, sediment accumulation in Junor Lake is unavoidable.

In 1994, PGC received authorization from DSL and USACE to remove accumulated sediments from Junor Lake, but the attempt was not successful. In particular, the equipment was inadequately sized, and associated labor was only capable of removing a few hundred cubic yards of sediment. The failure of the prior sediment removal only delayed the inevitable need to remove 5,300 cubic yards of sediment.[1] As the accumulated sediment increases in Junor Lake, it reduces water storage capacity, and increases sediment uptake by the golf course's irrigation pump, causing damage to PGC's irrigation system. The sediment accelerates pipe deterioration, lowers water pressure, and shortens pump life. PGC plans to seek future authorizations to remove sediment from Junor Lake on a more regular basis.

Project Purpose and Geographic Area

The **basic purpose** of the proposed project is to maintain the continuing viability of the property as a world-renowned golf course. The **overall/specific purpose** of the project is to maintain Junor Lake by removing and disposing of approximately 5300 cubic yards of accumulated sediment from the reservoir, to provide irrigation water to the golf course while also maintaining the integrity and value of the property for its current purpose and function.

For the purposes of USACE review, the dredging activity constitutes a 'water dependent activity' because the removal of accumulated sediment occurs only within jurisdictional wetland and waters. The placement of sediment bags is not considered water-dependent activity; however, only 0.05-acre of temporary wetland impact is necessary to place sediment bags on upland west of Wetland A.

The **geographic area** of the project is the PGC property. The golf course was developed and has remained at its current location for over a century. The purpose of the project is to maintain the continuing viability of the PGC property as a world-renowned golf course, so other properties are not available to meet the purpose of the project. However, to ensure a reasonable range of alternatives are considered, off-site alternatives are included for portions of the overall project.

[1] The sediment removed from Junor Lake includes an unknown amount of golf balls. In accordance with state regulations, PGC will coordinate with Oregon Department of Environmental Quality concurrently with the USACE and DSL permitting process.

Project Criteria

The project requires removal of 5300 cubic yards of sediment from Junor Lake and appropriately disposing of the sediment. The sediment will be removed by dredging and then placed nearby in large sediment bags. The project alternatives are evaluated using six project criteria: 1) Site size, 2) Site availability; 3) Logistics; 4) Environmental impacts; 5) Cost; and 6) Other qualitative factors. Project criteria are further defined below:

1. Site Size

The site must provide minimum necessary water storage capacity or supply, and also allow for disposal of the removed sediment.

1a. Water Storage/Supply Size: Will the site provide an adequate supply of water to the golf course?

To meets Applicant's water use needs, project alternatives must have storage capacity of at least 4 acre-feet of water, based on PGC's state-issued water rights.

1b. Sediment Disposal Size: Will the site allow for disposal of the full volume of sediment removed?

Approximately 5300 cubic yards of sediment must be removed from Junor Lake. This sediment volume would fill approximately 90 sediment bags (roughly 60 cubic yards per bag, or 5 dump truck loads per bag equivalent).

2. Site Availability

2a. Water Storage/Supply Availability: Is the site one which can be reasonably obtained, utilized, expanded, converted, or modified to provide an adequate supply of water to the golf course?

PGC holds state-issued water rights to store surface water in Junor Lake from Woods Creek and Fanno Creek, and to use flows from Fanno Creek at Junor Lake and to utilize groundwater. Modifications to existing water rights are complex and uncertain, if for example, PGC requested to change the water storage location or alter the diversion point (other than at Junor Lake). Alternative sources of available water are explored, but speculative alteration of PGC's water rights is not proposed.

2b. Sediment Disposal Availability: Is the site one which can be reasonably obtained, utilized, expanded, converted, or modified to allow for sediment disposal?

Available sediment storage locations must have topography suitable for capturing water seeping from the sediment bags, and returning it to Junor Lake. Capturing the seepage water is required to keep the dredge afloat and keep turbid water from entering Woods Creek and Fanno Creek. Some locations may necessitate excavation and grading to create berms to capture seepage water for reuse. The availability of offsite sediment disposal was not considered practicable due to excessive trucking cost, limitations on the materials authorized as "clean fill" in construction and quarry sites, and landfill disposal cost.

3. Logistics

3a. Water Use Infrastructure: Will the alternative allow connection and use with the existing water system?

Junor Lake is situated at the confluence of Woods Creek and Fanno Creek. PGC's entire water use system is designed and constructed to utilize Junor Lake as a "bulge in the system" to provide enough volume and pressure to run the sprinkler system. The size of Junor Lake (i.e. water storage volume) allows water flows to recharge Junor Lake daily for nightly irrigation. A lake of smaller capacity will not adequately serve the pumping demand required to irrigate an 18-hole golf course each night during the dry season.

3.b. Construction Ingress/Egress: Will existing roads, bridges, and staging areas allow for the necessary construction?

The process of dredging Junor Lake and pumping sediment into geofabric bags for onsite storage could require access by heavy construction equipment. Access to PGC is limited, and internal access roads are too narrow for and not constructed to withstand heavy equipment. Consequently, construction logistics are very limited.

3c. Infrastructure Damage Avoidance: Will the alternative avoid damage to existing infrastructure?

Portions of the PGC property contain infrastructure that can be easily damaged by heavy machinery. Irrigation infrastructure is located throughout the PGC property. Additionally, many of the fairways, tees, and green have subsurface drainage pipe and tiles to facilitate water percolation through the soil. The south edge of the property has storm and sanitary sewers under the Fanno Creek pedestrian and bike trail.

4. Environmental Impact

Woods Creek and Fanno Creek dissect the PGC property -- these wetlands are listed in the US Fish & Wildlife Services' National Wetland Inventory, as well as in the Local Wetland Inventory. In addition, Wetland A is an emergent wetland near the south edge of the golf course property; while Wetland B is a partially forested wetland located north of Woods Creek and east of Junor Lake. Wetland C is a very narrow band of emergent wetland encircling Junor Lake. Wildlife utilize the creeks and wetlands and other portions of PGC's property.

4a. Stream Impacts (Quantitative): Will the alternative have impacts to streams?

To dredge Junor Lake, it is necessary to temporarily isolate it from Fanno and Woods Creeks. Less than 15 feet of Woods Creek will be temporarily disturbed for placement of a coffer dam where Woods Creek enters Junor Lake. The creek channel at this location is mostly unvegetated and has a soil substrate. The coffer dam will use plastic sheeting and sand bags to minimize impacts to the creek sidewalls and bottom. The temporary bypass pipe will be secured to 660 feet of the south edge of Junor Lake. After dredging, the coffer dam and pipe bypass will be removed leaving no damage to Woods Creek. No permanent damage will occur to Woods Creek or Junor Lake.

4b. Stream Functions (Qualitative): Will the alternative have impacts to water quality?

With only 15 feet of temporary channel disturbance, potential stream functions were assessed informally by a wetland scientist. Fish usage is limited to warm water-adapted species. The coffer dam and bypass pipe will temporarily affect Junor Lake as fish habitat; however, upstream segments of Woods Creek have sufficient in-stream habitat when the bypass is utilized. The proposed activity will not adversely impact water temperatures or water quality in Woods Creek. Post dredging conditions will have significantly greater sediment trapping and improved water quality functions.

4c. Wetlands Impacts (Quantitative): Will the alternative have impacts to wetlands?

Wetland A: Offset from Fanno Creek and Woods Creek, Wetland A is situated at the southern edge of the golf course property. Wetland A is 0.72-acre and palustrine, emergent wetland, per Cowardin Classification System. The wetland water regime best matches HGM-Slope. It is the only wetland in the project area outside of the flood zones for Fanno and Woods Creeks. While sustained by limited urban runoff and precipitation, Wetland A becomes seasonally dry most years and only connected to Fanno Creek during the rainy season. Wetland A provides wildlife habitat for terrestrial mammals, amphibians and birds, but lacks surface water conditions for fish habitat. Wetland A will be impacted by placement of sediment bags in the wetland.

Wetland B: Situated on a low terrace immediately north of Woods Creek (less than one-half located within project area). Roughly 1 acre and palustrine forested and emergent, per Cowardin Classification System. It has an HGM-Slope water regime. This wetland has connectivity to Woods Creek and occasionally floods when upgradient segments of Woods Creek receive heavy rainfall, sometimes once or twice per year. No impact is proposed to Wetland B, since placement of sediment bags in Wetland B will increase stream flows and downgradient flooding (offsite to southwest), as well as reduce onsite sediment trapping.

Wetland C: Portions of Wetland C occur at the base of a retaining wall that encloses Junor Lake. It is anticipated the sediment dredging will replace such portions of Wetland C with open water. There are other portions of Wetland C that consist of mowed lawn near the retaining wall. All of the alternatives will avoid permanent impacts to terrestrial portions of Wetland C.

4d. Wetlands Functions (Qualitative): Will the alternative have impacts to wetlands quality?

Wetland functions are assessed using Oregon Rapid Wetland Assessment Protocol (ORWAP). Such methodology generates a summary of findings, which is included in Appendix F of the JPA. Wetland functions potentially affected by the proposed dredging and sediment bag placement are limited to Wetlands A and C. Wetland A primarily provides terrestrial habitat, water quality, songbird, and amphibian habitat functions (breeding, nesting and feeding). It has incidental or indirect functions for water storage (desynchronization), sediment trapping, seasonal water for fisheries, carbon sequestration, and nutrient cycling. Wetland C functions are associated with the open water of Junor Lake, namely emergent habitat, water fowl feeding, amphibian nesting and feeding (invertebrates), fisheries support, nutrient cycling, and sediment trapping.

4e. Wildlife Impacts (Quantitative): Will the alternative have impacts to wildlife?

The proposed dredging activity and sediment bag placement will not impact habitat for any rare, threatened, or endangered species. Anticipated impacts to wildlife are displacement of wetland-dependent species, such as amphibians, songbirds, small mammals, and invertebrates. Loss of such habitat will displace wildlife to the east and/or west where Fanno Creek and Woods Creeks provide similar habitats. In general, impacts to wildlife are proportional to the degree of land disturbance and loss of cover or vertical structure.

4f. Wildlife Functions (Qualitative): Will the alternative have impacts to wildlife quality/diversity?

Urban wildlife functions are evaluated within the context that potential habitat is already highly fractured and affected by stressors like artificial lighting, vehicle/equipment noises, and human intrusion. Urban wildlife functions are often diminished, when compared to rural and large tracts of forest, range and open space. Typical functions include breeding, nesting and feeding opportunities within brush thickets, forests, and scattered clearings. Wetland-dependent wildlife functions typically incorporate near-surface wetness favorable to amphibians and certain invertebrates.

4g. Forest Upland Impacts (Quantitative): Will the alternative have impacts to forest uplands?

Upland forests and forested corridors occur throughout the PGC property, and extend offsite along Woods Creek and Fanno Creek. The alternatives proposed to avoid potential impacts to forest lands, since such areas require 50 to 100 years to mature. Additionally, loss of forest lands within an urban area increases summer temperatures, reduces wildlife habitat, decreases water quality, and interrupts migration corridors.

4h. Forest Upland Functions (Qualitative): Will the alternative have impacts to forest uplands quality?

Forested habitats have many terrestrial functions for urban wildlife, namely breeding, nesting, feeding, and migration. These habitats provide vertical habitat for small mammals and birds sensitive to ground predation. Forested areas also provide shelter from rain/snow with dense foliage, nesting cavities, natural platforms atop branches, and snags for perching. Forest area provide refugia for small mammals and song birds that reside offsite, but occasional travel through such corridors. Additionally, nearby residents greatly desire tall trees for visual purposes, windbreaks, air quality and temperature regulation. Humans also have a great affinity for urban wildlife, wildlife sounds, and diversity of other species utilizing forested habitats.

5. Cost

A comparative analysis of the cost of different alternatives. If the cost of an alternative is clearly exorbitant compared to similar actions and the proposed alternative, the alternative is eliminated as not practicable.

Projects costs include, but are not limited to, dredging, excavation and grading (land contouring), sediment bag placement or alternative transportation and disposal, and labor. Some alternative scenarios include the costs of bridge replacement, temporary road construction, alternative reservoir construction, fairway rehabilitation, trucking, and more. Estimated costs were compiled by the project team, and given consideration by a large-scale contractor to determine if such costs were within a reason range of expectations. See letter at end of this document from Deacon Construction LLC (Steve Deacon, November 13, 2023). The cost of compensatory mitigation is not factored into any of the alternative scenarios. Also, the costs do not include profits or other financial gains to the golf course from the project, but do take into consideration the damages to the golf course caused by project interference and/or permanent impairments.

5a. Dredging, Excavation, or Reservoir Costs:

The floating dredge and pumping system expenses include mobilization, set-up, operations for 6 to 8 weeks, demobilization, and ground rehabilitation.

5b. Sediment Bag Placement Cost:

This category includes expenses for sediment bag manufacturing, staging area preparation, grading, operations for 6 to 8 weeks, soil cover placement, and staging area rehabilitation.

5c. Infrastructure Costs:

Several alternatives require supplemental work for construction access, such as bridge replacement, temporary road construction, fairway rehabilitation, and protection of subsurface utilities.

5d. Implementation Costs:

Each alternative results in disruption of golf course operations and player utilization of golf course fairways. The dredging approach with sediment bag placement at Wetland A minimizes such disruption with temporary closures for pipe installation, setup and decommissioning. Several

alternatives require closure of entire fairways for construction of access roads, and/or sediment bag placement. And a few alternatives would reduce length of fairways and/or result in extensive damage to fairways that must rebuild the underlying drainage network and new turf. The cost of these rehabilitation efforts is an unavoidable project expense. Not included in this cost are temporary loss of revenue, loss of membership and loss of tournament income, which are difficult to assess for this alternatives analysis, and are therefore considered without precise dollar figures.

6. Other Qualitative Factors

Other qualitative factors are necessary to evaluate the relative suitability and practicability of alternatives to fulfill the basic and overall/specific purposes of the project. These factors are assessed on a yes/no basis as related to essential elements of the golf course. Alternatives that do not satisfy these factors will damage the golf course property and therefore cannot fulfill the basic and overall/specific purposes for the project. Moreover, if PGC cannot maintain a world-class golf course, event sponsors will no longer hold golf tournaments at PGC. Attached at the end of this document are letters supporting and validating these criteria from golf course architect, Dan Hixson (October 16, 2023), and golf course advisor, Henry DeLozier (October 14, 2023).

6a. Complete Golf Course: Will the alternative maintain the use of all 18 holes of the golf course, as well as practice greens and the driving range?

6b. Design Integrity: Will the alternative maintain the design integrity of the golf course, including the tees, greens, roughs, and golfing hazards?

6c. Drainage: Will the alternative maintain optimal soil and drainage conditions to support golf course irrigation and landscaping?

6d. Accessory Work Areas: Will the alternative maintain accessory work areas that are essential to golf course functions, such as a yard debris area and turf farm?

Sediment Excavation versus Sediment Dredging

The proposed dredging and sediment bag placement project is complex. Removing sediment from Junor Lake has only two approaches – excavation or dredging. To excavate, Junor Lake must be drained, haul roads constructed, sediment lifted out with excavators and bulldozers, and reconstruction of damaged fairways, retaining walls, and associated landscaping. The excavated sediment will also amount to 5300 cubic yard (similar amount as dredging). Such approach involves a lot of machinery, equipment operators, truckers and inspectors. Unlike most excavation projects, removal of the sediment will be messy, destructive, and risky due to potential opportunities for spillage, equipment failures and unintentional accidents. The excavated sediment must be hauled to a location where containment cells can be constructed. Given the excavated sediment contains about 50 percent water, the containment cell area will utilize the entirety of Wetland A, plus more working space for topsoil storage, truck haul roads, and excavator maneuvering. The remaining portion of the golf course lacks sufficient space for containment cell construction and associated haul roads.

In contrast, the dredging approach is rather surgical, with only the dredge cutting head and discharge pipeline having contact with the removed sediment. The equipment needed is limited to a floating dredge, pump and generators, temporary pipeline laid on the surface, and a pilot aided by several assistants. To keep the dredge floating, water will captured at the sediment placement site and pumped back to Junor Lake (hence a closed loop). There would be no water discharge to Fanno or Woods Creeks. The dredging approach is clearly the Least Environmentally Damaging Practicable Alternative for the removal of the accumulated sediment in Junor Lake.

Onsite Sediment Containment versus Onsite Sediment Bag Placement

Placement or hauling of the dredged sediment also has limited approaches, namely onsite containment cells, onsite sediment bags, and offsite disposal. All approaches involve removal (salvage) of topsoil, excavation of subsoil to desired grades, final contouring, and eventual return placement of the salvaged topsoil. Construction of sediment containment cells requires extensive work to create basins capable of holding a slurry of sand, silt, clay, and water. Such basins must be of sufficient size to hold the materials (about 5300 cubic yards) – either hauled in by truck, or pumped from dredge. Such construction is involves excavators, bulldozers, soil compactors, culverts, rock spillways, and road construction directly to each containment cell.

In contrast, construction for sediment bag placement utilizes less space (hence less grading) to build a sloping surface and small downgradient berm to capture and recycle drainage water. Such construction requires fewer excavators and bulldozers, as well as less durable road construction (for pickups, rather than 12CY dump trucks). The sediment bag placement approach also requires less water storage capacity, since the drainage water is continuously cycled back to Junor Lake to maintain water levels for the floating dredge (whereas the containment cell approach must hold more water and has a larger construction footprint). Thus, the sediment bag placement approach has less overall impacts for sediment sequestration.

Equipment/Truck Access From North of Fanno Creek versus Access From South of Fanno Creek.

Several alternative explored by the project team highlight a significant issue for either transporting sediment by truck or use of heavy equipment. Access from the north side of Fanno Creek is via S.W. Scholls Ferry Road and an interior road designed for pickups and maintenance carts. To access Junor Lake, it is necessary to use a weight restricted bridge, since it is old. While pickup trucks can utilize the bridge, it is not sufficiently strong to bear the weight of loaded dump trucks or equipment like excavators, or bulldozers. A replacement bridge is needed for such use, which has an estimated cost of $800,000 for engineering and construction. It is cost-prohibitive to replace the bridge for this project, as well as logistically difficult to bring in cranes, flatbed trailers and concrete mixing trucks to place the bridge decking.

In contrast, truck and heavy equipment access to the southernmost portion of the property (where sediment placement is proposed) is possible with safety and structural precautions. Specifically, it is necessary to add steel plating atop the Fanno Creek trail (paved path) to prevent damage to underlying sewer lines. A practical alternative will have minimal crossings by heavy equipment and loaded dump trucks. Several other alternatives that would haul away the sediment would require further reinforcement to protect the underground utilities. That is, there is a significant risk of damage to the sewer lines when up to 600 roundtrips of dump trucks must cross the Fanno Creek trail. Regardless, the alternatives which haul away the sediment will have dump truck fuel usage of 2500 and 3000 gallons, as well as street sweeping needs. The truck hauling alternatives require additional handling (movement) of the sediment, tipping fees and associated labor adds a minimum of 520,000 to the project cost. Aside from the logistical challenges, hauling away the sediment can only be done during the dry season when construction costs are highest and pedestrian use of Fanno Creek is greatest.

Rejected Alternatives

No-Action Alternative

The no-action alternative will result in Junor Lake filling with silts and clays, and eventually becoming a vegetated marsh. The irrigation uptake structure will become unusable due to clogging and the pumping system running dry, causing PGC to be unable to use water from the lake. PGC's state-issue water storage right will be forfeited and potentially cancelled; thus, PGC will be unable to irrigate the golf course. Without irrigation, turf and landscaping at the golf course will die and the golf course will become unusable. Specifically, the turf will seasonally become dormant, weeds will invade lawn areas, turf quality will become hard and undesirable, and golfing use will plummet to unsustainable levels. PGC will not be able to host events. The no-action alternative is unviable and will ultimately destabilize the golf course and force its closure. The no-action alternative cannot meet the project purpose.

New Site for Golf Course Alternative

Applicant began its alternatives analysis evaluation in January of 2020 by considering approaches to remove accumulated sediment in Junor Lake and potential options for sediment placement or offsite transport. Unlike construction of a new residential subdivision, commercial center, or industrial facility, the golf course cannot be relocated to a different property. It is surrounded by residential subdivisions and schools in all directions, so it is land-locked. The nearest vacant ground of sufficient size and suitability is more than six miles to the southwest and situated outside the Urban Growth Boundary. Such location does not serve the golf course membership, who live locally, and a replacement location would double or triple their commute to the golf course. PGC's water rights permit use of local water sources that cannot be utilized at an unrelated property. Additionally, the cost of constructing a new golf course would far exceed any other alternative discussed herein. As such, an alternate golf course location will not satisfy the project purpose.

Offsite Quarry or Construction Site Sediment Placement Alternative

Sediment placement at a quarry site was examined, which will involve hauling the sediment captured in the sediment bags offsite. Construction sites in the Beaverton-Tigard vicinity have similar potential for sediment bag disposal. Construction sites and quarries often accept clean fill material to backfill previously-mined areas (for future reclamation). Like traditional fill operations, quarries accept clean soil and that soil can be delivered in dump trucks once it is solid material. To attain solid-like consistency, excess water must first drain out of the sediment bags; then it can be loaded into dump trucks. At least a year is needed to remove the excess water from the sequestered sediment. Since the filled sediment bags are too heavy to lift individually, each bag will be cut open, then sediment loaded by backhoe into dump trucks. The anticipated number of truck loads is 550 to 600 (assuming 12 cubic yard capacity). The trucking time is approximately 7 trips per truck per day to the nearest, available quarry, located in the vicinity of S.W. Tonquin Road and S.W. Morgan Road (23 miles away in Tualatin). The only available travel route will be via S.W. 82nd Avenue, then S.W. Garden Home Road and S.W. Oleson Road to Oregon Highway 217. Given weekends, holidays and mechanical difficulties, the sediment hauling is estimated to span approximately 5 weeks. Recent inflation has substantially increased the expected loading and hauling cost to $350,000, plus an additional dumping cost of roughly $325,000, which includes a required step to mechanically sieve the hauled soil to remove golf balls. There will also be labor and support equipment costs (such as flaggers, street sweeping, etc.) that add another estimated $55,000. Added together, the option to haul the sediment offsite to a quarry or construction site will cost approximately $720,000. Such cost is substantially higher than the cost of the proposed alternative. The project team considered this supplemental hauling, and disposal cost impracticable.

Replacement Irrigation Pond and Above Ground Storage Reservoir Alternatives

PGC considered several alternatives involving constructing a new irrigation lake or above-ground reservoirs in the vicinity of Junor Lake, namely directly to the south or east. Potential locations north and west of Junor Lake are too congested for a 1.5- to 2-acre pond, due to insufficient space between tee boxes, fairways, bunkers and greens. Pond construction will close 3 fairways for 12 to 18 months for preparation, excavation, and fairway reconstruction/realignment. Constructing a new irrigation pond to the south will add water hazards to fairways no. 13 and 14 (both par 4). Such hazards will substantially increase play difficulty – an undesirable condition for the majority of PGC golfers. The area south of the existing Junor Lake will have an additional problem – no connection to Fanno Creek and Woods Creek. Both creeks are 4 to 6 feet topographically lower than fairways no. 13 and 14, which makes it impractical to divert water into a new irrigation pond. Regardless of alternative irrigation pond locations, new irrigation water storage will damage the use of the fairways for several years. PGC will be unable to host golf tournaments for these construction years – such events are valuable to retaining memberships and make a significant economic benefit to the local community in terms of lodging, food service, tourism, car rentals, and recreation. Such pond or storage tanks will ultimately reduce fairway length and PGC will no longer be eligible for national and international tournaments. This alternative is not viable and actually detrimental to the PGC membership and long-term sustainability of the property due loss of

revenue (green fees and pro shop sales that cover day-to-day expenses). This alternative cannot meet the project purpose.

Groundwater, Domestic Water or Recycle Water Alternative

PGC explored alternate sources of irrigation water, namely groundwater (well water), domestic water, and recycled water. Groundwater in this vicinity must be drilled to sufficient depth to yield pumping rates suitable for a golf course (much greater well yield than a simple domestic well and most commercial wells). The only geologic formation that has sufficient yield is an aquifer that also has higher salt content than typical drinking water. If used alone, this ground water permanently damages soil, turf and landscaping, eventually killing the plants -- it must be used sparingly and in combination with surface water to prevent the salt toxicity. PGC also investigated purchase contracts from two water districts for irrigation water; however, potential water suppliers indicated they cannot not commit to large volume water delivery. Furthermore, potential providers will reserve the right to cease water deliveries during periods of excessive heat and/or long-term drought. See letter at end of this document from Raleigh Water District (Matt Steidler, October 13, 2023). Without adequate water supply, the golf course will need to close temporarily until water service is resumed. The anticipated cost of domestic water could be 10 times more expensive than the cost of removing the accumulated sediment from Junor Lake. Over 20 years, the cost of irrigation using domestic water is expected to be a minimum of $6,000,000. The use of domestic water for PGC irrigation is not practicable and has an added risk that the water supply can be cut off during critical periods. Recycled water is currently not available in this vicinity.

Sediment Bag Placement in Wetland B

This alternative will remove, then fill the forested upland situated between fairways 11, 12, and 13, and Wetland B. Wetland B has a direct connection to Woods Creek and floods when upgradient lands receive heavy rainfall. Potential impacts to Wetland B are likely significant due to loss of flood storage capacity and desynchronization. Placement of sediment bags in Wetland B will likely increase flood flows on downgradient lands (offsite to southwest), as well as reduce in-situ sediment trapping. Placement of sediment bags in this location will also destroy a grove of mature ash trees. Sediment bag placement in this wetland will have a significantly greater environmental impact than placement in Wetland A and other alternatives. Finally, the upper portion of this open space is a hillside with 15 to >25% slopes, so it is not suitable for sediment bag placement without substantial excavation and contouring. This alternative cannot meet the project purpose due to excessive environmental damage.

Sediment Bag Placement in Upland Forest

A potential sediment bag location is an upland forest between fairways 14, 15 and 16. The trees in this vicinity are greater than 100 years old. This dense cluster of older and taller trees provides habitat for numerous bird species, and has perch branches for predator birds. It also has close proximity to Fanno Creek, Woods Creek, and Junor Lake. This wooded grove also serves as a scenic resource for residences located to the west, and is designated as a scenic resource by Washington County, unlike Wetland A. Destruction of this natural resource would also be contrary to PGC's land stewardship policy and golf course design to balance mowed fairways and greens with tree and shrub corridors. Removal of such a natural resource is not supported by PGC due to excessive environmental damage. Additionally, Washington County is unlikely to approve such resource removal; hence this alternative cannot meet the project purpose.

Sediment Bag Placement at Driving Range

An alternate location for sediment placement is the driving range, located in the north-center of the golf course (east of the clubhouse). The driving range is surrounded by Fairways 3, 4 and 5. It is an integral component of the golf game, particularly for player warm-up and driving (swing) practice. When a player does not have sufficient time for a 9- or 18-holes game of golf, the driving range serves as a 1 or 2 hour substitute. Said differently, the driving range often has greater use than other facilities at the golf course. It cannot be removed to create room for a sediment placement area. From a practicality point of view, the driving range is the farthest distance from Junor Lake, specifically 2000 feet (nearly half a mile). Such distance and upslope position will require two auxiliary pumps to transport the sediment to this location. In addition, use of such area will also require substantial grading to recover seepage water, since the natural topography slopes away from the driving range and ultimately toward Fanno Creek. This location is not available, nor does this alternative meet the project purpose.

Onsite Sediment Placement in Fairway 15 or Multiple Fairways

This rejected alternative involves temporary decommissioning of the middle segment of Fairway 15, which is the only fairway large enough and logistically positioned to place sediment bags. The sediment bags will need to drain for one year, then be cut open, excavated and hauled to a landfill. The sediment material is too compressible, hence unsuitable to be spread out and incorporated into a new section of fairway. Sediment bag placement will require an area 150 feet wide and 700 feet long, and result in a net ground elevation increase of 1.5 feet. After sediment removal (hauled offsite for disposal), Fairway 15 irrigation and drainage systems must be reconstructed and stabilized for 18 months to allow for new turf grow to mature. This approach is not viable due to the large disruption to the golf course play and extensive rehabilitation (in addition to costing four times as much as the selected alternative).

A variation of this alternative was suggested, which involves spreading out the sediment as a thin layer (less than 0.5-inch) atop multiple fairways. This approach anticipates having turf grasses buried by a light application of sediment, then allowing the grasses to grow and sequester the sediment. This approach is akin to having volcanic ash gently burying the land surface and allowing plants to poke upward through the thin layer. This approach still requires the sediment to be pumped into sediment bags and excess water to drain out. Given that most of the fairways are sloping, only portions of Fairways 7, 10, 11, 13, 14, 15, 16, and 18 have flat enough slopes. Given the quantity of sediment, this procedure will need to be conducted four times each summer for 4 years, which effectively closes those fairways during peak play times and tournaments. This approach is completely contrary to common turf management practices and would create a patchy, irregular turf growth. It is akin to placing chipped bark atop a football or soccer field – illogical and damaging to the underlying turf. Such approach is simply unacceptable for a golf course and the rehabilitation costs will be double to triple the cost of best ranked sediment bag placement alternatives.

<u>Practical Alternatives and Criteria Evaluation</u>

Onsite Sediment Bag Placement in Yard Debris-Turf Farm Areas

The yard debris and turf farm areas are located north of Fanno Creek and immediately east of S.W. 86th Avenue. The yard debris and turf farm areas are essential components of the golf course because maintenance of the grounds constantly generates leaf litter, trimmed branches, and fallen trees (sawed apart). While the golf course is able to utilize chipped remains of trees/branches, there is simply too much organic material to re-use onsite. The turf farm is needed due to a perpetual need to replace patchy and worn turf with healthy turf for fairways, greens, and tee boxes. The south part of the yard debris area consists of loose fill material that is unstable and too steep for sediment bag placement. The turf farm includes a maintenance road that must be relocated to create a 0.7-acre sediment bag placement area. Such space is too small for the entire sediment volume to be dredged, so the dredging would require 2 phases, occurring 2 years apart. PGC would have an additional operations expense of hauling away all of the yard debris (instead of having storage space). These temporary operations would last for four years, given the 2-phased dredging approach needed for this smaller sediment storage space.

To utilize the Yard Debris-Turf Farm area for sediment bag placement, it would be necessary to build a temporary containment system that consists of berms on the south, east and west sides. Such berms would require regrading of the turf farm area to generate dirt and create an adequate slope towards the south containment berm. Within the containment area, a small network of drain pipes and gravel cover would be needed to capture water draining from the sediment bags and consolidate the water to pump back to Junor Lake to keep the dredge afloat. Given space limitations, the sediment bags would be stacked 2 or 3 bags high. This alternative is not practicable; however, if implemented, PGC must remove the sediment bags to restore storage capacity to the yard debris area and growing area for turf. This alternative incorporates the additional costs of hauling the sediment to an authorized landfill. Including disposal fees and restoration expense, this alternative is roughly three times more expensive than the selected alternative.

Onsite Sediment Placement in Yard Debris-Turf Farm Areas			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	N	The north part of the yard debris and turf farm area would require 2 phases for sediment disposal, since the combined area is too small for 1 dredging. There is no replacement space for yard debris and turf growing.
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	The north part of the yard debris and turf farm area can be modified for 2-phase sediment storage if maintenance road relocated to south and turf farm eliminated.
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water use infrastructure
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement area has direct access to S.W. 86th Avenue
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrig. & drainage systems in Fairways 13, 14 and 15
Environmental Impact	4a. Stream Impacts	Y	No impact to Fanno Ck., temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging.
	4b. Stream Functions	Y	No impact to Fanno Ck., temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging.
	4c. Wetland Impacts	Y	No direct impacts to Wetlands A and B; emergent fringe of Junor Lake would expand to entire lake as sediment accumulates (Wetland C)
	4d. Wetland Functions	Y	No loss of wetland functions.
	4e. Wildlife Impacts	Y	Only incidental wildlife use of yard debris-turf farm area, since area is regularly disturbed. No significant impacts.
	4f. Wildlife Functions	Y	No loss of wildlife functions..
	4g. Forest Upland Impacts	Y	No impact to upland forests.
	4h. Forest Upland Functions	Y	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	N	Approx. $350,000 for dredge operations for first phase, and $250,000 for second phase.
	5b. Sediment Bag Placement Cost	N	Approx. $150,000 for ground preparation to build containment system to capture drainage water from sediment bags and pump back to Junor Lake. Additional $1.4M for dump truck hauling, and landfill fees, since yard debris and turf farm needed for long-term operations.
	5c. Infrastructure Cost	N	Approx. $75,000 to temporarily relocate yard debris area to alternate location, and $150,000 post-project restoration of turf farm area (both needed for long-term operations).

	5d. Implementation Cost	Y	About 6 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairways 7, 11, 16, 17 and 18 for 1 hour durations

Other Qualitative Factors	6a. Complete Golf Course	Y	Essential elements for golf play will be maintained
	6b. Design Integrity	Y	The golf course design will be maintained
	6c. Drainage	Y	PGC will be able to maintain its irrigated landscaping
	6d. Accessory Work Areas	N	The alternative will temporarily remove the yard debris area and turf farm. Both must be reconstructed to provide long-term maintenance space for ongoing golf course needs.

Onsite Sediment Bag Placement in Wetland A

The sediment will be removed from Junor Lake by floating dredge, then pumped 1300 feet to a sediment placement location immediately south of Fairway 15. The sediment placement location is emergent Wetland A, which is flanked by higher topography on all sides with a narrow outlet. The sediment removal volume is approximately 5300 cubic yards and will be considered permanent removal, and the wetland fill area is 0.72-acre permanent fill. The fill incudes a small portion of Wetland A (where it overflows to the west) that may indirectly become filled with sediment from sediment bag drainage water. The sediment bags will be placed in a northeast-southwest alignment (parallel to topographic contours) and the sediment bags will be stacked in 3 to 5 lifts (or levels). Minor temporary wetland or waters impacts associated with construction measures will also occur. The project will not discharge water to Fanno Creek or Woods Creek; however, adjacent uplands will be used to infiltrate excess water on an as-needed basis. The dredging is expected to take 4 to 6 weeks to complete, with 2 to 4 weeks of preparation and decommissioning afterwards. While this alternative meets all project criteria and has the lowest cost, it has a significant wetland impact (greater than some other alternative, but 0.15-acre less than Wetland B impact).

Onsite Sediment Bag Placement in Wetland A			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	Y	1.5 acres incl. Wetland A and surrounding land for staging, grading, sediment bag disposal, and temporary topsoil storage
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	Vicinity of Wetland A has ideal topographic setting for placement of sediment bags, capture of dredge seepage, and pumping location to return water to Junor Lake
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water infrastructure.
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement construction access to S.W. 82nd Avenue (crossing Fanno Creek trail)
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrigation and drainage systems in Fairways 13, 14 and 15; steel plating necessary to protect underground sewer lines and utilities below Fanno Creek trail
Environmental Impact	4a. Stream Impacts	N	No impact to Fanno Ck. Temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4b. Stream Functions	N	No impact to Fanno Ck. Temp. coffer dam placed in Woods Creek with bypass pipe to isolate flow during dredging
	4c. Wetland Impacts	Y	Preparatory grading and sediment bag placement would impact entirety of Wetland A; emergent fringe of Junor Lake will be reduced by excavation of sediment. Temporary impact

			to terrestrial Wetland C during excavation phase, but restored after project completion; Wetland B is avoided
	4d. Wetland Functions	Y	Loss of water storage, terrestrial & amphibian habitat, song bird nesting & feeding, and carbon sequestration for WL A.
	4e. Wildlife Impacts	Y	Most birds and small mammals will be displaced by grading and sediment bag placement activity (ground disturbance, construction noise and equipment movement)
	4f. Wildlife Functions	Y	Typical nesting, breeding and feeding habitat loss during excavation and sediment placement phase. Except for tree-dependent wildlife, most wildlife functions restored over subsequent decade after project is completed.
	4g. Forest Upland Impacts	N	No impact to upland forests.
	4h. Forest Upland Functions	N	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	Y	Approx. $400,000 for dredge operations
	5b. Sediment Bag Placement Cost	Y	Approx. $125,000 for manufacturing, ground preparation and post-construction revegetation
	5c. Infrastructure Cost	Y	Approx. $25,000 for temporary access via S.W. 82nd Avenue, including steel plate covers for sewer lines/utilities
	5d. Implementation Cost	Y	About 10 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairways 7, 11, 13, 14 and 15 for 1 hour durations
Other Qualitative Factors	6a. Complete Golf Course	Y	Interruption to essential golf course features will be avoided
	6b. Design Integrity	Y	The golf course design will remain intact
	6c. Drainage	Y	PGC will be able to maintain its irrigated landscaping
	6d. Accessory Work Areas	Y	No impact to accessory work areas

Onsite Sediment Bag Placement West of Wetland A - Proposed Alternative

The upland area west of Wetland A is approximately two times larger than Wetland A. It slopes mostly to the north, but perimeter areas on the west and south also slope toward the surrounding Fanno Creek bike and pedestrian trail. While Wetland A is situated in a concave topographic position, this upland area has a convex topographic position. It is necessary to grade this upland to have a gentle, northeast-sloping surface to drain to Wetland A. The importance of the east-sloping surface is to capture dredge water seeping from the filled sediment bags, then pump it to Junor Lake. That is, it is necessary to capture seepage from the sediment bags to keep the dredge afloat. The sediment bag placement will be configured to have two layers – bags that rest atop the ground surface and a layer of bags that positioned between two lower bags. Such stacking is needed, since there is insufficient upland to have only one layer of sediment bags.

The 0.05-acre of temporary wetland impact is needed to create an access route between a staging area (southeast of Wetland A) and the upland west of Wetland A. The access route will need 2 to 3 feet of fill material, after minimal brush trimming along the south edge of Wetland A. As mentioned, the access route will be temporary to allow grading and excavation equipment access to the sediment bags (from the southeast staging area). The temporary impact also includes a 30-foot extension of the stormwater pipe to delivers water to Wetland A. Both the access route fill material and extension pipe will be removed during the decommissioning phase. This alternative also includes 3 cubic yards of silt and clay carried by sediment bag seepage water that gets diffusely spread out (less than 1/16-inch thick) in the north part of Wetland A. Such volume is sufficiently small that plants and wildlife will not be adversely affected. Such volume and thin layer is too small to be removed. While this alternative will disturb two times larger of an area than the Wetland A alternative, it will have only a temporary wetland impact. For such reasons, this ranked higher than other alternatives.

Onsite Sediment Placement West of Wetland A			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	Y	Sediment disposal is possible
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	The upland area has sufficient space for sediment bags; however, staging area must be situated east of Wetland A.
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water use infrastructure
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement construction access to S.W. 82nd Avenue (crossing Fanno Creek trail)
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrigation and drainage systems in Fairways 13, 14 and 15; steel plating and other measures necessary to protect underground sewer lines and utilities below Fanno Creek trail (no damage to underground infrastructure is permissible).
Environmental Impact	4a. Stream Impacts	N	No impact to Fanno Creek, temporary coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4b. Stream Functions	N	No impact to Fanno Creek, temporary coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4c. Wetland Impacts	Y	South edge of Wetland A (0.05-acre) temporarily impacted for access between staging area and sediment bags; emergent fringe of Junor Lake will be reduced by excavation of sediment. Temporary impact to terrestrial Wetland C during excavation phase, but restored after project completion.
	4d. Wetland Functions	Y	Temporary loss of water storage, emergent habitat, songbird nesting and feeding for south edge of Wetland A. Temporary impact of 0.05-acre will be restored to natural condition.
	4e. Wildlife Impacts	Y	Most birds and small mammals will be temporarily displaced by grading and sediment bag placement activity (ground disturbance, construction noise and equipment movement)
	4f. Wildlife Functions	Y	Typical nesting, breeding and feeding habitat loss during grading and sediment placement phase. Except for tree-dependent wildlife, most species able to return to Wetland A after project is completed.
	4g. Forest Upland Impacts	N	No impact to upland forests.
	4h. Forest Upland Functions	N	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	Y	Approx. $400,000 for dredge operations
	5b. Sediment Bag Placement Cost	N	Approx. $350,000 for manufacturing, ground preparation and post-construction revegetation. Additional cost of $100,000 for post-project decommissioning.
	5c. Infrastructure Cost	Y	Approx. $75,000 for temporary access via S.W. 82nd Avenue, including steel plate covers for sewer lines/utilities
	5d. Implementation Cost	Y	About 10 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairway 15 for 1 hour durations.
Other Qualitative Factors	6a. Complete Golf Course	Y	Golf course essential elements will be maintained
	6b. Design Integrity	Y	The golf course design will be maintained
	6c. Drainage	Y	The golf course's drainage and irrigation will be maintained
	6d. Accessory Work Areas	Y	No impact to accessory work areas

Summary of Alternatives

The project team for Portland Golf Club evaluated numerous alternative scenarios, ranging from no-action, new irrigation pond or reservoir, sediment placement in Wetland A or Wetland B, sediment bag placement within golf course fairways, and several variations of these alternatives. Eight alternatives were immediately rejected for triple to greater than 50 times cost ($1.3M to $40M) or having impacts to higher functioning/value wetland. For example, the sediment placement in Wetland B alternative was rejected due to greater wetland loss to a higher functioning forested wetland. Another rejected alternative was the removal of mature upland forest (>100 year old trees) due to significant loss of wildlife habitat and a valuable design resource for the golf course. Several alternatives were rejected on the basis of significantly disrupting golfing play by closure of fairway(s) for 9 to 12 months or creating severe golf course damage that would take several years to repair (these also exceeded $1M expense). Other rejected alternatives involved sediment bag transport offsite, since hauling costs added a hauling expense of $500,000 and an undetermined disposal fee at a landfill (likely in excess of $500,000). The remaining alternative were examined for consistency with the evaluation criteria and project purpose. The table on the following page summarizes each alternative, estimated cost and reason(s) for selecting the LEDPA alternative.

Rejected Alternatives	Estimated Cost	Rejection Rationale
Rejected -- No-Action	$25 million	Loss of irrigation water storage in Junor Lake would result in golf course closure. Alternative does not meet project purpose.
Rejected -- New Golf Course	$40 million	No feasible, does not meet project purpose.
Rejected -- New Irrigation Pond or Above-Ground Reservoir	$1.5 to 4.2 million	Extensive impacts due to excess spoils from new pond excavation. Temporary closure of 3 fairways for 9 months during pond excavation and post-project fairway restoration. Does not meet project purpose.
Rejected -- Well and Domestic Water or Recycled Water Purchase	$6.7 to 9.2 million	Unstable water source and extensive construction to bring new water to golf course. Recycled water not available in golf course vicinity. Does not meet project purpose.
Rejected -- Sediment Excavation, loose material placement in Wetland A	$950,000	Impacts Wetland A, large cost to build haul road across 3 fairways, then restore afterwards. Temporary closure of 3 fairways for 9 months. Significant disruption of golf course operations and golf play. Does not meet project purpose.
Rejected -- Sediment Bag Placement at Driving Range	$3 million	Driving range reconstructed after sediment hauled to landfill. Replacement of irrigation and drainage systems. Significant disruption of golf course operations (player activity).
Rejected -- Sediment Bag Placement at Upland Forest	$725,000	Destruction of mature, 100-year old trees, loss of wildlife habitat, loss of golf course design element. Impact to adjacent neighborhood quality of life.

[continued on following page]

Rejected -- Sediment Bag Placement at Fairway 15 or multiple fairways	$2.4 million	1 to 3 fairways closed for at least 1 year for sediment placement, then 2 years for fairway reconstructed after sediment hauled and disposed at landfill. Replacement of irrigation and drainage systems. Significant disruption of golf course operations (player activity). Does not meet project purpose.
Rejected -- Sediment Bag Placement in Wetland B	$1.3 million	Requires Fanno Ck. bridge replacement, loss of forested wetland, loss of floodplain storage. Not financially viable alternative.

Practical Alternatives	Estimated Cost	Discussion and Selection
Sediment Bag Placement at Yard Debris-Turf Farm Area	$2.5 million	North part of yard debris and turf farm needed for long-term operations, so sediment bags would be hauled away to landfill. Disposal at landfill makes alternative financially not viable (more than triple cost).
Sediment Bag Placement in Wetland A	$550,000	This alternative has less wetland impact than Wetland B alternative; but it has significantly greater wetland impact than the selected alternative (see below).
Sediment Bag Placement west of Wetland A	$825,000	Temporary impact to Wetland A for access road between staging area and upland west of Wetland A. This alternative has only temporary wetland impacts, so it ranks higher and it is the selected alternative.

Mitigation Analysis

Mitigation cannot be used as a method to reduce environmental impacts in the evaluation of alternatives. Thus, this section addresses the Applicant's proposed mitigation of environmental impacts from the least environmentally damaging practicable alternative identified above.

In accordance with State and Federal Mitigation Rules, mitigation is best accomplished with restoration of temporary impact area to natural conditions. Applicant responsible compensatory mitigation (onsite wetland replacement) is not economically, spatially, or environmentally feasible. The proposed sediment bag placement will temporarily impact 0.05-acre of wetland, which best qualifies as Palustrine, Emergent wetland (PEM) Cowardin and Slopes / Flat (S/F) Oregon Hydrogeomorphic (OHGM) classification.

As per principal objectives for Compensatory Wetland Mitigation (CWM), the Temporary Impact Restoration Plan will satisfy the following objectives:

A) Replacing wetland functions and values lost at the impact site – The temporary impacts preserves most wetland functions and values. Brush trimming will occur for the temporary fill placement and it will be removed during the decommission phase, as specified in the Restoration Plan (Appendix B). In addition, the check dams and 30-foot extension pipe needed for the temporary access route will be removed, so there will not be any loss to hydrologic function.

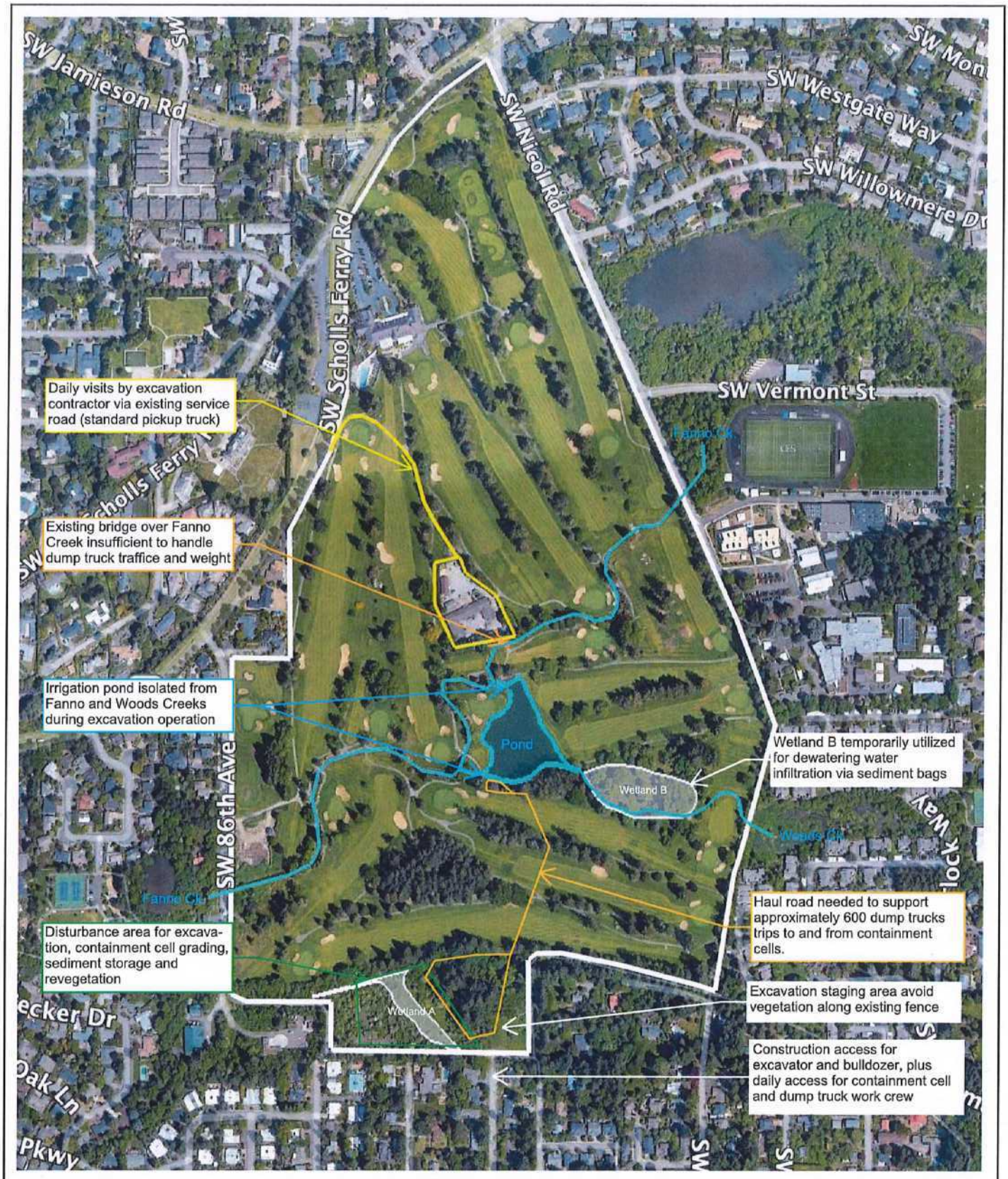
B) Providing local replacement of said functions and values – The temporary impacts are restored to a natural condition during the decommission phase, so local replacement is achieved.

C) Providing self-sustaining wetland with minimal long-term maintenance – The Temporary Impacts Restoration Plan (Appendix B) outlines planting and seeding goals/objectives, procedures, and post-installation monitoring for 2 growing seasons. This approach and focus on restoration of natural conditions is consistent with current conditions that are self-sustaining.

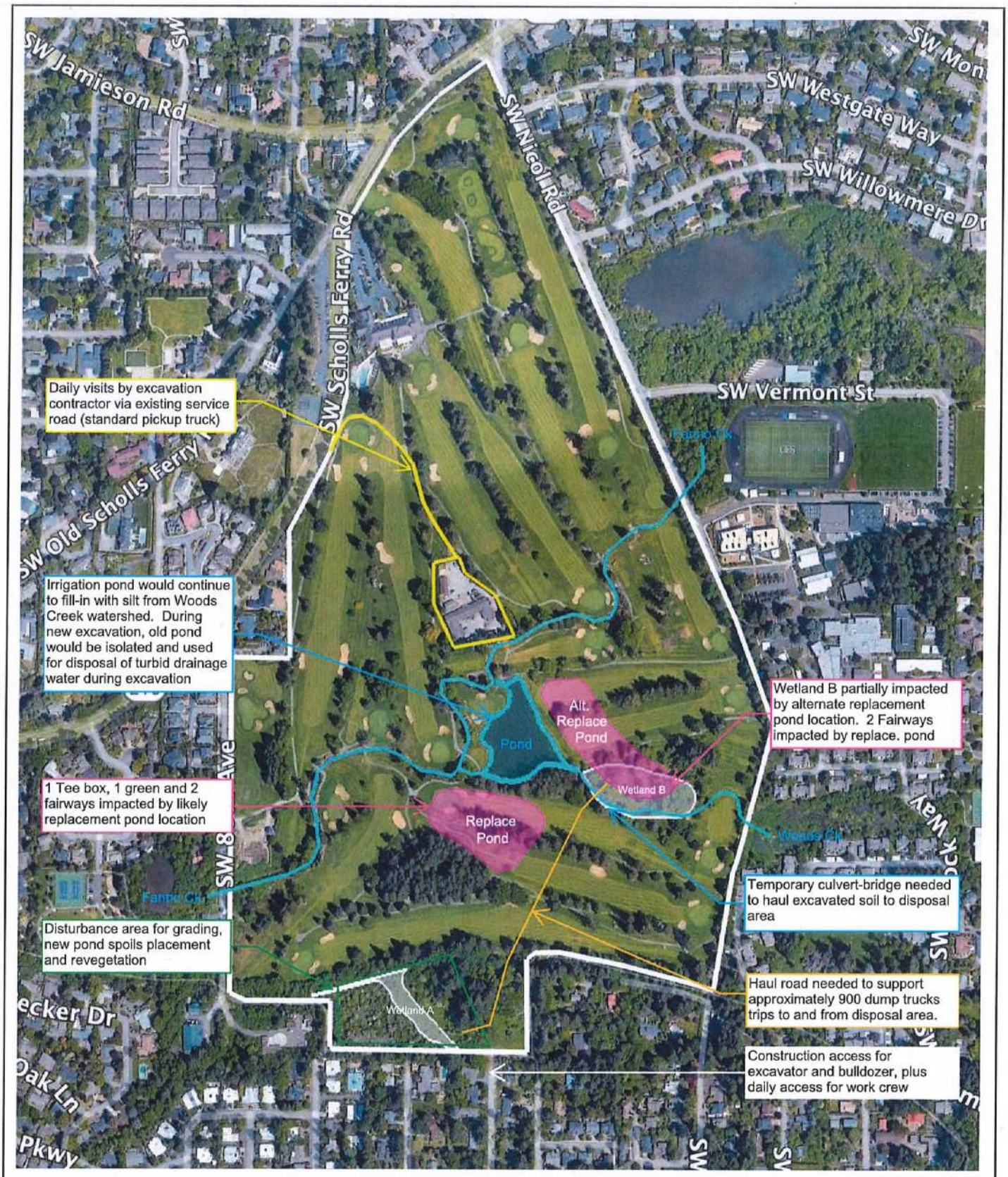
Conclusion

To restore capacity to Junor Lake, PGC has thoroughly evaluated numerous alternatives, including no-action, replacement irrigation pond, offsite sediment disposal, and several variation of sediment bag placement. PGC initially proposed sediment excavation and placement in Wetland A, then further analysis found an environmentally preferrable approach using dredging instead of excavation. PGC proposed sediment bag placement in Wetland A due to site attributes, logistics, environmental impacts, cost, and fulfillment of the project purpose (to maintain the PGC property as a historic and renowned golf course). That approach would impact the entire 0.72-acre Wetland A; however, discussions with regulatory agencies concluded that the sediment bag placement west of Wetland A should have a temporary wetland impact (0.05-acre). In particular, the selected alternative has a 0.05-acre wetland impact associated with a temporary access route between the staging area and land west of Wetland A. Such impact will be reversed with corrective actions, as outlined in the Temporary Impacts Restoration Plan (Appendix B). Such purchase assures no net loss of wetland acreage, plus no loss of wetland function and value.

The preceding Least Environmental Damaging Practicable Alternative (LEDPA) analysis documents this decision-making process and provides transparency for the rationale in selecting the best ranked alternative. The LEDPA analysis concluded that onsite excavation will result in greater environmental impacts than dredging and sediment bag placement (which has a smaller, less invasive impact). Additionally, the sediment bag placement approach avoids hauling over 600 truckloads of sediment to a rock quarry or construction site as fill (not currently allowed due to presence of inert golf balls within the sediment). The sediment bag placement on the upland west of Wetland A will satisfy PGC's need to restore water storage capacity in Junor Lake, minimize golf play interruption, and minimize damage to essential golf infrastructure. While all of the alternatives are expensive, the LEDPA conclusion results in using less equipment, disturbing less ground, and makes use of natural topography to minimize wetland impacts. The proposed project also avoids damage to a mature grove of Douglas-fir trees; and recycles water back to Junor Lake.



Terra Science, Inc. Soil, Water & Wetland Consultants	ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC) Washington County, Oregon	SEDIMENT EXCAVATION ALTERNATIVE
GRAPHIC SCALE 0 ft. 400 ft. 800 ft.	June 2023	



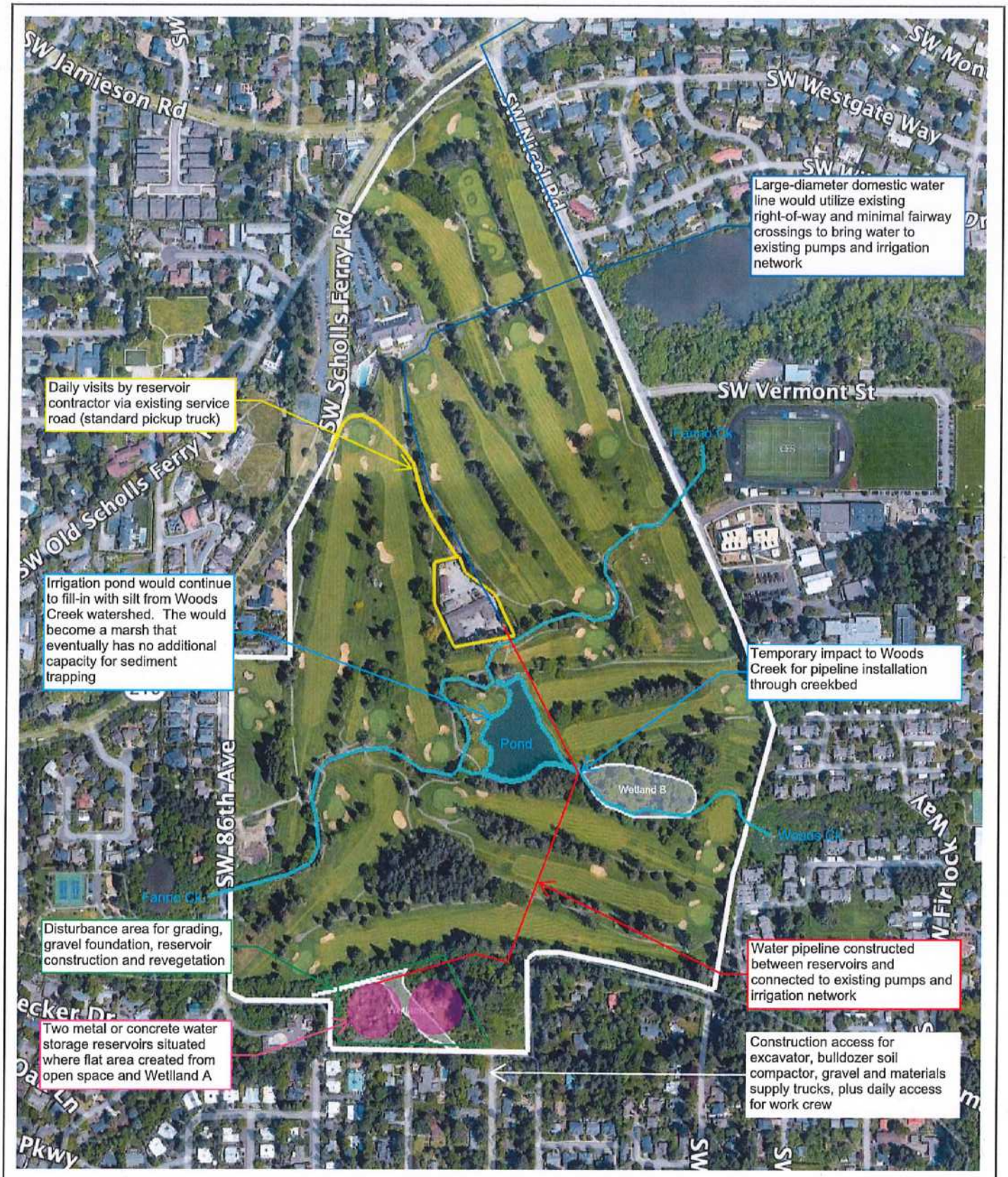
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 400 ft. 800 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

June 2023

REPLACEMENT POND ALTERNATIVE



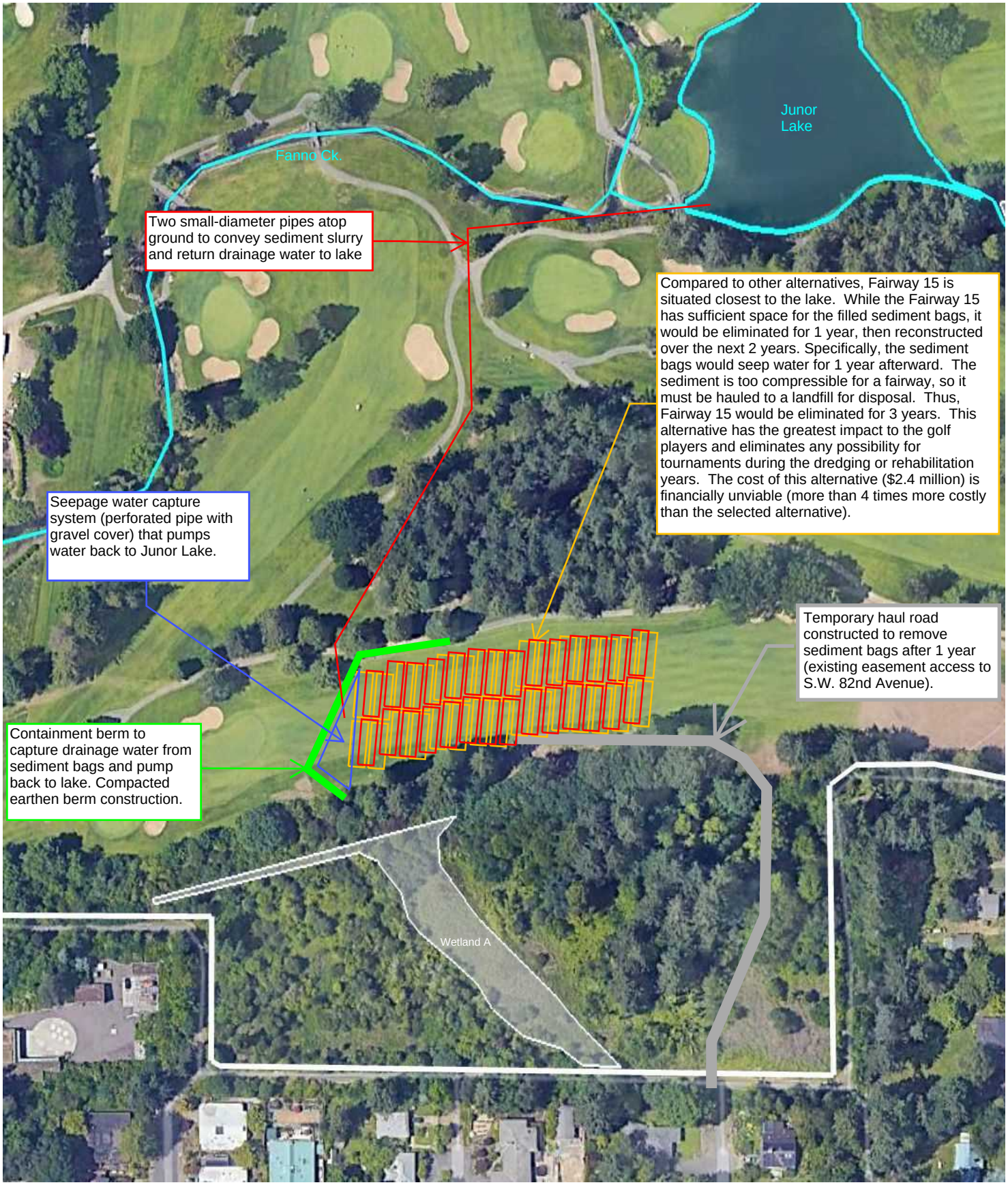
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 400 ft. 800 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

June 2023

METAL OR CONCRETE RESERVOIR AND DOMESTIC WATER SOURCE ALTERNATIVES



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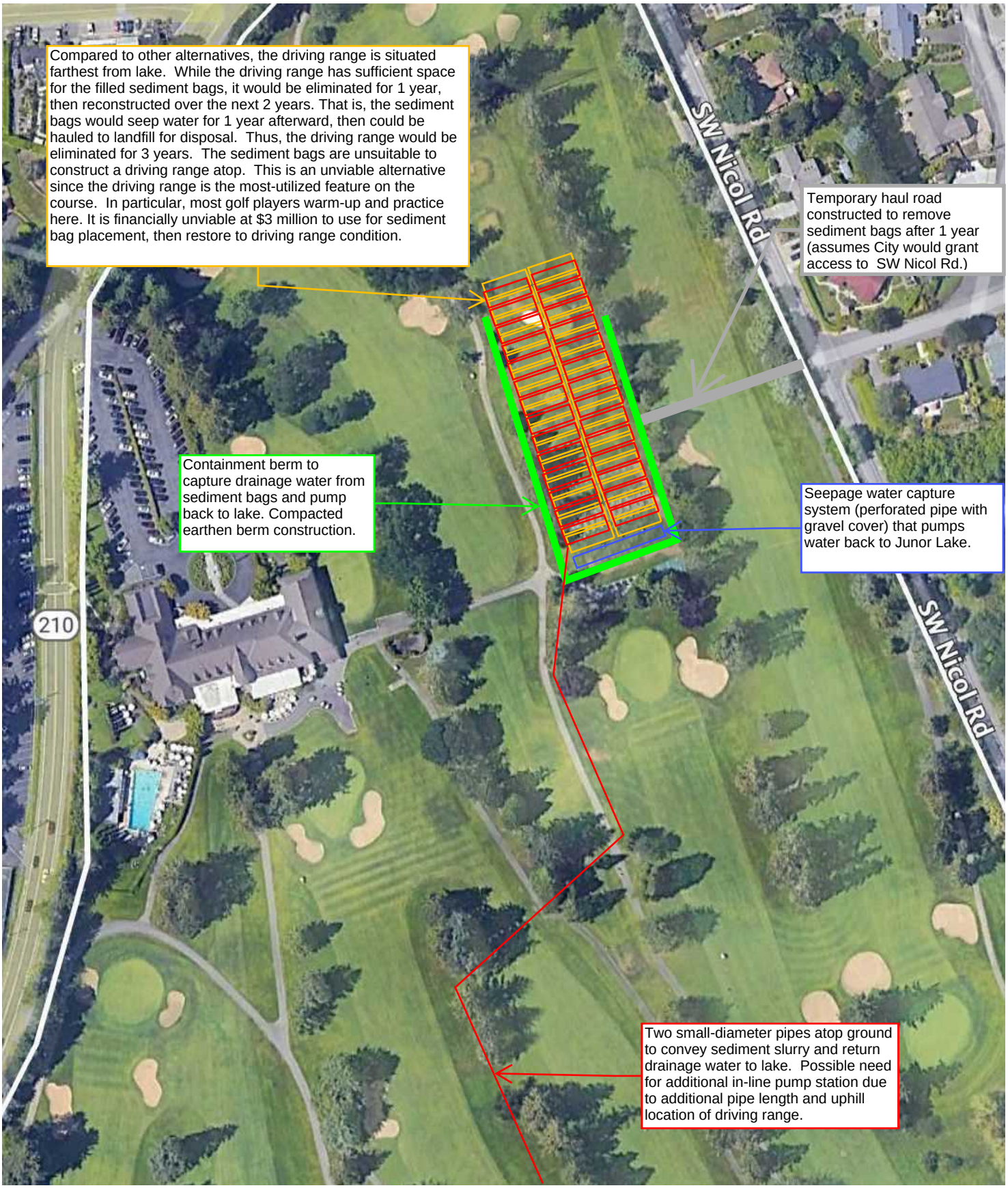
GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

FAIRWAY 15
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



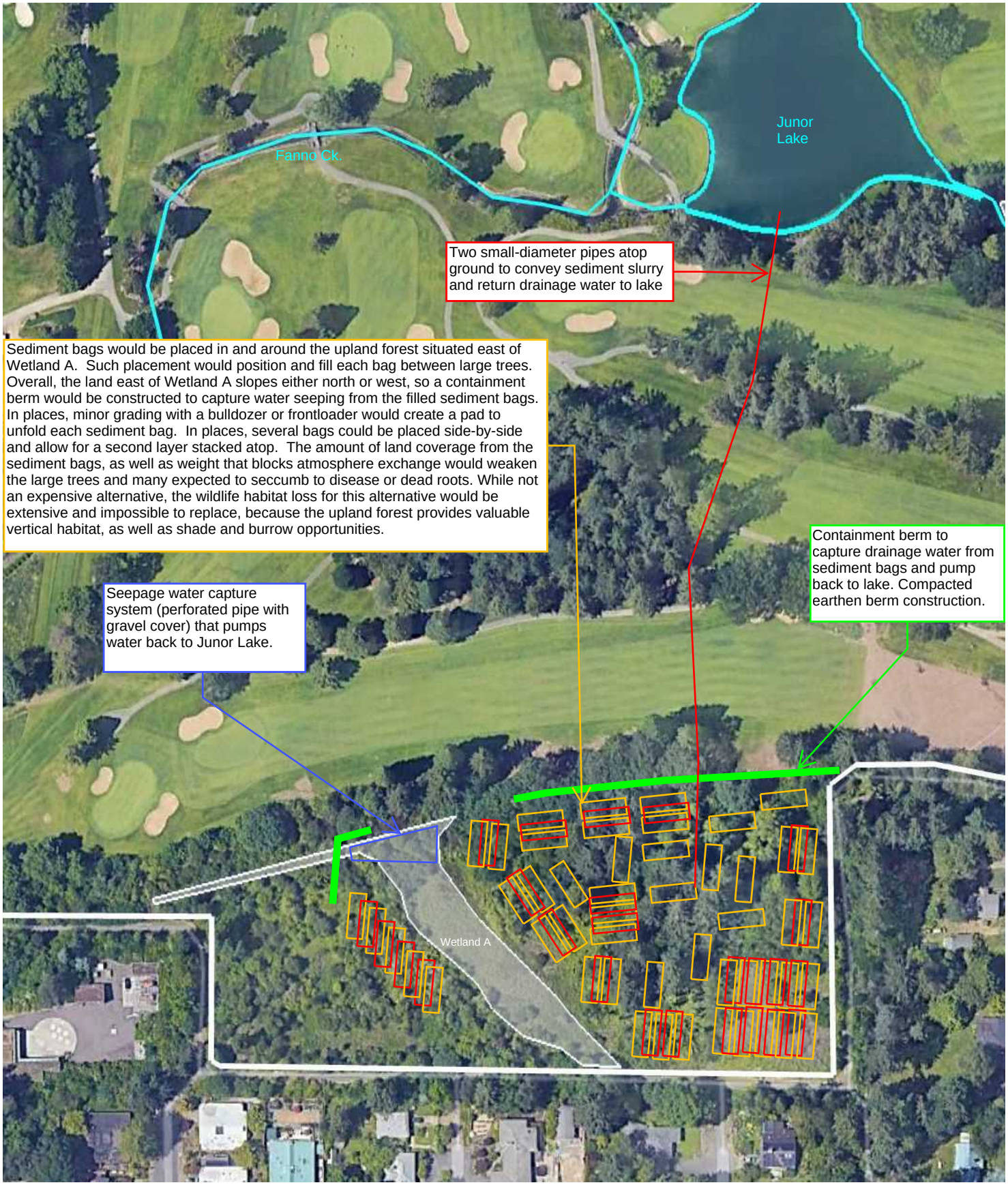
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

DRIVING RANGE
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



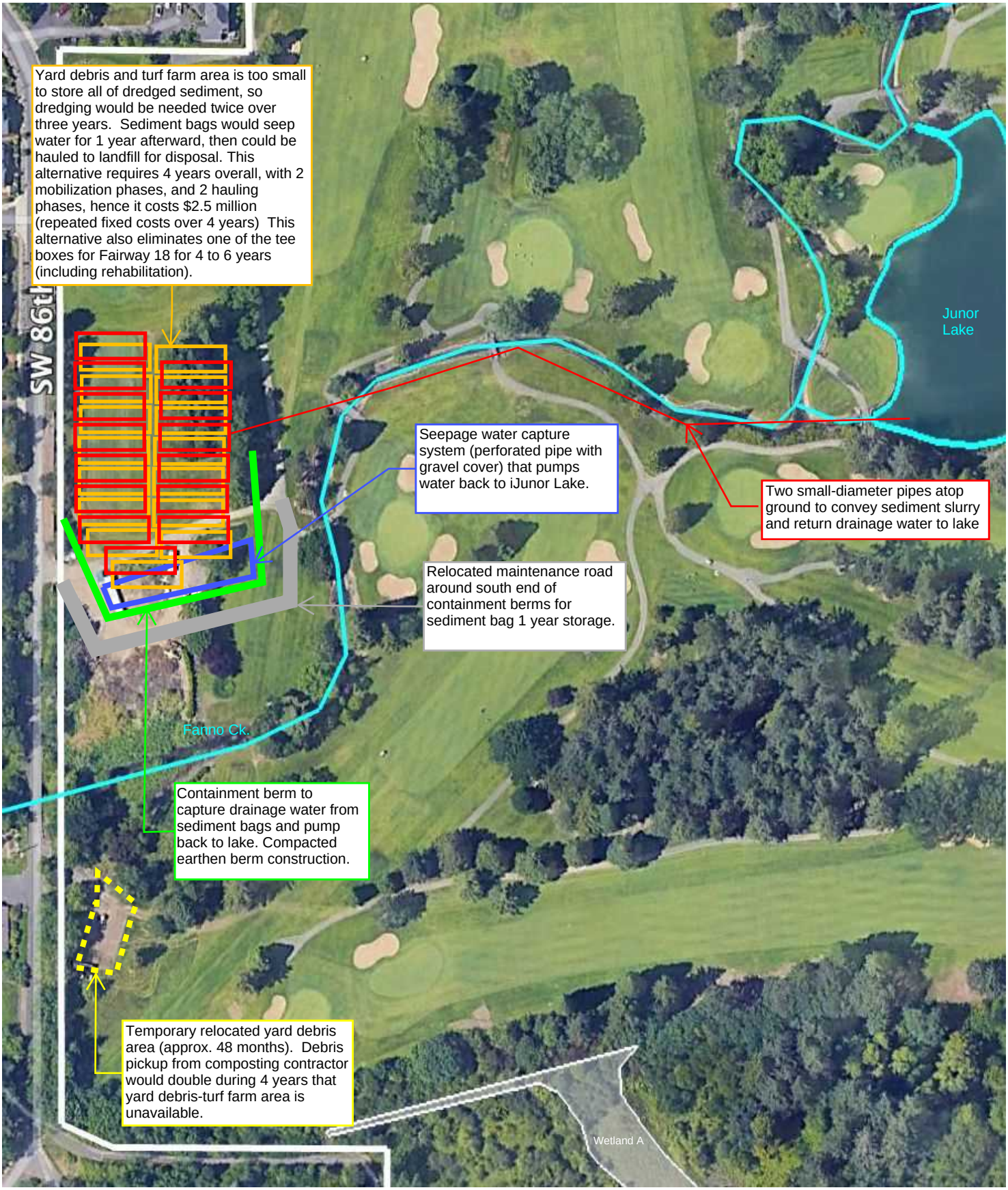
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

UPLAND FOREST
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



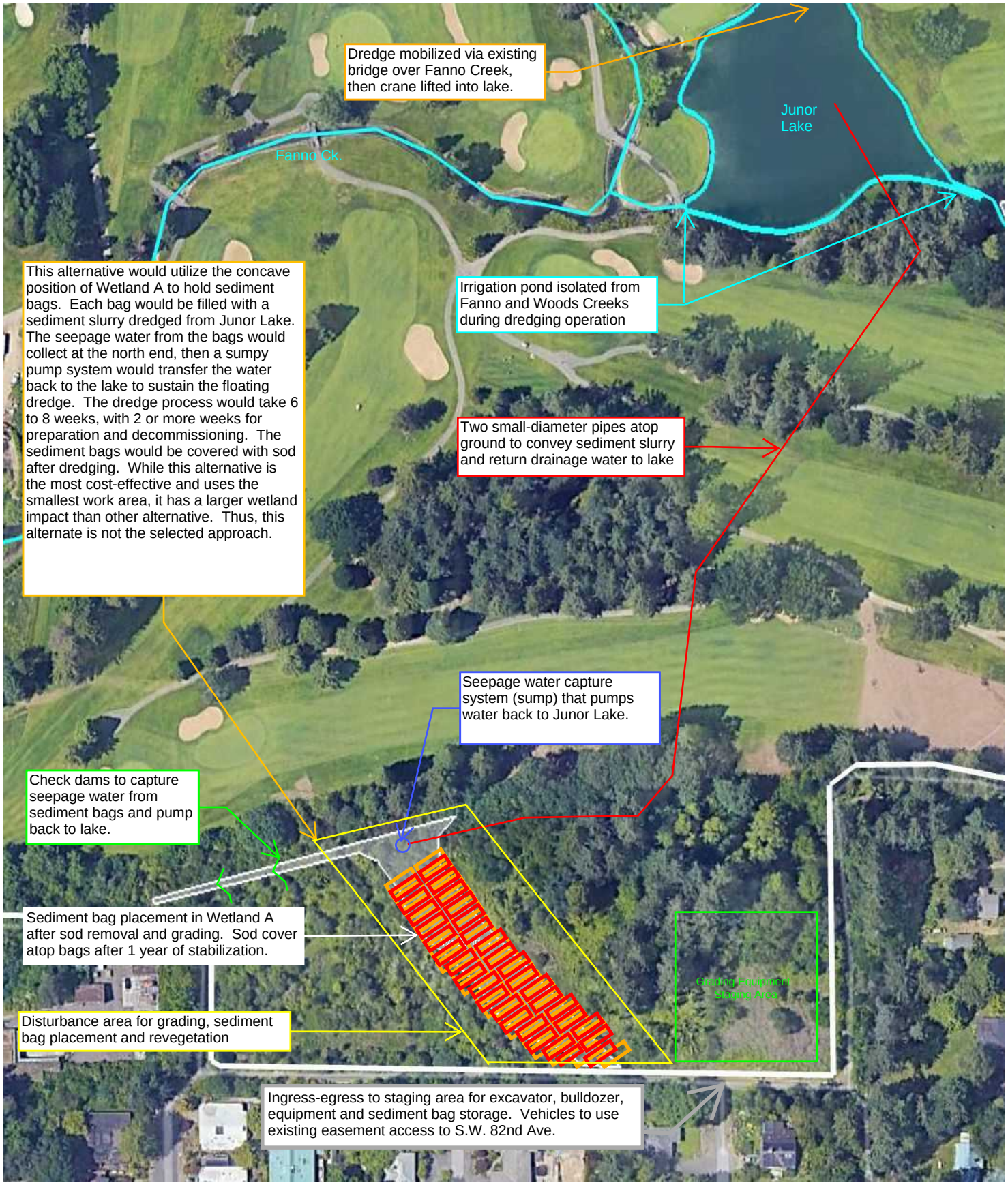
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

YARD DEBRIS-TURF FARM AREA
SEDIMENT BAG PLACEMENT
ALTERNATIVE



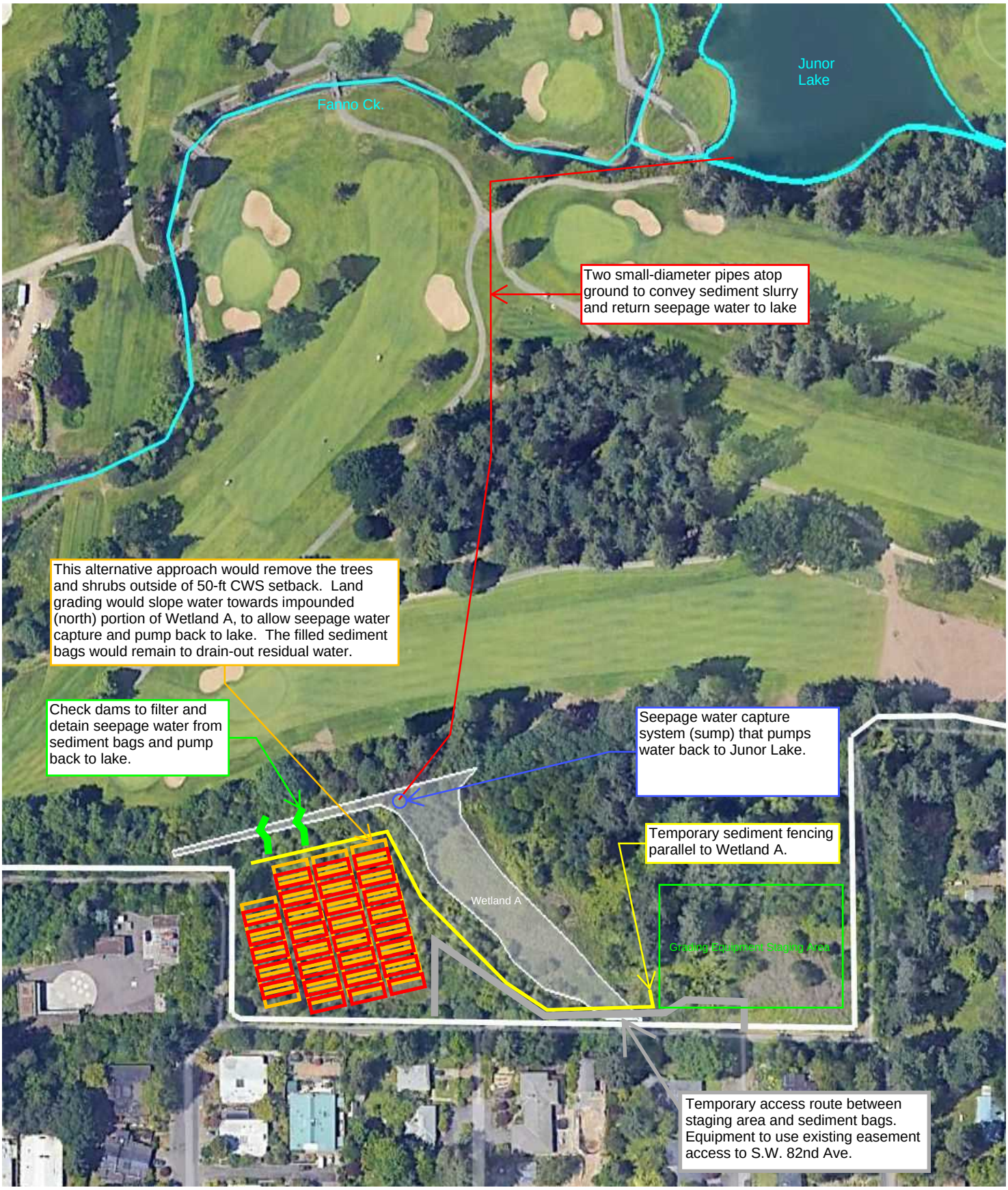
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

WETLAND "A" SEDIMENT BAG PLACEMENT ALTERNATIVE



Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SEDIMENT BAG PLACEMENT
WEST OF WETLAND A
ALTERNATIVE

October 16, 2023

Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

I understand that Portland Golf Club is planning a project to remove sediment from Junor Lake on the golf course property. As part of that project, you are considering alternatives for disposal of the removed sediment, as well as potential options for the lake itself. You inquired regarding the following matters:

- The importance of maintaining Junor Lake as a water feature on the property; and
- The impact of storing large volumes (5,300 cubic yards) of silt sediment on the property:
    - Temporarily on top of a fairway for later disposal,
    - Under a fairway or multiple fairways for permanent disposal,
    - Permanently between fairways, or
    - Permanently in the yard debris area, turf farm area, or driving range area.

I have worked with Portland Golf Club as its golf course architect for the past 11 years, as well as working on the property prior to that time, so I am intimately familiar with the golf course property. I was a PGA Professional prior to transitioning to golf course architecture 23 years ago, and, since that transition, I have designed, improved, and worked on numerous golf courses. My experience is further outlined in the attached CV.

Successful golf course design includes numerous interrelated components that function together to provide the elements essential for golf play. Playability is an important component of golf course design, related to the ability of a course to accommodate all types and levels of play, allowing novice and professional golfers, and all in between, to enjoy a golf course. The width of a playing corridor is directly related to playability, allowing golfers to have options when playing a course. The narrower a course, the less options exist, and options are essential to strategy. Good design allows a less experienced player to take more shots to avoid challenging aspects of the course, while an experienced player will be able to make precise shots through the difficult elements of the design. Moreover, the sequencing of golf play requires variability between holes, and highlighting of the best natural features of the property and topography.

This is not to say that golf course design ends with its fairways and greens. Driving ranges and other practice areas are needed for players to improve their golf games. Transitions between holes are similarly part of the design and aesthetic of the course. Hazards should be beautiful and strategic and include variety, including bunkers, water hazards, rough areas, trees, and contours. Golf course must be constructed properly to incorporate all the necessary design elements, while also ensuring that soil and drainage are both appropriate to support the golf course landscaping. Finally, golf courses are supported by other basic components that are essential to upkeep and operations, such as areas for yard debris and growing replacement turf grass – a golf course

without these operational components cannot sustain the vast amount of work that goes into a golf course and its maintenance.

Junor Lake is an essential and central feature of the golf course's design. It is a water hazard, provides natural variety to the course, and serves as the golf course's source of irrigation water. It is extremely important for Portland Golf Club to maintain Junor Lake as part of the golf course's design and to restore and preserve the original depth of the lake to store necessary irrigation water.

Suitable locations for disposal of 5,300 cubic yards of silt do not exist on the golf course portion of Portland Golf Club's property. Portland Golf Club is located on a relatively small property for a modern golf course. Every portion of the golf course is interconnected and functions together to create a playable design. Taking a fairway out of play destroys playability because a 17-hole golf course is not a complete golf course. The areas between fairways are not unused space. To the contrary, the existing slopes and contours of the entire property are part of the design, as well as rough areas, hazards, and trees. Silt material is harmful to golf course drainage. Portland Golf Club employs numerous methods to improve drainage by increasing sand in its soils, and introducing 5,300 cubic yards of silt on the property would be disastrous for proper maintenance of the grounds. Finally, operations on the golf course would be substantially hindered if the yard debris area or turf production area are used for sediment disposal. The Portland Golf Club property would be damaged and less suitable for golf play if large amounts of silt is stored or disposed of within the golf course portion of the property or its necessary accessory areas.

In summary, maintaining Junor Lake is essential to the design of Portland Golf Club's course, and introducing 5,300 cubic yards of silt material within the golf course will damage the golf course design and maintenance. Please let me know if you have any further questions related to the sediment-removal project.

Sincerely,

Dan Hixson

DAN HIXSON
PRINCIPAL
HIXSON GOLF DESIGN
13707 Fielding Road
Lake Oswego OR 97034
503-789-7176
danlhix@yahoo.com

Hixson Golf Design was founded in 2000 by PGA Professional Dan Hixson. A life time of growing up within a golf Professional family provided the thorough understanding of the game and its courses. Initially providing master planning and renovation designs for clubs and courses, new course design was added to the portfolio with the opening of Bandon Crossings in 2008.

The company's philosophy is to combine an economical business sense to architecture with sound and artistically designed golf courses that excite and inspire golfers. Smart creative designs result in courses that people want to play over and over.

CORE KNOWLEDGE & FUNCTIONAL SKILL AREAS:

- Strategic team-oriented approach.
- Provides experience and resources to monitor the project from inception through grow-in.
- 23 years of in-field experience working with builders to carry out intent of plans and vision.
- Experienced in Construction Management and shaping of golf features.
- A thorough knowledge of the game of golf, its history, current trends, players and design strategy.
- Experienced in creation of both Master plans and new course routings of any sizes.
- Financial responsibility to clients through creative problem solving.

PROFESSIONAL HISTORY & CREDENTIALS

- Clackamas Community College 1979-81
- Oregon State University 1982-84
- PGA of America Member since 1990
- Head Golf Professional at Columbia Edgewater Country Club 1990-99
- OGCSA Member since 2010

PORTFOLIO – NEW COURSES

- **6 New Courses,** Bandon Crossings, Wine Valley, Crestview, Silvies Valley Ranch (2), Bar Run and Lake Oswego Municipal Golf Course.
- **Architect of Record -** Creating and implementing Long Range Golf Course Improvement Plans and Master Plans at 21 Golf Courses and Country Clubs in Washington and Oregon.
- **Total Courses Worked on,** to date is 48, with multiple and ongoing projects at many of the courses.
- **Four Original Designs** are continually highly ranked and or have won awards on a National level.
- **Currently working** on a dozen projects of various sizes.

October 14, 2023

Mr. Lonnie Lister
General Manager
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

The purpose of this opinion letter is to address your question concerning the removal of sediment naturally accumulated in one of the lakes on your golf course.

As part of the permitting for that project, I understand that duly authorized government agencies with which you are working have questioned whether the silt dredged from the lake can be incorporated as soil on the golf course. Alternatively, the agencies have also inquired about converting accessory work areas (yard debris area and/or turf farm) to a disposal area for the 5,300 cubic yards of silt you plan to dredge from the lake.

As you know, I am currently a consultant with GGA Partners, a leading advisory services firm which specializes in golf-related matters and, specifically, in the areas of golf course asset development and financing. I was previously the Vice President – Golf for Pulte Homes, which now does business as Pulte Group, the largest developer of golf communities in the US. In that position, I developed 27 golf courses in 10 states, and was responsible for the operation of more than 20 Pulte golf courses. Based on this and other experience, let me answer your questions about best practices when managing golf courses, and the financial implications of certain management decisions.

Silt is a difficult material for golf courses to incorporate, generally speaking. Golf courses require excellent water drainage to support landscaping and surfaces that are suitable for golf play. Silt inhibits drainage because it fills the spaces between the bits of silt between other types of soil. Golf courses typically engage in activities that improve drainage, so I would not advise you to add silt to Portland Golf Club's mixture of soils. Disposing of the silt on the golf course may seem to be a desirable option due to availability and lower expense, but doing so may cause damage to the soil composition and negatively impact turf quality.

The quality of golf course landscaping is of critical importance to the playability of the course itself, and thus the long-term economic health of the business. Golf courses with poor drainage and consequently poor landscaping and playing surfaces offer inferior golf experiences for their golfers. Such golf courses cannot attract or maintain club members. Additionally, event sponsors only select golf courses for tournaments if they exhibit superior design, construction, and maintenance.

Without the ability to attract and retain members and to hold tournaments, a golf course cannot be profitable, and therefore cannot be sustained economically. It is unwise to use silt in the manner being considered as material harm can arise from such an approach.

GGA Partners
2415 East Camelback Road, Suite 700
Phoenix, Arizona 85016

Tel: 1-888-432-9494
Email: info@ggapartners.com
Web: ggapartners.com

Finally, work areas are essential features of all successful golf courses. Those playing the game of golf experience only the golf course itself and other guest areas. However, the work areas are what allow golf course managers to maintain the course and grounds. Golf courses create extensive amounts of yard debris every year and require substantial equipment to complete regular maintenance and repairs. Further, golf course turf requires frequent patching due to wear and infrastructure repairs. If it can be avoided, I would not advise you to convert the yard debris area or turf farm for sediment disposal. Doing so will decrease the function and value of the golf course property and require use of other areas or offsite areas to support the work that goes into managing the golf course.

I stand ready to provide additional insight, if needed. Please advise me if you have any other questions or if I can be of assistance.

Sincerely,

Henry DeLozier

GGA Partners USA LLC

DEACON

901 NE Glisan St. Suite 100
Portland, OR 97232

P: 503.297.8791

deacon.com

OR# 134328 | WA# DEACOC*851BM

November 13, 2023

Mr. Lonnie Lister
General Manager
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Mr. Lister,

I have been asked to evaluate the costs related to the Alternatives Analysis that has been prepared by Portland Golf Club for the pond dredging project. I feel comfortable weighing in on some of the costs, especially the ones related to construction. Other costs, related to repair of the golf course, rebuilding a golf course, etc. are better reviewed by someone qualified in those fields.

I will provide a short summary of my background. I am a 1971 graduate in Civil Engineering from Purdue University. For the next ten years I worked in construction for two large general contractors: Turner Construction and Continental Heller Construction. In 1981 I moved to Portland to start our company, Deacon Construction, a commercial general contractor, where I served as Project Manager, Estimator, CEO and now Chairman of the Board. Our company completes around $500 mil. of projects each year, with offices in Portland, Seattle, Sacramento, and Pleasanton.

I have read the Alternatives Analysis report and feel comfortable providing my opinion of the following costs in the report. I have the advantage of having worked on preliminary concepts for this project, in 2021, and analyzing the options for removing silt from the lake via dredging and excavation.

1. Replacement Bridge: the estimated cost of $250,000 is reasonable, assuming the cost includes engineering, demolition of the existing bridge and upgrading of the existing abutments.

2. Dredging or Excavation Cost: in 2021 our cost estimate for excavation and moving the silt to the Pinger property was approximately $400,000 and the estimate for dredging was around $650,000. This is relatively close to the $550,000 used in the current analysis.

3. Sediment Bag Cost & Grading: the estimated cost of $250,000 is very close to our previous estimate.

4. Partial Dredging or Excavation & Infrastructure Cost: the costs in the report are reasonable, based on what percentage of the overall project is assumed.

5. Temporary Access via SW 82nd Avenue: the $50,000 estimate for this work is reasonable.

6. Sediment Bag Cost & Haul Off of Silt: the estimated cost of $650,000 is reasonable as it would include the $250,000 noted above in Item #3, plus the haul off and dump fees for 5300 CY of silt. This balance of $400,000 equates to a cost of around $75/CY, which is realistic. It will be expensive to haul the silt, after one year of draining, and find a dump site for this material that is mixed with golf balls. It might even require separating the golf balls out of the fill before it can be placed offsite.

Hopefully this information is helpful. Feel free to let me know if there are questions or additional areas you would like feedback about.

Steve Deacon
Chairman
Deacon Construction, LLC

Raleigh Water District

October 13, 2023

Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

As you know, Portland Golf Club ("PGC") is within the boundaries of the Raleigh Water District (the "District"), which is a domestic water supply district formed under ORS, chapter 264, in the Portland metropolitan area. You inquired about whether the District might be able to supply large volumes of water to PGC on a temporary or permanent basis for its irrigation needs.

In order to supply water to PGC for irrigation, there are a couple hurdles that will need to be figured out. First, the District purchases water from the City of Portland under contract. PGC's large water demand will increase the District's peak water use in the summer, which will increase rates throughout the District and therefore may be expensive for PGC and all District customers. Second, the District receives water through a water line shared with other utilities. In the summer months, the District often reaches capacity for its share of use from the water line. As such, water deliveries to PGC may be restricted to available capacity, PGC may need to restrict its usage to particular times, or infrastructure upgrades may be required. Third, summer interruptible water is an option that is available from the City of Portland. This option would require the District to apply to the City of Portland for a specific amount of water to be purchased during a specified time frame above the contracted amount. This water is billed at a specified rate and is payable to Portland whether it is used or not. This amount would be passed on to PGC. However, the summer interruptible water is not guaranteed and is totally at the discretion of the City of Portland.

The District is willing to further discuss options for water deliveries to PGC. Please note that the District's standard terms for water delivery include the ability to curtail water use when supplies are insufficient for all users, and domestic needs may be prioritized over irrigation. The District is not able to offer guaranteed irrigation water service in large volumes to PGC throughout the year.

Sincerely,

Matt Steidler
District Manager
Raleigh Water District

APPENDIX D – LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATE (LEDPA) ANALYSIS

UPDATED ALTERNATIVES ANALYSIS FRAMEWORK FOR PORTLAND GOLF CLUB IRRIGATION POND DREDGING PORTLAND, WASHINGTON COUNTY, OREGON

Prepared for

OREGON DEPARTMENT OF STATE LANDS
775 Summer Street N.E., Suite 100
Salem, Oregon 97301-1279
(DSL Application 63610-RF)

and

U.S. ARMY CORPS OF ENGINEERS
Portland District, Eugene Field Office
211 East 7th Avenue, Suite 105
Eugene, Oregon 97401-2763
(USACE Application NWP 2023-0024)

Prepared by

PORTLAND GOLF COURSE
5900 S.W. Scholls Ferry Road
Portland, Oregon 97225

NOVEMBER 2024 (Updated)

Introduction

On behalf of Portland Golf Club, the following is an updated alternative analysis framework document for Section 7 of PCG's Joint Permit Application (JPA), USACE Application NWP 2023-0024 and DSL Application 63610-RF. This document itemizes the project criteria and alternatives analysis for the proposed Irrigation Pond (aka Junor Lake) Sediment Removal-Disposal project located on PGC property in southwest Portland, Washington County, Oregon Based on agency discussions, the proposed sediment bag placement will occur on upland west of Wetland A and all of the wetland impact will be temporary. The dredging portion of the project is only slightly modified with the change of sediment bag placement. Information herein addresses U.S. Army Corps of Engineers' (USACE's) permit program requirements under the National Environmental Policy Act (NEPA) and the Clean Water Act, Section 404(b)(1) guidelines. This analysis also addresses the Department of State Lands' (DSL's) alternatives analysis requirements under OAR 141-085-0550(5)(o). This document supersedes the previous alternatives analysis submitted with the JPA in August, 2024.

Background

Portland Golf Club (PGC, Applicant) is a premier golf course located in eastern Washington County, Oregon located at 5900 S.W. Scholls Ferry Road. PGC was established in 1914, when no roads existed to the property, and the golf course was accessed by the Oregon Electric railroad. PGC's golf course was designed by world-renowned golf course architect, Robert Trent Jones and is highly regarded throughout the golfing world for combining magnificent design with extreme speed. PGC is listed in the National Register of Historic Places by the National Park Service under the National Historic Preservation Act of 1966 to protect PGC as one of America's historic resources.

Over the years, PGC hosted seven Portland Opens, five Portland Classics, the 1969 Alcan Championship, and the 1982 U.S. Senior Open. PGC hosts thousands of golf plays each year as well as local, regional and national tournaments, such as the Western Amateur, Women's Western Open, Oregon Amateur, U.S. Senior Amateur, PGA Championship, Ryder Cup, PNGA Men, PNGA Women, U.S. Women's Amateur Championship, and Fred Meyer Challenge. Such events each bring 100 or more out-of-state amateur and professional golfers to each event who stay locally for lodging, food services, and entertainment.

The PGC property is 147 acres, which is very compact for a modern day golf course. Approximately 95 acres are irrigated and mowed turf, while the remainder of the property consists of a clubhouse, parking lots, maintenance facilities, recreational uses (pool and tennis courts), and natural spaces (such as creeks, forest, and shrub land). The property is a peaceful oasis only minutes from downtown Portland, with two creeks, Woods Creek and Fanno Creek, winding through the golf course, mature tree-lined fairways, manicured greens, wildlife, and floral configurations. PGC offers active open space within the urban environment of the Portland metro area. The PGC property also provides needed floodplain storage when Fanno Creek floods.

Donald Junor, born in Aberdeenshire Scotland in 1889, came to Portland Golf Club in 1920, and at that time he was the most experienced greens keeper (golf professional) on the Pacific Coast. In the 1920s, he dredged a reservoir on the golf course property using horses, which is named " Junor Lake" in his honor. Junor Lake stores water for irrigation, which water is essential to PGC's operations, but the lake is much more than an irrigation reservoir. Junor Lake is essential to PGC's operations (in-ground water reservoir), as well as a golfing hazard for 2 fairways, and open water feature that attracts waterfowl and small mammals that inhabit nearby forest and open spaces, contributing to the overall design, function, and enjoyment of the property.

Project Overview

Junor Lake is 1.77 acres, receives year-round flows from Woods Creek, and, in turn, seasonally overflows into Fanno Creek. Fanno Creek bisects the golf course, with half of the fairways to the north (front 9 holes) and other half to the south (mostly back 9 holes). Woods Creek bisects the southern portion of the

property, flowing from the east boundary to the Junor Lake, then overflows to Fanno Creek via gate valves to the northwest and southwest. Fanno Creek flows several miles from the golf course to the southwest and is tributary to the Tualatin River.

Woods Creek watershed extends west and south (almost to Interstate 5 near Capitol Highway). The watershed continues to urbanize with in-fill lots being converted to residences, streets widened for sidewalks, and construction of higher density developments (duplexes, apartments, backyard cottages, etc.). Consequently, this increased amount of upgradient (offsite) stormwater has eroded upgradient creek channels and ditches, then washing such dirt onsite via Woods Creek. The nature of this urban watershed now has flashy flows that carry sediments to Junor Lake. While improved sediment trapping from the Woods Creek watershed is beyond the scope of this project, PGC is supportive of mutually beneficial restoration projects that improve water quality. PGC welcomes opportunities to work with Clean Water Services to improve water quality and stream habitat.

PGC minimizes erosion potential within the golf course by facilitating infiltration and having very little impervious cover. Additional measures to reduce onsite runoff include continued maintenance of forest and tree corridors that intercept rainfall and facilitate subsurface water movement. PGC also closes a gate valve to prevent sediment-laden water from being deposited in Junor Lake when Fanno Creek carries sediments from rain events. Thus, the loss water storage potential in Junor Lake is due to sediment imported by Woods Creek. Given the urbanizing nature of the Woods Creek watershed, sediment accumulation in Junor Lake is unavoidable.

In 1994, PGC received authorization from DSL and USACE to remove accumulated sediments from Junor Lake, but the attempt was not successful. In particular, the equipment was inadequately sized, and associated labor was only capable of removing a few hundred cubic yards of sediment. The failure of the prior sediment removal only delayed the inevitable need to remove 5,300 cubic yards of sediment.[1] As the accumulated sediment increases in Junor Lake, it reduces water storage capacity, and increases sediment uptake by the golf course's irrigation pump, causing damage to PGC's irrigation system. The sediment accelerates pipe deterioration, lowers water pressure, and shortens pump life. PGC plans to seek future authorizations to remove sediment from Junor Lake on a more regular basis.

Project Purpose and Geographic Area

The **basic purpose** of the proposed project is to maintain the continuing viability of the property as a world-renowned golf course. The **overall/specific purpose** of the project is to maintain Junor Lake by removing and disposing of approximately 5300 cubic yards of accumulated sediment from the reservoir, to provide irrigation water to the golf course while also maintaining the integrity and value of the property for its current purpose and function.

For the purposes of USACE review, the dredging activity constitutes a 'water dependent activity' because the removal of accumulated sediment occurs only within jurisdictional wetland and waters. The placement of sediment bags is not considered water-dependent activity; however, only 0.05-acre of temporary wetland impact is necessary to place sediment bags on upland west of Wetland A.

The **geographic area** of the project is the PGC property. The golf course was developed and has remained at its current location for over a century. The purpose of the project is to maintain the continuing viability of the PGC property as a world-renowned golf course, so other properties are not available to meet the purpose of the project. However, to ensure a reasonable range of alternatives are considered, off-site alternatives are included for portions of the overall project.

[1] The sediment removed from Junor Lake includes an unknown amount of golf balls. In accordance with state regulations, PGC will coordinate with Oregon Department of Environmental Quality concurrently with the USACE and DSL permitting process.

Project Criteria

The project requires removal of 5300 cubic yards of sediment from Junor Lake and appropriately disposing of the sediment. The sediment will be removed by dredging and then placed nearby in large sediment bags. The project alternatives are evaluated using six project criteria: 1) Site size, 2) Site availability; 3) Logistics; 4) Environmental impacts; 5) Cost; and 6) Other qualitative factors. Project criteria are further defined below:

1. Site Size

The site must provide minimum necessary water storage capacity or supply, and also allow for disposal of the removed sediment.

1a. Water Storage/Supply Size: Will the site provide an adequate supply of water to the golf course?

To meets Applicant's water use needs, project alternatives must have storage capacity of at least 4 acre-feet of water, based on PGC's state-issued water rights.

1b. Sediment Disposal Size: Will the site allow for disposal of the full volume of sediment removed?

Approximately 5300 cubic yards of sediment must be removed from Junor Lake. This sediment volume would fill approximately 90 sediment bags (roughly 60 cubic yards per bag, or 5 dump truck loads per bag equivalent).

2. Site Availability

2a. Water Storage/Supply Availability: Is the site one which can be reasonably obtained, utilized, expanded, converted, or modified to provide an adequate supply of water to the golf course?

PGC holds state-issued water rights to store surface water in Junor Lake from Woods Creek and Fanno Creek, and to use flows from Fanno Creek at Junor Lake and to utilize groundwater. Modifications to existing water rights are complex and uncertain, if for example, PGC requested to change the water storage location or alter the diversion point (other than at Junor Lake). Alternative sources of available water are explored, but speculative alteration of PGC's water rights is not proposed.

2b. Sediment Disposal Availability: Is the site one which can be reasonably obtained, utilized, expanded, converted, or modified to allow for sediment disposal?

Available sediment storage locations must have topography suitable for capturing water seeping from the sediment bags, and returning it to Junor Lake. Capturing the seepage water is required to keep the dredge afloat and keep turbid water from entering Woods Creek and Fanno Creek. Some locations may necessitate excavation and grading to create berms to capture seepage water for reuse. The availability of offsite sediment disposal was not considered practicable due to excessive trucking cost, limitations on the materials authorized as "clean fill" in construction and quarry sites, and landfill disposal cost.

3. Logistics

3a. Water Use Infrastructure: Will the alternative allow connection and use with the existing water system?

Junor Lake is situated at the confluence of Woods Creek and Fanno Creek. PGC's entire water use system is designed and constructed to utilize Junor Lake as a "bulge in the system" to provide enough volume and pressure to run the sprinkler system. The size of Junor Lake (i.e. water storage volume) allows water flows to recharge Junor Lake daily for nightly irrigation. A lake of smaller capacity will not adequately serve the pumping demand required to irrigate an 18-hole golf course each night during the dry season.

3.b. Construction Ingress/Egress: Will existing roads, bridges, and staging areas allow for the necessary construction?

The process of dredging Junor Lake and pumping sediment into geofabric bags for onsite storage could require access by heavy construction equipment. Access to PGC is limited, and internal access roads are too narrow for and not constructed to withstand heavy equipment. Consequently, construction logistics are very limited.

3c. Infrastructure Damage Avoidance: Will the alternative avoid damage to existing infrastructure?

Portions of the PGC property contain infrastructure that can be easily damaged by heavy machinery. Irrigation infrastructure is located throughout the PGC property. Additionally, many of the fairways, tees, and green have subsurface drainage pipe and tiles to facilitate water percolation through the soil. The south edge of the property has storm and sanitary sewers under the Fanno Creek pedestrian and bike trail.

4. Environmental Impact

Woods Creek and Fanno Creek dissect the PGC property -- these wetlands are listed in the US Fish & Wildlife Services' National Wetland Inventory, as well as in the Local Wetland Inventory. In addition, Wetland A is an emergent wetland near the south edge of the golf course property; while Wetland B is a partially forested wetland located north of Woods Creek and east of Junor Lake. Wetland C is a very narrow band of emergent wetland encircling Junor Lake. Wildlife utilize the creeks and wetlands and other portions of PGC's property.

4a. Stream Impacts (Quantitative): Will the alternative have impacts to streams?

To dredge Junor Lake, it is necessary to temporarily isolate it from Fanno and Woods Creeks. Less than 15 feet of Woods Creek will be temporarily disturbed for placement of a coffer dam where Woods Creek enters Junor Lake. The creek channel at this location is mostly unvegetated and has a soil substrate. The coffer dam will use plastic sheeting and sand bags to minimize impacts to the creek sidewalls and bottom. The temporary bypass pipe will be secured to 660 feet of the south edge of Junor Lake. After dredging, the coffer dam and pipe bypass will be removed leaving no damage to Woods Creek. No permanent damage will occur to Woods Creek or Junor Lake.

4b. Stream Functions (Qualitative): Will the alternative have impacts to water quality?

With only 15 feet of temporary channel disturbance, potential stream functions were assessed informally by a wetland scientist. Fish usage is limited to warm water-adapted species. The coffer dam and bypass pipe will temporarily affect Junor Lake as fish habitat; however, upstream segments of Woods Creek have sufficient in-stream habitat when the bypass is utilized. The proposed activity will not adversely impact water temperatures or water quality in Woods Creek. Post dredging conditions will have significantly greater sediment trapping and improved water quality functions.

4c. Wetlands Impacts (Quantitative): Will the alternative have impacts to wetlands?

Wetland A: Offset from Fanno Creek and Woods Creek, Wetland A is situated at the southern edge of the golf course property. Wetland A is 0.72-acre and palustrine, emergent wetland, per Cowardin Classification System. The wetland water regime best matches HGM-Slope. It is the only wetland in the project area outside of the flood zones for Fanno and Woods Creeks. While sustained by limited urban runoff and precipitation, Wetland A becomes seasonally dry most years and only connected to Fanno Creek during the rainy season. Wetland A provides wildlife habitat for terrestrial mammals, amphibians and birds, but lacks surface water conditions for fish habitat. Wetland A will be impacted by placement of sediment bags in the wetland.

Wetland B: Situated on a low terrace immediately north of Woods Creek (less than one-half located within project area). Roughly 1 acre and palustrine forested and emergent, per Cowardin Classification System. It has an HGM-Slope water regime. This wetland has connectivity to Woods Creek and occasionally floods when upgradient segments of Woods Creek receive heavy rainfall, sometimes once or twice per year. No impact is proposed to Wetland B, since placement of sediment bags in Wetland B will increase stream flows and downgradient flooding (offsite to southwest), as well as reduce onsite sediment trapping.

Wetland C: Portions of Wetland C occur at the base of a retaining wall that encloses Junor Lake. It is anticipated the sediment dredging will replace such portions of Wetland C with open water. There are other portions of Wetland C that consist of mowed lawn near the retaining wall. All of the alternatives will avoid permanent impacts to terrestrial portions of Wetland C.

4d. Wetlands Functions (Qualitative): Will the alternative have impacts to wetlands quality?

Wetland functions are assessed using Oregon Rapid Wetland Assessment Protocol (ORWAP). Such methodology generates a summary of findings, which is included in Appendix F of the JPA. Wetland functions potentially affected by the proposed dredging and sediment bag placement are limited to Wetlands A and C. Wetland A primarily provides terrestrial habitat, water quality, songbird, and amphibian habitat functions (breeding, nesting and feeding). It has incidental or indirect functions for water storage (desynchronization), sediment trapping, seasonal water for fisheries, carbon sequestration, and nutrient cycling. Wetland C functions are associated with the open water of Junor Lake, namely emergent habitat, water fowl feeding, amphibian nesting and feeding (invertebrates), fisheries support, nutrient cycling, and sediment trapping.

4e. Wildlife Impacts (Quantitative): Will the alternative have impacts to wildlife?

The proposed dredging activity and sediment bag placement will not impact habitat for any rare, threatened, or endangered species. Anticipated impacts to wildlife are displacement of wetland-dependent species, such as amphibians, songbirds, small mammals, and invertebrates. Loss of such habitat will displace wildlife to the east and/or west where Fanno Creek and Woods Creeks provide similar habitats. In general, impacts to wildlife are proportional to the degree of land disturbance and loss of cover or vertical structure.

4f. Wildlife Functions (Qualitative): Will the alternative have impacts to wildlife quality/diversity?

Urban wildlife functions are evaluated within the context that potential habitat is already highly fractured and affected by stressors like artificial lighting, vehicle/equipment noises, and human intrusion. Urban wildlife functions are often diminished, when compared to rural and large tracts of forest, range and open space. Typical functions include breeding, nesting and feeding opportunities within brush thickets, forests, and scattered clearings. Wetland-dependent wildlife functions typically incorporate near-surface wetness favorable to amphibians and certain invertebrates.

4g. Forest Upland Impacts (Quantitative): Will the alternative have impacts to forest uplands?

Upland forests and forested corridors occur throughout the PGC property, and extend offsite along Woods Creek and Fanno Creek. The alternatives proposed to avoid potential impacts to forest lands, since such areas require 50 to 100 years to mature. Additionally, loss of forest lands within an urban area increases summer temperatures, reduces wildlife habitat, decreases water quality, and interrupts migration corridors.

4h. Forest Upland Functions (Qualitative): Will the alternative have impacts to forest uplands quality?

Forested habitats have many terrestrial functions for urban wildlife, namely breeding, nesting, feeding, and migration. These habitats provide vertical habitat for small mammals and birds sensitive to ground predation. Forested areas also provide shelter from rain/snow with dense foliage, nesting cavities, natural platforms atop branches, and snags for perching. Forest area provide refugia for small mammals and song birds that reside offsite, but occasional travel through such corridors. Additionally, nearby residents greatly desire tall trees for visual purposes, windbreaks, air quality and temperature regulation. Humans also have a great affinity for urban wildlife, wildlife sounds, and diversity of other species utilizing forested habitats.

5. Cost

A comparative analysis of the cost of different alternatives. If the cost of an alternative is clearly exorbitant compared to similar actions and the proposed alternative, the alternative is eliminated as not practicable.

Projects costs include, but are not limited to, dredging, excavation and grading (land contouring), sediment bag placement or alternative transportation and disposal, and labor. Some alternative scenarios include the costs of bridge replacement, temporary road construction, alternative reservoir construction, fairway rehabilitation, trucking, and more. Estimated costs were compiled by the project team, and given consideration by a large-scale contractor to determine if such costs were within a reason range of expectations. See letter at end of this document from Deacon Construction LLC (Steve Deacon, November 13, 2023). The cost of compensatory mitigation is not factored into any of the alternative scenarios. Also, the costs do not include profits or other financial gains to the golf course from the project, but do take into consideration the damages to the golf course caused by project interference and/or permanent impairments.

5a. Dredging, Excavation, or Reservoir Costs:

The floating dredge and pumping system expenses include mobilization, set-up, operations for 6 to 8 weeks, demobilization, and ground rehabilitation.

5b. Sediment Bag Placement Cost:

This category includes expenses for sediment bag manufacturing, staging area preparation, grading, operations for 6 to 8 weeks, soil cover placement, and staging area rehabilitation.

5c. Infrastructure Costs:

Several alternatives require supplemental work for construction access, such as bridge replacement, temporary road construction, fairway rehabilitation, and protection of subsurface utilities.

5d. Implementation Costs:

Each alternative results in disruption of golf course operations and player utilization of golf course fairways. The dredging approach with sediment bag placement at Wetland A minimizes such disruption with temporary closures for pipe installation, setup and decommissioning. Several

alternatives require closure of entire fairways for construction of access roads, and/or sediment bag placement. And a few alternatives would reduce length of fairways and/or result in extensive damage to fairways that must rebuild the underlying drainage network and new turf. The cost of these rehabilitation efforts is an unavoidable project expense. Not included in this cost are temporary loss of revenue, loss of membership and loss of tournament income, which are difficult to assess for this alternatives analysis, and are therefore considered without precise dollar figures.

6. Other Qualitative Factors

Other qualitative factors are necessary to evaluate the relative suitability and practicability of alternatives to fulfill the basic and overall/specific purposes of the project. These factors are assessed on a yes/no basis as related to essential elements of the golf course. Alternatives that do not satisfy these factors will damage the golf course property and therefore cannot fulfill the basic and overall/specific purposes for the project. Moreover, if PGC cannot maintain a world-class golf course, event sponsors will no longer hold golf tournaments at PGC. Attached at the end of this document are letters supporting and validating these criteria from golf course architect, Dan Hixson (October 16, 2023), and golf course advisor, Henry DeLozier (October 14, 2023).

6a. Complete Golf Course: Will the alternative maintain the use of all 18 holes of the golf course, as well as practice greens and the driving range?

6b. Design Integrity: Will the alternative maintain the design integrity of the golf course, including the tees, greens, roughs, and golfing hazards?

6c. Drainage: Will the alternative maintain optimal soil and drainage conditions to support golf course irrigation and landscaping?

6d. Accessory Work Areas: Will the alternative maintain accessory work areas that are essential to golf course functions, such as a yard debris area and turf farm?

Sediment Excavation versus Sediment Dredging

The proposed dredging and sediment bag placement project is complex. Removing sediment from Junor Lake has only two approaches – excavation or dredging. To excavate, Junor Lake must be drained, haul roads constructed, sediment lifted out with excavators and bulldozers, and reconstruction of damaged fairways, retaining walls, and associated landscaping. The excavated sediment will also amount to 5300 cubic yard (similar amount as dredging). Such approach involves a lot of machinery, equipment operators, truckers and inspectors. Unlike most excavation projects, removal of the sediment will be messy, destructive, and risky due to potential opportunities for spillage, equipment failures and unintentional accidents. The excavated sediment must be hauled to a location where containment cells can be constructed. Given the excavated sediment contains about 50 percent water, the containment cell area will utilize the entirety of Wetland A, plus more working space for topsoil storage, truck haul roads, and excavator maneuvering. The remaining portion of the golf course lacks sufficient space for containment cell construction and associated haul roads.

In contrast, the dredging approach is rather surgical, with only the dredge cutting head and discharge pipeline having contact with the removed sediment. The equipment needed is limited to a floating dredge, pump and generators, temporary pipeline laid on the surface, and a pilot aided by several assistants. To keep the dredge floating, water will captured at the sediment placement site and pumped back to Junor Lake (hence a closed loop). There would be no water discharge to Fanno or Woods Creeks. The dredging approach is clearly the Least Environmentally Damaging Practicable Alternative for the removal of the accumulated sediment in Junor Lake.

Onsite Sediment Containment versus Onsite Sediment Bag Placement

Placement or hauling of the dredged sediment also has limited approaches, namely onsite containment cells, onsite sediment bags, and offsite disposal. All approaches involve removal (salvage) of topsoil, excavation of subsoil to desired grades, final contouring, and eventual return placement of the salvaged topsoil. Construction of sediment containment cells requires extensive work to create basins capable of holding a slurry of sand, silt, clay, and water. Such basins must be of sufficient size to hold the materials (about 5300 cubic yards) – either hauled in by truck, or pumped from dredge. Such construction is involves excavators, bulldozers, soil compactors, culverts, rock spillways, and road construction directly to each containment cell.

In contrast, construction for sediment bag placement utilizes less space (hence less grading) to build a sloping surface and small downgradient berm to capture and recycle drainage water. Such construction requires fewer excavators and bulldozers, as well as less durable road construction (for pickups, rather than 12CY dump trucks). The sediment bag placement approach also requires less water storage capacity, since the drainage water is continuously cycled back to Junor Lake to maintain water levels for the floating dredge (whereas the containment cell approach must hold more water and has a larger construction footprint). Thus, the sediment bag placement approach has less overall impacts for sediment sequestration.

Equipment/Truck Access From North of Fanno Creek versus Access From South of Fanno Creek.

Several alternative explored by the project team highlight a significant issue for either transporting sediment by truck or use of heavy equipment. Access from the north side of Fanno Creek is via S.W. Scholls Ferry Road and an interior road designed for pickups and maintenance carts. To access Junor Lake, it is necessary to use a weight restricted bridge, since it is old. While pickup trucks can utilize the bridge, it is not sufficiently strong to bear the weight of loaded dump trucks or equipment like excavators, or bulldozers. A replacement bridge is needed for such use, which has an estimated cost of $800,000 for engineering and construction. It is cost-prohibitive to replace the bridge for this project, as well as logistically difficult to bring in cranes, flatbed trailers and concrete mixing trucks to place the bridge decking.

In contrast, truck and heavy equipment access to the southernmost portion of the property (where sediment placement is proposed) is possible with safety and structural precautions. Specifically, it is necessary to add steel plating atop the Fanno Creek trail (paved path) to prevent damage to underlying sewer lines. A practical alternative will have minimal crossings by heavy equipment and loaded dump trucks. Several other alternatives that would haul away the sediment would require further reinforcement to protect the underground utilities. That is, there is a significant risk of damage to the sewer lines when up to 600 roundtrips of dump trucks must cross the Fanno Creek trail. Regardless, the alternatives which haul away the sediment will have dump truck fuel usage of 2500 and 3000 gallons, as well as street sweeping needs. The truck hauling alternatives require additional handling (movement) of the sediment, tipping fees and associated labor adds a minimum of 520,000 to the project cost. Aside from the logistical challenges, hauling away the sediment can only be done during the dry season when construction costs are highest and pedestrian use of Fanno Creek is greatest.

Rejected Alternatives

No-Action Alternative

The no-action alternative will result in Junor Lake filling with silts and clays, and eventually becoming a vegetated marsh. The irrigation uptake structure will become unusable due to clogging and the pumping system running dry, causing PGC to be unable to use water from the lake. PGC's state-issue water storage right will be forfeited and potentially cancelled; thus, PGC will be unable to irrigate the golf course. Without irrigation, turf and landscaping at the golf course will die and the golf course will become unusable. Specifically, the turf will seasonally become dormant, weeds will invade lawn areas, turf quality will become hard and undesirable, and golfing use will plummet to unsustainable levels. PGC will not be able to host events. The no-action alternative is unviable and will ultimately destabilize the golf course and force its closure. The no-action alternative cannot meet the project purpose.

New Site for Golf Course Alternative

Applicant began its alternatives analysis evaluation in January of 2020 by considering approaches to remove accumulated sediment in Junor Lake and potential options for sediment placement or offsite transport. Unlike construction of a new residential subdivision, commercial center, or industrial facility, the golf course cannot be relocated to a different property. It is surrounded by residential subdivisions and schools in all directions, so it is land-locked. The nearest vacant ground of sufficient size and suitability is more than six miles to the southwest and situated outside the Urban Growth Boundary. Such location does not serve the golf course membership, who live locally, and a replacement location would double or triple their commute to the golf course. PGC's water rights permit use of local water sources that cannot be utilized at an unrelated property. Additionally, the cost of constructing a new golf course would far exceed any other alternative discussed herein. As such, an alternate golf course location will not satisfy the project purpose.

Offsite Quarry or Construction Site Sediment Placement Alternative

Sediment placement at a quarry site was examined, which will involve hauling the sediment captured in the sediment bags offsite. Construction sites in the Beaverton-Tigard vicinity have similar potential for sediment bag disposal. Construction sites and quarries often accept clean fill material to backfill previously-mined areas (for future reclamation). Like traditional fill operations, quarries accept clean soil and that soil can be delivered in dump trucks once it is solid material. To attain solid-like consistency, excess water must first drain out of the sediment bags; then it can be loaded into dump trucks. At least a year is needed to remove the excess water from the sequestered sediment. Since the filled sediment bags are too heavy to lift individually, each bag will be cut open, then sediment loaded by backhoe into dump trucks. The anticipated number of truck loads is 550 to 600 (assuming 12 cubic yard capacity). The trucking time is approximately 7 trips per truck per day to the nearest, available quarry, located in the vicinity of S.W. Tonquin Road and S.W. Morgan Road (23 miles away in Tualatin). The only available travel route will be via S.W. 82nd Avenue, then S.W. Garden Home Road and S.W. Oleson Road to Oregon Highway 217. Given weekends, holidays and mechanical difficulties, the sediment hauling is estimated to span approximately 5 weeks. Recent inflation has substantially increased the expected loading and hauling cost to $350,000, plus an additional dumping cost of roughly $325,000, which includes a required step to mechanically sieve the hauled soil to remove golf balls. There will also be labor and support equipment costs (such as flaggers, street sweeping, etc.) that add another estimated $55,000. Added together, the option to haul the sediment offsite to a quarry or construction site will cost approximately $720,000. Such cost is substantially higher than the cost of the proposed alternative. The project team considered this supplemental hauling, and disposal cost impracticable.

Replacement Irrigation Pond and Above Ground Storage Reservoir Alternatives

PGC considered several alternatives involving constructing a new irrigation lake or above-ground reservoirs in the vicinity of Junor Lake, namely directly to the south or east. Potential locations north and west of Junor Lake are too congested for a 1.5- to 2-acre pond, due to insufficient space between tee boxes, fairways, bunkers and greens. Pond construction will close 3 fairways for 12 to 18 months for preparation, excavation, and fairway reconstruction/realignment. Constructing a new irrigation pond to the south will add water hazards to fairways no. 13 and 14 (both par 4). Such hazards will substantially increase play difficulty – an undesirable condition for the majority of PGC golfers. The area south of the existing Junor Lake will have an additional problem – no connection to Fanno Creek and Woods Creek. Both creeks are 4 to 6 feet topographically lower than fairways no. 13 and 14, which makes it impractical to divert water into a new irrigation pond. Regardless of alternative irrigation pond locations, new irrigation water storage will damage the use of the fairways for several years. PGC will be unable to host golf tournaments for these construction years – such events are valuable to retaining memberships and make a significant economic benefit to the local community in terms of lodging, food service, tourism, car rentals, and recreation. Such pond or storage tanks will ultimately reduce fairway length and PGC will no longer be eligible for national and international tournaments. This alternative is not viable and actually detrimental to the PGC membership and long-term sustainability of the property due loss of

revenue (green fees and pro shop sales that cover day-to-day expenses). This alternative cannot meet the project purpose.

Groundwater, Domestic Water or Recycle Water Alternative

PGC explored alternate sources of irrigation water, namely groundwater (well water), domestic water, and recycled water. Groundwater in this vicinity must be drilled to sufficient depth to yield pumping rates suitable for a golf course (much greater well yield than a simple domestic well and most commercial wells). The only geologic formation that has sufficient yield is an aquifer that also has higher salt content than typical drinking water. If used alone, this ground water permanently damages soil, turf and landscaping, eventually killing the plants -- it must be used sparingly and in combination with surface water to prevent the salt toxicity. PGC also investigated purchase contracts from two water districts for irrigation water; however, potential water suppliers indicated they cannot not commit to large volume water delivery. Furthermore, potential providers will reserve the right to cease water deliveries during periods of excessive heat and/or long-term drought. See letter at end of this document from Raleigh Water District (Matt Steidler, October 13, 2023). Without adequate water supply, the golf course will need to close temporarily until water service is resumed. The anticipated cost of domestic water could be 10 times more expensive than the cost of removing the accumulated sediment from Junor Lake. Over 20 years, the cost of irrigation using domestic water is expected to be a minimum of $6,000,000. The use of domestic water for PGC irrigation is not practicable and has an added risk that the water supply can be cut off during critical periods. Recycled water is currently not available in this vicinity.

Sediment Bag Placement in Wetland B

This alternative will remove, then fill the forested upland situated between fairways 11, 12, and 13, and Wetland B. Wetland B has a direct connection to Woods Creek and floods when upgradient lands receive heavy rainfall. Potential impacts to Wetland B are likely significant due to loss of flood storage capacity and desynchronization. Placement of sediment bags in Wetland B will likely increase flood flows on downgradient lands (offsite to southwest), as well as reduce in-situ sediment trapping. Placement of sediment bags in this location will also destroy a grove of mature ash trees. Sediment bag placement in this wetland will have a significantly greater environmental impact than placement in Wetland A and other alternatives. Finally, the upper portion of this open space is a hillside with 15 to >25% slopes, so it is not suitable for sediment bag placement without substantial excavation and contouring. This alternative cannot meet the project purpose due to excessive environmental damage.

Sediment Bag Placement in Upland Forest

A potential sediment bag location is an upland forest between fairways 14, 15 and 16. The trees in this vicinity are greater than 100 years old. This dense cluster of older and taller trees provides habitat for numerous bird species, and has perch branches for predator birds. It also has close proximity to Fanno Creek, Woods Creek, and Junor Lake. This wooded grove also serves as a scenic resource for residences located to the west, and is designated as a scenic resource by Washington County, unlike Wetland A. Destruction of this natural resource would also be contrary to PGC's land stewardship policy and golf course design to balance mowed fairways and greens with tree and shrub corridors. Removal of such a natural resource is not supported by PGC due to excessive environmental damage. Additionally, Washington County is unlikely to approve such resource removal; hence this alternative cannot meet the project purpose.

Sediment Bag Placement at Driving Range

An alternate location for sediment placement is the driving range, located in the north-center of the golf course (east of the clubhouse). The driving range is surrounded by Fairways 3, 4 and 5. It is an integral component of the golf game, particularly for player warm-up and driving (swing) practice. When a player does not have sufficient time for a 9- or 18-holes game of golf, the driving range serves as a 1 or 2 hour substitute. Said differently, the driving range often has greater use than other facilities at the golf course. It cannot be removed to create room for a sediment placement area. From a practicality point of view, the driving range is the farthest distance from Junor Lake, specifically 2000 feet (nearly half a mile). Such distance and upslope position will require two auxiliary pumps to transport the sediment to this location. In addition, use of such area will also require substantial grading to recover seepage water, since the natural topography slopes away from the driving range and ultimately toward Fanno Creek. This location is not available, nor does this alternative meet the project purpose.

Onsite Sediment Placement in Fairway 15 or Multiple Fairways

This rejected alternative involves temporary decommissioning of the middle segment of Fairway 15, which is the only fairway large enough and logistically positioned to place sediment bags. The sediment bags will need to drain for one year, then be cut open, excavated and hauled to a landfill. The sediment material is too compressible, hence unsuitable to be spread out and incorporated into a new section of fairway. Sediment bag placement will require an area 150 feet wide and 700 feet long, and result in a net ground elevation increase of 1.5 feet. After sediment removal (hauled offsite for disposal), Fairway 15 irrigation and drainage systems must be reconstructed and stabilized for 18 months to allow for new turf grow to mature. This approach is not viable due to the large disruption to the golf course play and extensive rehabilitation (in addition to costing four times as much as the selected alternative).

A variation of this alternative was suggested, which involves spreading out the sediment as a thin layer (less than 0.5-inch) atop multiple fairways. This approach anticipates having turf grasses buried by a light application of sediment, then allowing the grasses to grow and sequester the sediment. This approach is akin to having volcanic ash gently burying the land surface and allowing plants to poke upward through the thin layer. This approach still requires the sediment to be pumped into sediment bags and excess water to drain out. Given that most of the fairways are sloping, only portions of Fairways 7, 10, 11, 13, 14, 15, 16, and 18 have flat enough slopes. Given the quantity of sediment, this procedure will need to be conducted four times each summer for 4 years, which effectively closes those fairways during peak play times and tournaments. This approach is completely contrary to common turf management practices and would create a patchy, irregular turf growth. It is akin to placing chipped bark atop a football or soccer field – illogical and damaging to the underlying turf. Such approach is simply unacceptable for a golf course and the rehabilitation costs will be double to triple the cost of best ranked sediment bag placement alternatives.

<u>Practical Alternatives and Criteria Evaluation</u>

Onsite Sediment Bag Placement in Yard Debris-Turf Farm Areas

The yard debris and turf farm areas are located north of Fanno Creek and immediately east of S.W. 86th Avenue. The yard debris and turf farm areas are essential components of the golf course because maintenance of the grounds constantly generates leaf litter, trimmed branches, and fallen trees (sawed apart). While the golf course is able to utilize chipped remains of trees/branches, there is simply too much organic material to re-use onsite. The turf farm is needed due to a perpetual need to replace patchy and worn turf with healthy turf for fairways, greens, and tee boxes. The south part of the yard debris area consists of loose fill material that is unstable and too steep for sediment bag placement. The turf farm includes a maintenance road that must be relocated to create a 0.7-acre sediment bag placement area. Such space is too small for the entire sediment volume to be dredged, so the dredging would require 2 phases, occurring 2 years apart. PGC would have an additional operations expense of hauling away all of the yard debris (instead of having storage space). These temporary operations would last for four years, given the 2-phased dredging approach needed for this smaller sediment storage space.

To utilize the Yard Debris-Turf Farm area for sediment bag placement, it would be necessary to build a temporary containment system that consists of berms on the south, east and west sides. Such berms would require regrading of the turf farm area to generate dirt and create an adequate slope towards the south containment berm. Within the containment area, a small network of drain pipes and gravel cover would be needed to capture water draining from the sediment bags and consolidate the water to pump back to Junor Lake to keep the dredge afloat. Given space limitations, the sediment bags would be stacked 2 or 3 bags high. This alternative is not practicable; however, if implemented, PGC must remove the sediment bags to restore storage capacity to the yard debris area and growing area for turf. This alternative incorporates the additional costs of hauling the sediment to an authorized landfill. Including disposal fees and restoration expense, this alternative is roughly three times more expensive than the selected alternative.

Onsite Sediment Placement in Yard Debris-Turf Farm Areas			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	N	The north part of the yard debris and turf farm area would require 2 phases for sediment disposal, since the combined area is too small for 1 dredging. There is no replacement space for yard debris and turf growing.
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	The north part of the yard debris and turf farm area can be modified for 2-phase sediment storage if maintenance road relocated to south and turf farm eliminated.
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water use infrastructure
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement area has direct access to S.W. 86th Avenue
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrig. & drainage systems in Fairways 13, 14 and 15
Environmental Impact	4a. Stream Impacts	Y	No impact to Fanno Ck., temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging.
	4b. Stream Functions	Y	No impact to Fanno Ck., temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging.
	4c. Wetland Impacts	Y	No direct impacts to Wetlands A and B; emergent fringe of Junor Lake would expand to entire lake as sediment accumulates (Wetland C)
	4d. Wetland Functions	Y	No loss of wetland functions.
	4e. Wildlife Impacts	Y	Only incidental wildlife use of yard debris-turf farm area, since area is regularly disturbed. No significant impacts.
	4f. Wildlife Functions	Y	No loss of wildlife functions..
	4g. Forest Upland Impacts	Y	No impact to upland forests.
	4h. Forest Upland Functions	Y	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	N	Approx. $350,000 for dredge operations for first phase, and $250,000 for second phase.
	5b. Sediment Bag Placement Cost	N	Approx. $150,000 for ground preparation to build containment system to capture drainage water from sediment bags and pump back to Junor Lake. Additional $1.4M for dump truck hauling, and landfill fees, since yard debris and turf farm needed for long-term operations.
	5c. Infrastructure Cost	N	Approx. $75,000 to temporarily relocate yard debris area to alternate location, and $150,000 post-project restoration of turf farm area (both needed for long-term operations).

	5d. Implementation Cost	Y	About 6 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairways 7, 11, 16, 17 and 18 for 1 hour durations

Other Qualitative Factors	6a. Complete Golf Course	Y	Essential elements for golf play will be maintained
	6b. Design Integrity	Y	The golf course design will be maintained
	6c. Drainage	Y	PGC will be able to maintain its irrigated landscaping
	6d. Accessory Work Areas	N	The alternative will temporarily remove the yard debris area and turf farm. Both must be reconstructed to provide long-term maintenance space for ongoing golf course needs.

Onsite Sediment Bag Placement in Wetland A

The sediment will be removed from Junor Lake by floating dredge, then pumped 1300 feet to a sediment placement location immediately south of Fairway 15. The sediment placement location is emergent Wetland A, which is flanked by higher topography on all sides with a narrow outlet. The sediment removal volume is approximately 5300 cubic yards and will be considered permanent removal, and the wetland fill area is 0.72-acre permanent fill. The fill incudes a small portion of Wetland A (where it overflows to the west) that may indirectly become filled with sediment from sediment bag drainage water. The sediment bags will be placed in a northeast-southwest alignment (parallel to topographic contours) and the sediment bags will be stacked in 3 to 5 lifts (or levels). Minor temporary wetland or waters impacts associated with construction measures will also occur. The project will not discharge water to Fanno Creek or Woods Creek; however, adjacent uplands will be used to infiltrate excess water on an as-needed basis. The dredging is expected to take 4 to 6 weeks to complete, with 2 to 4 weeks of preparation and decommissioning afterwards. While this alternative meets all project criteria and has the lowest cost, it has a significant wetland impact (greater than some other alternative, but 0.15-acre less than Wetland B impact).

Onsite Sediment Bag Placement in Wetland A			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	Y	1.5 acres incl. Wetland A and surrounding land for staging, grading, sediment bag disposal, and temporary topsoil storage
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	Vicinity of Wetland A has ideal topographic setting for placement of sediment bags, capture of dredge seepage, and pumping location to return water to Junor Lake
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water infrastructure.
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement construction access to S.W. 82nd Avenue (crossing Fanno Creek trail)
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrigation and drainage systems in Fairways 13, 14 and 15; steel plating necessary to protect underground sewer lines and utilities below Fanno Creek trail
Environmental Impact	4a. Stream Impacts	N	No impact to Fanno Ck. Temp. coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4b. Stream Functions	N	No impact to Fanno Ck. Temp. coffer dam placed in Woods Creek with bypass pipe to isolate flow during dredging
	4c. Wetland Impacts	Y	Preparatory grading and sediment bag placement would impact entirety of Wetland A; emergent fringe of Junor Lake will be reduced by excavation of sediment. Temporary impact

			to terrestrial Wetland C during excavation phase, but restored after project completion; Wetland B is avoided
	4d. Wetland Functions	Y	Loss of water storage, terrestrial & amphibian habitat, song bird nesting & feeding, and carbon sequestration for WL A.
	4e. Wildlife Impacts	Y	Most birds and small mammals will be displaced by grading and sediment bag placement activity (ground disturbance, construction noise and equipment movement)
	4f. Wildlife Functions	Y	Typical nesting, breeding and feeding habitat loss during excavation and sediment placement phase. Except for tree-dependent wildlife, most wildlife functions restored over subsequent decade after project is completed.
	4g. Forest Upland Impacts	N	No impact to upland forests.
	4h. Forest Upland Functions	N	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	Y	Approx. $400,000 for dredge operations
	5b. Sediment Bag Placement Cost	Y	Approx. $125,000 for manufacturing, ground preparation and post-construction revegetation
	5c. Infrastructure Cost	Y	Approx. $25,000 for temporary access via S.W. 82nd Avenue, including steel plate covers for sewer lines/utilities
	5d. Implementation Cost	Y	About 10 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairways 7, 11, 13, 14 and 15 for 1 hour durations
Other Qualitative Factors	6a. Complete Golf Course	Y	Interruption to essential golf course features will be avoided
	6b. Design Integrity	Y	The golf course design will remain intact
	6c. Drainage	Y	PGC will be able to maintain its irrigated landscaping
	6d. Accessory Work Areas	Y	No impact to accessory work areas

Onsite Sediment Bag Placement West of Wetland A - Proposed Alternative

The upland area west of Wetland A is approximately two times larger than Wetland A. It slopes mostly to the north, but perimeter areas on the west and south also slope toward the surrounding Fanno Creek bike and pedestrian trail. While Wetland A is situated in a concave topographic position, this upland area has a convex topographic position. It is necessary to grade this upland to have a gentle, northeast-sloping surface to drain to Wetland A. The importance of the east-sloping surface is to capture dredge water seeping from the filled sediment bags, then pump it to Junor Lake. That is, it is necessary to capture seepage from the sediment bags to keep the dredge afloat. The sediment bag placement will be configured to have two layers – bags that rest atop the ground surface and a layer of bags that positioned between two lower bags. Such stacking is needed, since there is insufficient upland to have only one layer of sediment bags.

The 0.05-acre of temporary wetland impact is needed to create an access route between a staging area (southeast of Wetland A) and the upland west of Wetland A. The access route will need 2 to 3 feet of fill material, after minimal brush trimming along the south edge of Wetland A. As mentioned, the access route will be temporary to allow grading and excavation equipment access to the sediment bags (from the southeast staging area). The temporary impact also includes a 30-foot extension of the stormwater pipe to delivers water to Wetland A. Both the access route fill material and extension pipe will be removed during the decommissioning phase. This alternative also includes 3 cubic yards of silt and clay carried by sediment bag seepage water that gets diffusely spread out (less than 1/16-inch thick) in the north part of Wetland A. Such volume is sufficiently small that plants and wildlife will not be adversely affected. Such volume and thin layer is too small to be removed. While this alternative will disturb two times larger of an area than the Wetland A alternative, it will have only a temporary wetland impact. For such reasons, this ranked higher than other alternatives.

Onsite Sediment Placement West of Wetland A			
Project Criteria		**Met**	**Comments**
Site Size	1a. Water Storage/Supply Size	Y	Utilizes existing Junor Lake
	1b. Sediment Disposal Size	Y	Sediment disposal is possible
Site Availability	2a. Water Storage/Supply Availability	Y	Existing Junor Lake will have adequate water storage capacity once dredging is complete
	2b. Sediment Disposal Availability	Y	The upland area has sufficient space for sediment bags; however, staging area must be situated east of Wetland A.
Logistics	3a. Water Use Infrastructure	Y	Junor Lake is compatible with existing water use infrastructure
	3b. Construction Ingress/Egress	Y	Dredge equipment access via existing maintenance road connecting S.W. Scholls Ferry Road and interior bridge over Fanno Creek; dredge mobilization on trailer towed by pickup; sediment bag placement construction access to S.W. 82nd Avenue (crossing Fanno Creek trail)
	3c. Infrastructure Damage Avoidance	Y	Dredge slurry pipes placed atop turf avoids damage to subsurface irrigation and drainage systems in Fairways 13, 14 and 15; steel plating and other measures necessary to protect underground sewer lines and utilities below Fanno Creek trail (no damage to underground infrastructure is permissible).
Environmental Impact	4a. Stream Impacts	N	No impact to Fanno Creek, temporary coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4b. Stream Functions	N	No impact to Fanno Creek, temporary coffer dam placed in Woods Creek with bypass pipe to isolated flow during dredging
	4c. Wetland Impacts	Y	South edge of Wetland A (0.05-acre) temporarily impacted for access between staging area and sediment bags; emergent fringe of Junor Lake will be reduced by excavation of sediment. Temporary impact to terrestrial Wetland C during excavation phase, but restored after project completion.
	4d. Wetland Functions	Y	Temporary loss of water storage, emergent habitat, songbird nesting and feeding for south edge of Wetland A. Temporary impact of 0.05-acre will be restored to natural condition.
	4e. Wildlife Impacts	Y	Most birds and small mammals will be temporarily displaced by grading and sediment bag placement activity (ground disturbance, construction noise and equipment movement)
	4f. Wildlife Functions	Y	Typical nesting, breeding and feeding habitat loss during grading and sediment placement phase. Except for tree-dependent wildlife, most species able to return to Wetland A after project is completed.
	4g. Forest Upland Impacts	N	No impact to upland forests.
	4h. Forest Upland Functions	N	No impact to upland forests.
Cost	5a. Dredge or Excavation and Reservoir Cost	Y	Approx. $400,000 for dredge operations
	5b. Sediment Bag Placement Cost	N	Approx. $350,000 for manufacturing, ground preparation and post-construction revegetation. Additional cost of $100,000 for post-project decommissioning.
	5c. Infrastructure Cost	Y	Approx. $75,000 for temporary access via S.W. 82nd Avenue, including steel plate covers for sewer lines/utilities
	5d. Implementation Cost	Y	About 10 days disruption to golf course for mobilization, set-up, post-dredging turf restoration; golf course disruption limited to Fairway 15 for 1 hour durations.
Other Qualitative Factors	6a. Complete Golf Course	Y	Golf course essential elements will be maintained
	6b. Design Integrity	Y	The golf course design will be maintained
	6c. Drainage	Y	The golf course's drainage and irrigation will be maintained
	6d. Accessory Work Areas	Y	No impact to accessory work areas

Summary of Alternatives

The project team for Portland Golf Club evaluated numerous alternative scenarios, ranging from no-action, new irrigation pond or reservoir, sediment placement in Wetland A or Wetland B, sediment bag placement within golf course fairways, and several variations of these alternatives. Eight alternatives were immediately rejected for triple to greater than 50 times cost ($1.3M to $40M) or having impacts to higher functioning/value wetland. For example, the sediment placement in Wetland B alternative was rejected due to greater wetland loss to a higher functioning forested wetland. Another rejected alternative was the removal of mature upland forest (>100 year old trees) due to significant loss of wildlife habitat and a valuable design resource for the golf course. Several alternatives were rejected on the basis of significantly disrupting golfing play by closure of fairway(s) for 9 to 12 months or creating severe golf course damage that would take several years to repair (these also exceeded $1M expense). Other rejected alternatives involved sediment bag transport offsite, since hauling costs added a hauling expense of $500,000 and an undetermined disposal fee at a landfill (likely in excess of $500,000). The remaining alternative were examined for consistency with the evaluation criteria and project purpose. The table on the following page summarizes each alternative, estimated cost and reason(s) for selecting the LEDPA alternative.

Rejected Alternatives	Estimated Cost	Rejection Rationale
Rejected -- No-Action	$25 million	Loss of irrigation water storage in Junor Lake would result in golf course closure. Alternative does not meet project purpose.
Rejected -- New Golf Course	$40 million	No feasible, does not meet project purpose.
Rejected -- New Irrigation Pond or Above-Ground Reservoir	$1.5 to 4.2 million	Extensive impacts due to excess spoils from new pond excavation. Temporary closure of 3 fairways for 9 months during pond excavation and post-project fairway restoration. Does not meet project purpose.
Rejected -- Well and Domestic Water or Recycled Water Purchase	$6.7 to 9.2 million	Unstable water source and extensive construction to bring new water to golf course. Recycled water not available in golf course vicinity. Does not meet project purpose.
Rejected -- Sediment Excavation, loose material placement in Wetland A	$950,000	Impacts Wetland A, large cost to build haul road across 3 fairways, then restore afterwards. Temporary closure of 3 fairways for 9 months. Significant disruption of golf course operations and golf play. Does not meet project purpose.
Rejected -- Sediment Bag Placement at Driving Range	$3 million	Driving range reconstructed after sediment hauled to landfill. Replacement of irrigation and drainage systems. Significant disruption of golf course operations (player activity).
Rejected -- Sediment Bag Placement at Upland Forest	$725,000	Destruction of mature, 100-year old trees, loss of wildlife habitat, loss of golf course design element. Impact to adjacent neighborhood quality of life.

[continued on following page]

Rejected -- Sediment Bag Placement at Fairway 15 or multiple fairways	$2.4 million	1 to 3 fairways closed for at least 1 year for sediment placement, then 2 years for fairway reconstructed after sediment hauled and disposed at landfill. Replacement of irrigation and drainage systems. Significant disruption of golf course operations (player activity). Does not meet project purpose.
Rejected -- Sediment Bag Placement in Wetland B	$1.3 million	Requires Fanno Ck. bridge replacement, loss of forested wetland, loss of floodplain storage. Not financially viable alternative.

Practical Alternatives	Estimated Cost	Discussion and Selection
Sediment Bag Placement at Yard Debris-Turf Farm Area	$2.5 million	North part of yard debris and turf farm needed for long-term operations, so sediment bags would be hauled away to landfill. Disposal at landfill makes alternative financially not viable (more than triple cost).
Sediment Bag Placement in Wetland A	$550,000	This alternative has less wetland impact than Wetland B alternative; but it has significantly greater wetland impact than the selected alternative (see below).
Sediment Bag Placement west of Wetland A	$825,000	Temporary impact to Wetland A for access road between staging area and upland west of Wetland A. This alternative has only temporary wetland impacts, so it ranks higher and it is the selected alternative.

Mitigation Analysis

Mitigation cannot be used as a method to reduce environmental impacts in the evaluation of alternatives. Thus, this section addresses the Applicant's proposed mitigation of environmental impacts from the least environmentally damaging practicable alternative identified above.

In accordance with State and Federal Mitigation Rules, mitigation is best accomplished with restoration of temporary impact area to natural conditions. Applicant responsible compensatory mitigation (onsite wetland replacement) is not economically, spatially, or environmentally feasible. The proposed sediment bag placement will temporarily impact 0.05-acre of wetland, which best qualifies as Palustrine, Emergent wetland (PEM) Cowardin and Slopes / Flat (S/F) Oregon Hydrogeomorphic (OHGM) classification.

As per principal objectives for Compensatory Wetland Mitigation (CWM), the Temporary Impact Restoration Plan will satisfy the following objectives:

A) Replacing wetland functions and values lost at the impact site – The temporary impacts preserves most wetland functions and values. Brush trimming will occur for the temporary fill placement and it will be removed during the decommission phase, as specified in the Restoration Plan (Appendix B). In addition, the check dams and 30-foot extension pipe needed for the temporary access route will be removed, so there will not be any loss to hydrologic function.

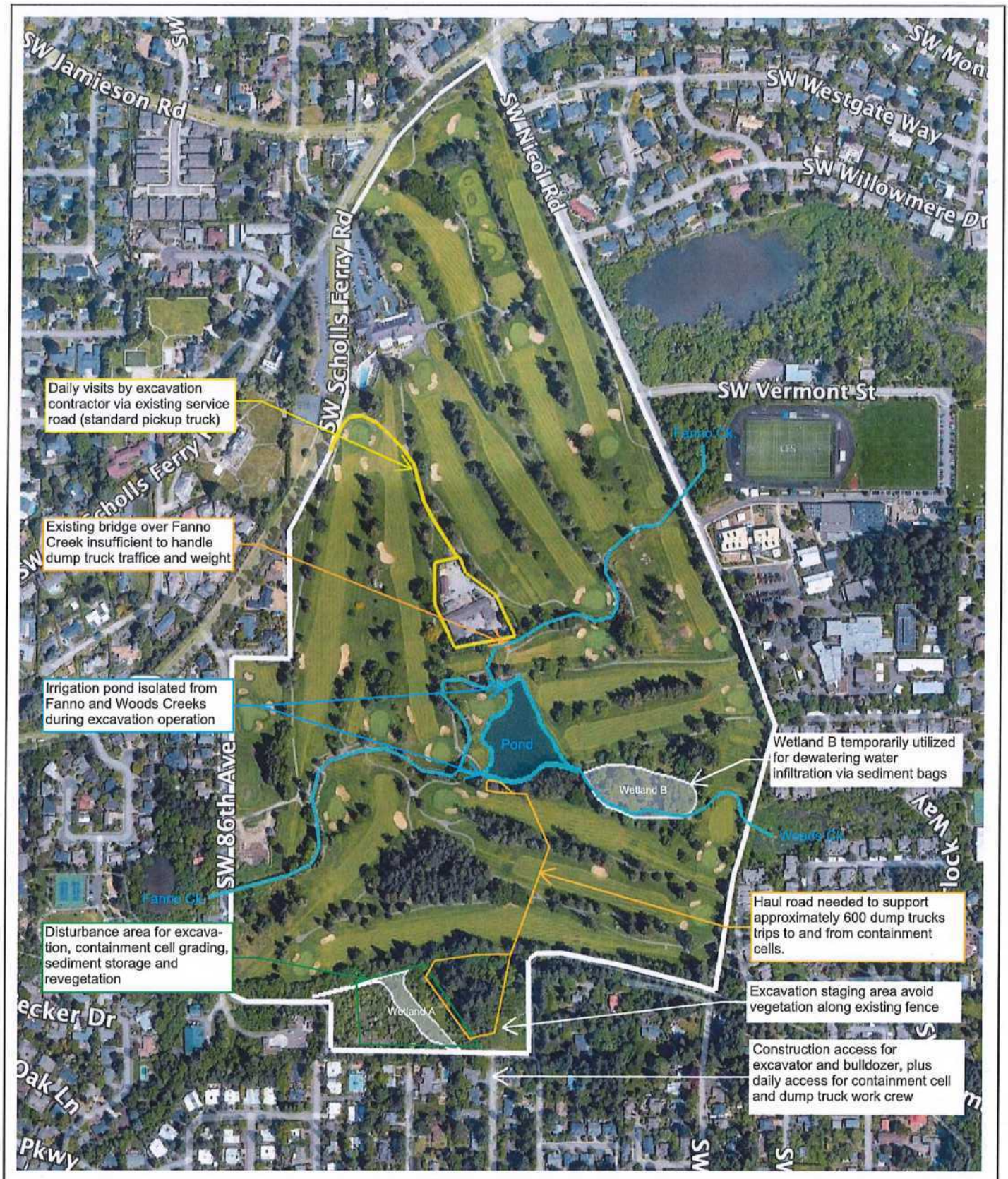
B) Providing local replacement of said functions and values – The temporary impacts are restored to a natural condition during the decommission phase, so local replacement is achieved.

C) Providing self-sustaining wetland with minimal long-term maintenance – The Temporary Impacts Restoration Plan (Appendix B) outlines planting and seeding goals/objectives, procedures, and post-installation monitoring for 2 growing seasons. This approach and focus on restoration of natural conditions is consistent with current conditions that are self-sustaining.

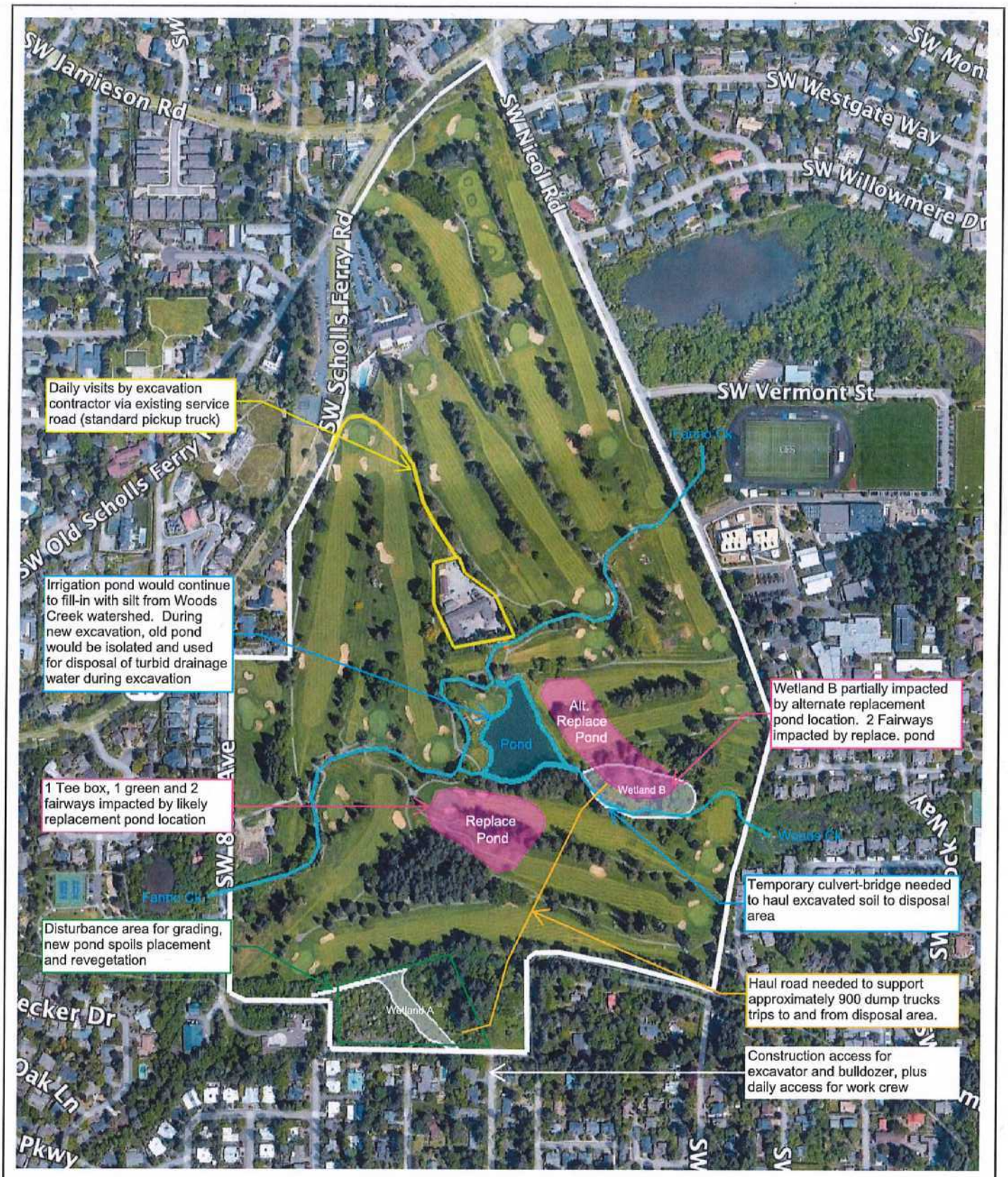
Conclusion

To restore capacity to Junor Lake, PGC has thoroughly evaluated numerous alternatives, including no-action, replacement irrigation pond, offsite sediment disposal, and several variation of sediment bag placement. PGC initially proposed sediment excavation and placement in Wetland A, then further analysis found an environmentally preferrable approach using dredging instead of excavation. PGC proposed sediment bag placement in Wetland A due to site attributes, logistics, environmental impacts, cost, and fulfillment of the project purpose (to maintain the PGC property as a historic and renowned golf course). That approach would impact the entire 0.72-acre Wetland A; however, discussions with regulatory agencies concluded that the sediment bag placement west of Wetland A should have a temporary wetland impact (0.05-acre). In particular, the selected alternative has a 0.05-acre wetland impact associated with a temporary access route between the staging area and land west of Wetland A. Such impact will be reversed with corrective actions, as outlined in the Temporary Impacts Restoration Plan (Appendix B). Such purchase assures no net loss of wetland acreage, plus no loss of wetland function and value.

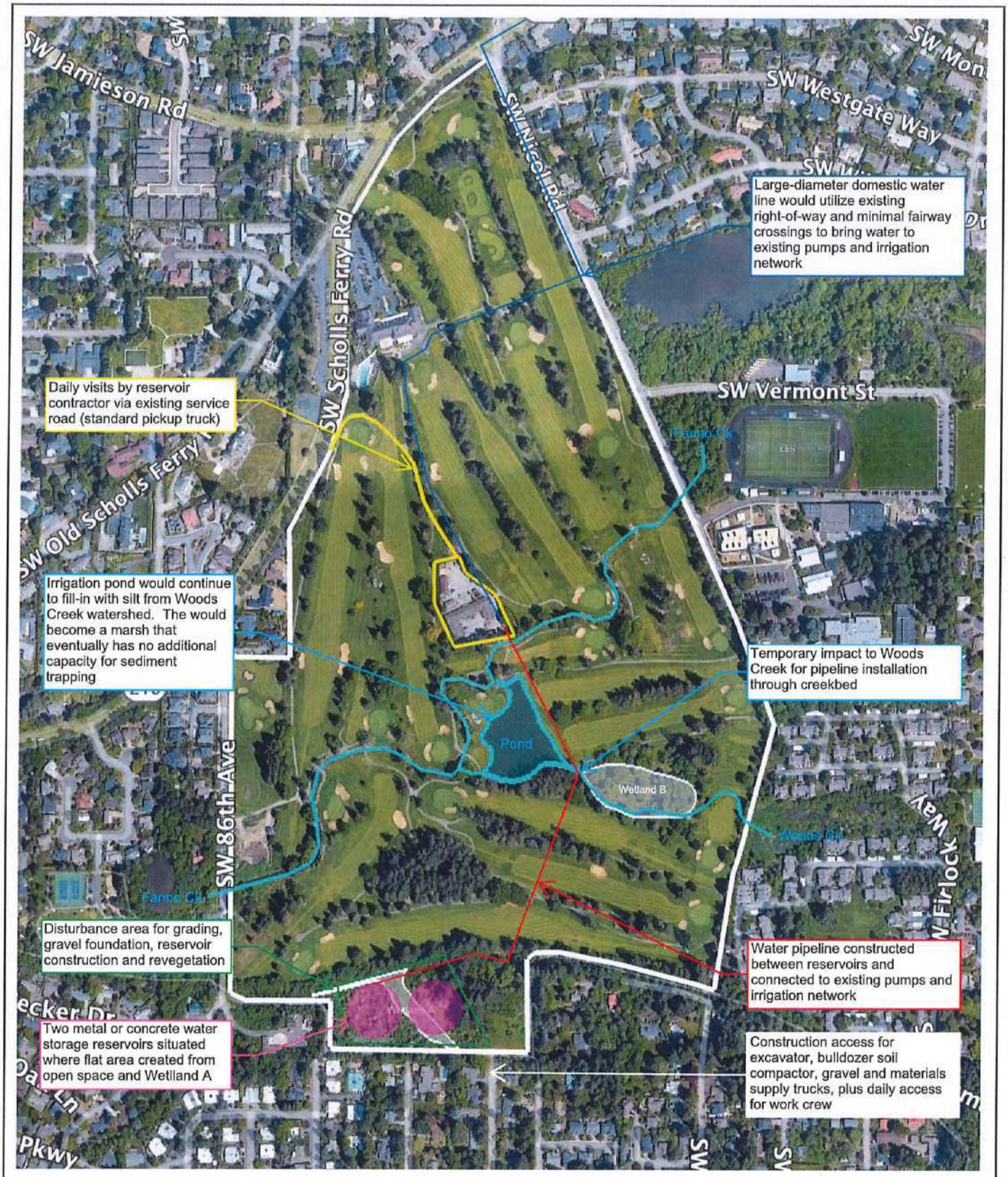
The preceding Least Environmental Damaging Practicable Alternative (LEDPA) analysis documents this decision-making process and provides transparency for the rationale in selecting the best ranked alternative. The LEDPA analysis concluded that onsite excavation will result in greater environmental impacts than dredging and sediment bag placement (which has a smaller, less invasive impact). Additionally, the sediment bag placement approach avoids hauling over 600 truckloads of sediment to a rock quarry or construction site as fill (not currently allowed due to presence of inert golf balls within the sediment). The sediment bag placement on the upland west of Wetland A will satisfy PGC's need to restore water storage capacity in Junor Lake, minimize golf play interruption, and minimize damage to essential golf infrastructure. While all of the alternatives are expensive, the LEDPA conclusion results in using less equipment, disturbing less ground, and makes use of natural topography to minimize wetland impacts. The proposed project also avoids damage to a mature grove of Douglas-fir trees; and recycles water back to Junor Lake.



Terra Science, Inc. Soil, Water & Wetland Consultants	ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC) Washington County, Oregon	SEDIMENT EXCAVATION ALTERNATIVE
GRAPHIC SCALE 0 ft. 400 ft. 800 ft.	June 2023	



Terra Science, Inc. Soil, Water & Wetland Consultants	ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC) Washington County, Oregon June 2023	REPLACEMENT POND ALTERNATIVE
GRAPHIC SCALE 0 ft. 400 ft. 800 ft.		



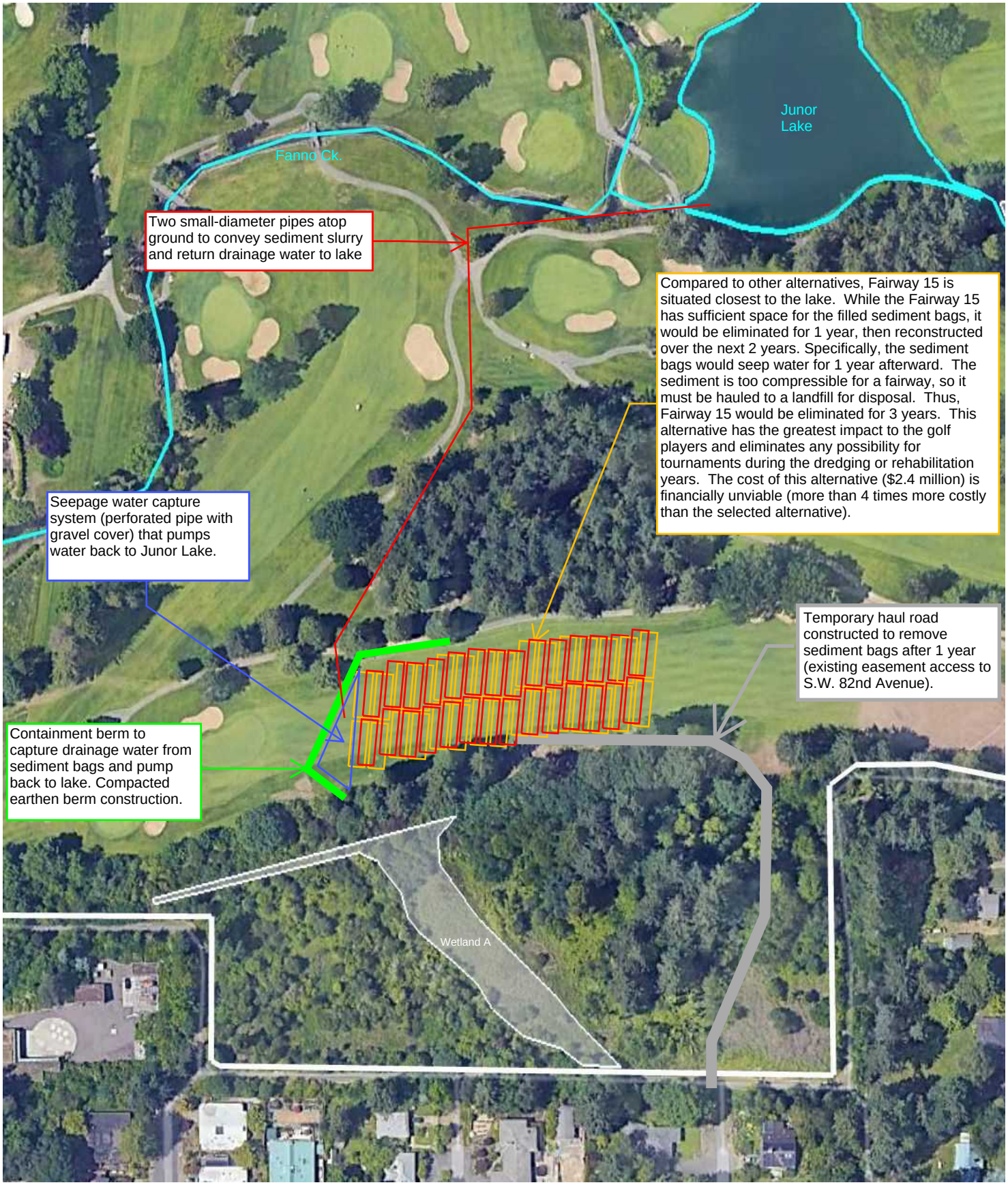
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 400 ft. 800 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

June 2023

METAL OR CONCRETE RESERVOIR AND DOMESTIC WATER SOURCE ALTERNATIVES



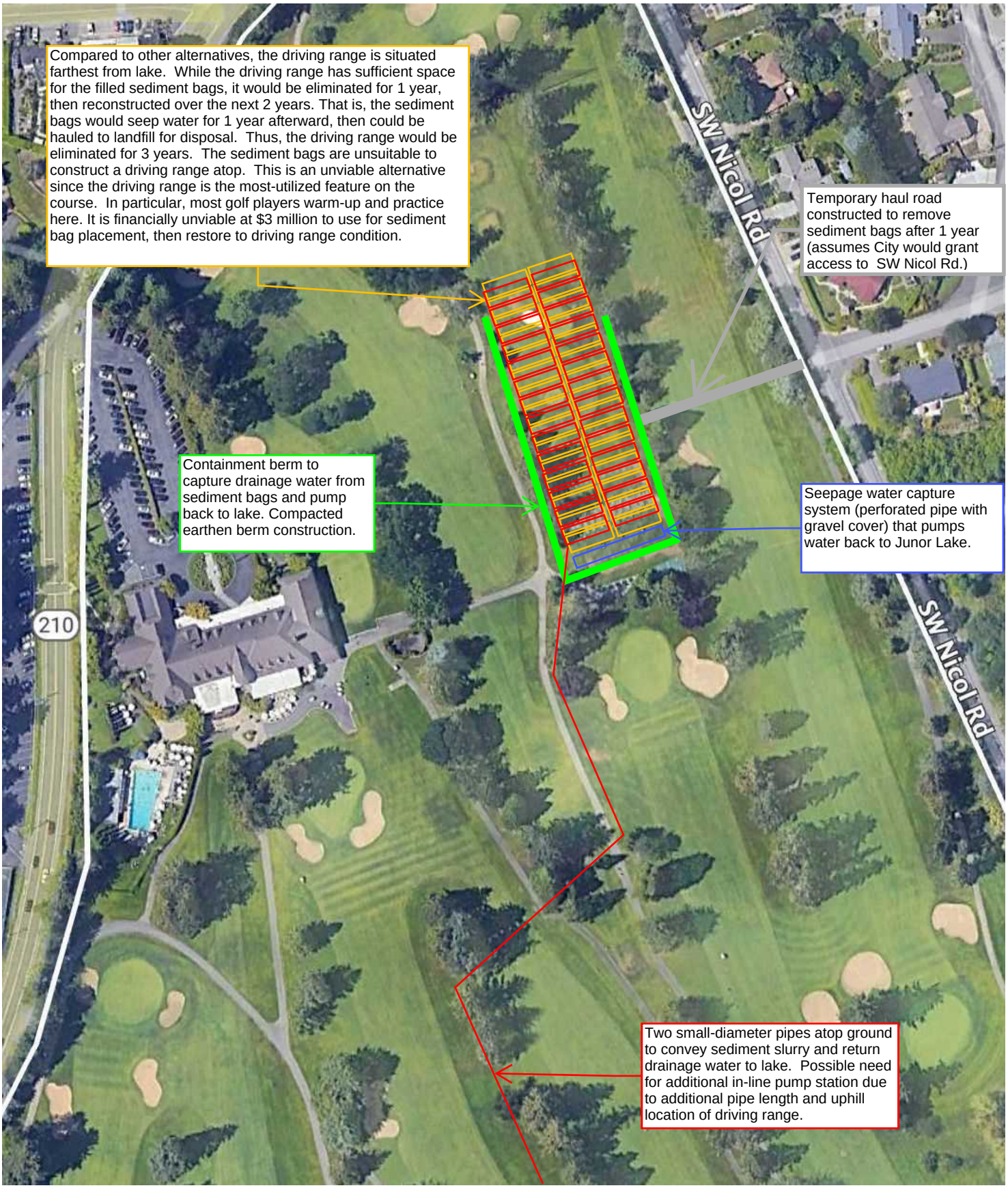
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

FAIRWAY 15
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
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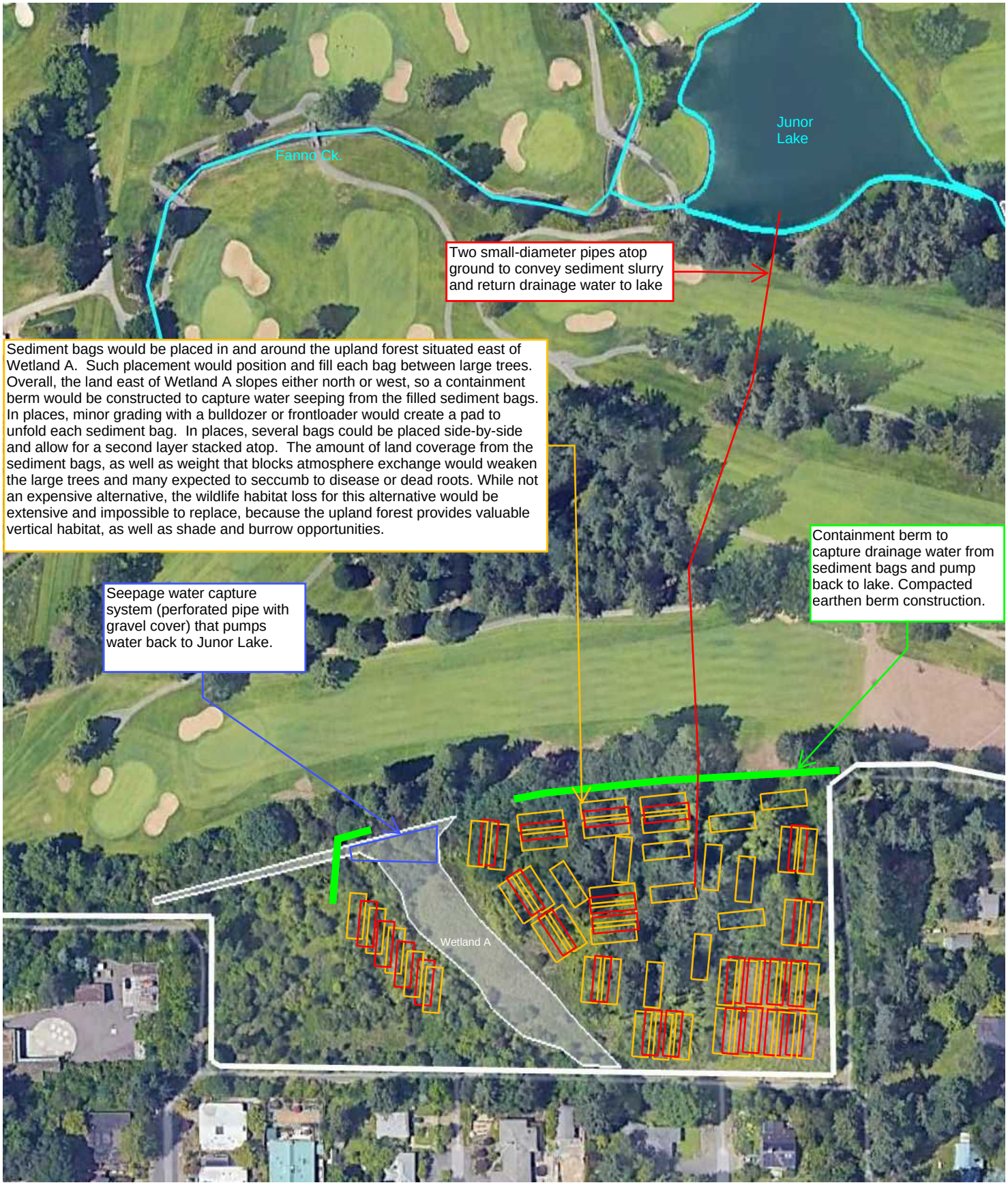
ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

DRIVING RANGE
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



Terra Science, Inc.
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GRAPHIC SCALE
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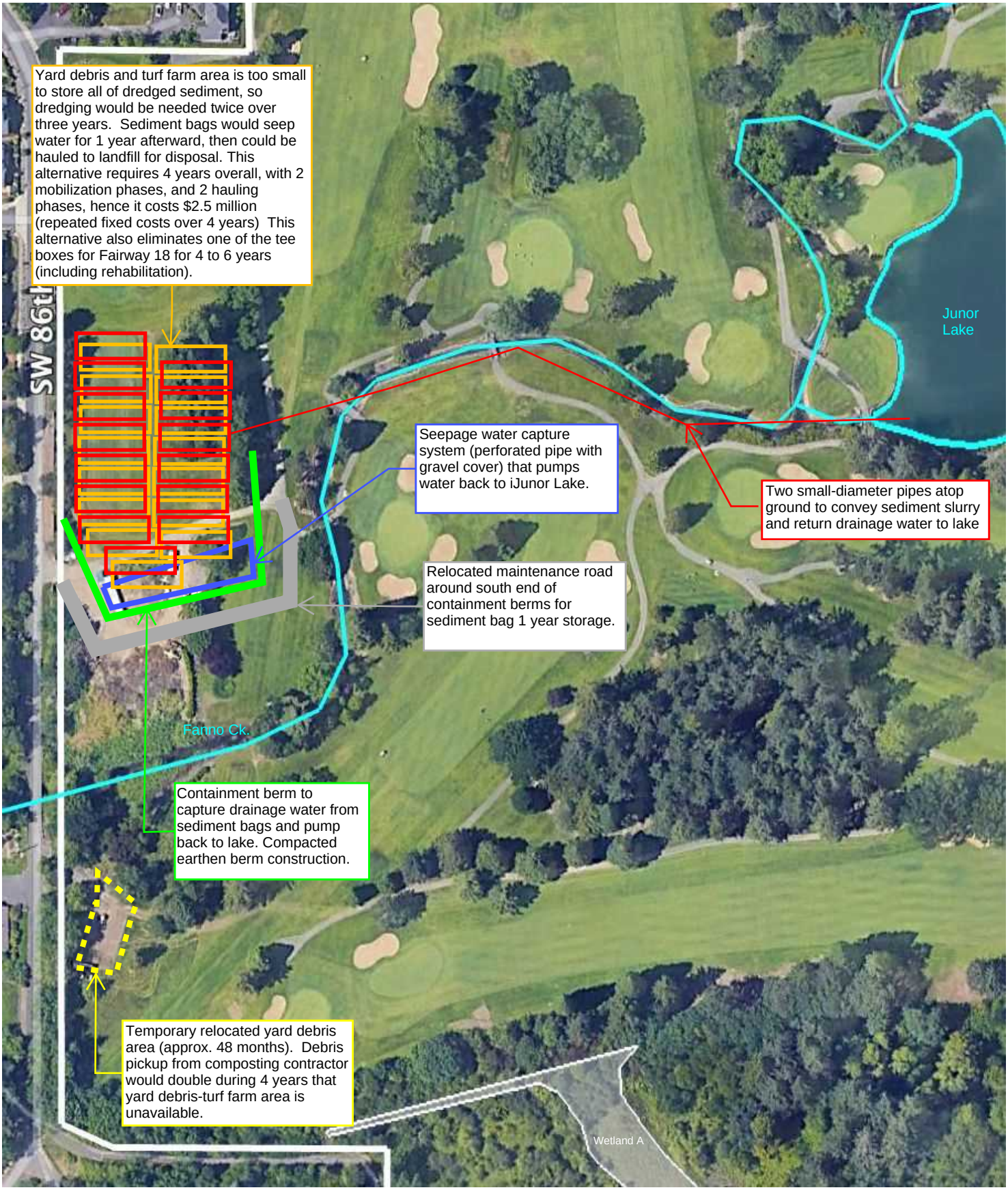
ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

UPLAND FOREST
SEDIMENT BAG PLACEMENT
REJECTED ALTERNATIVE



Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
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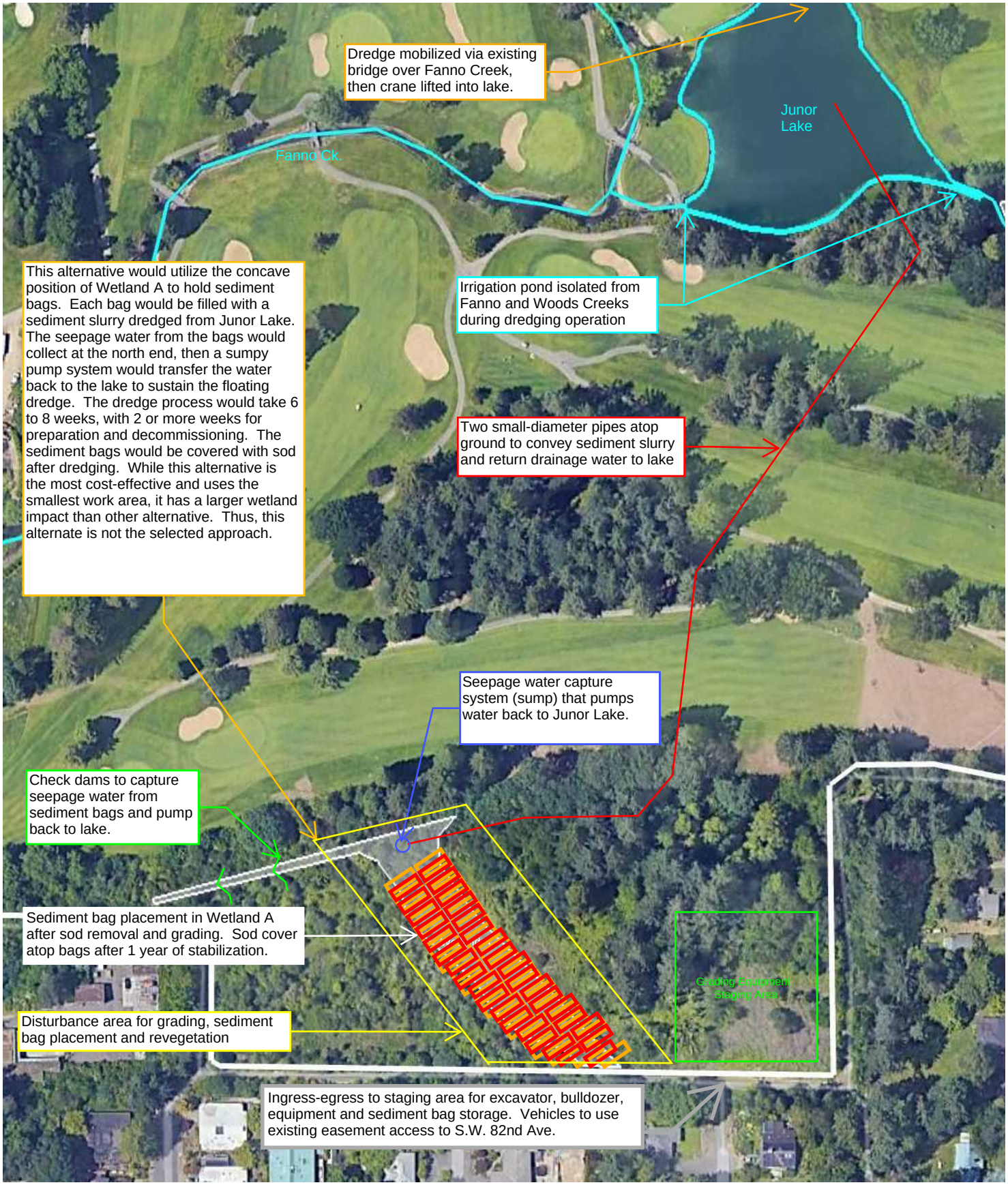
ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

YARD DEBRIS-TURF FARM AREA
SEDIMENT BAG PLACEMENT
ALTERNATIVE



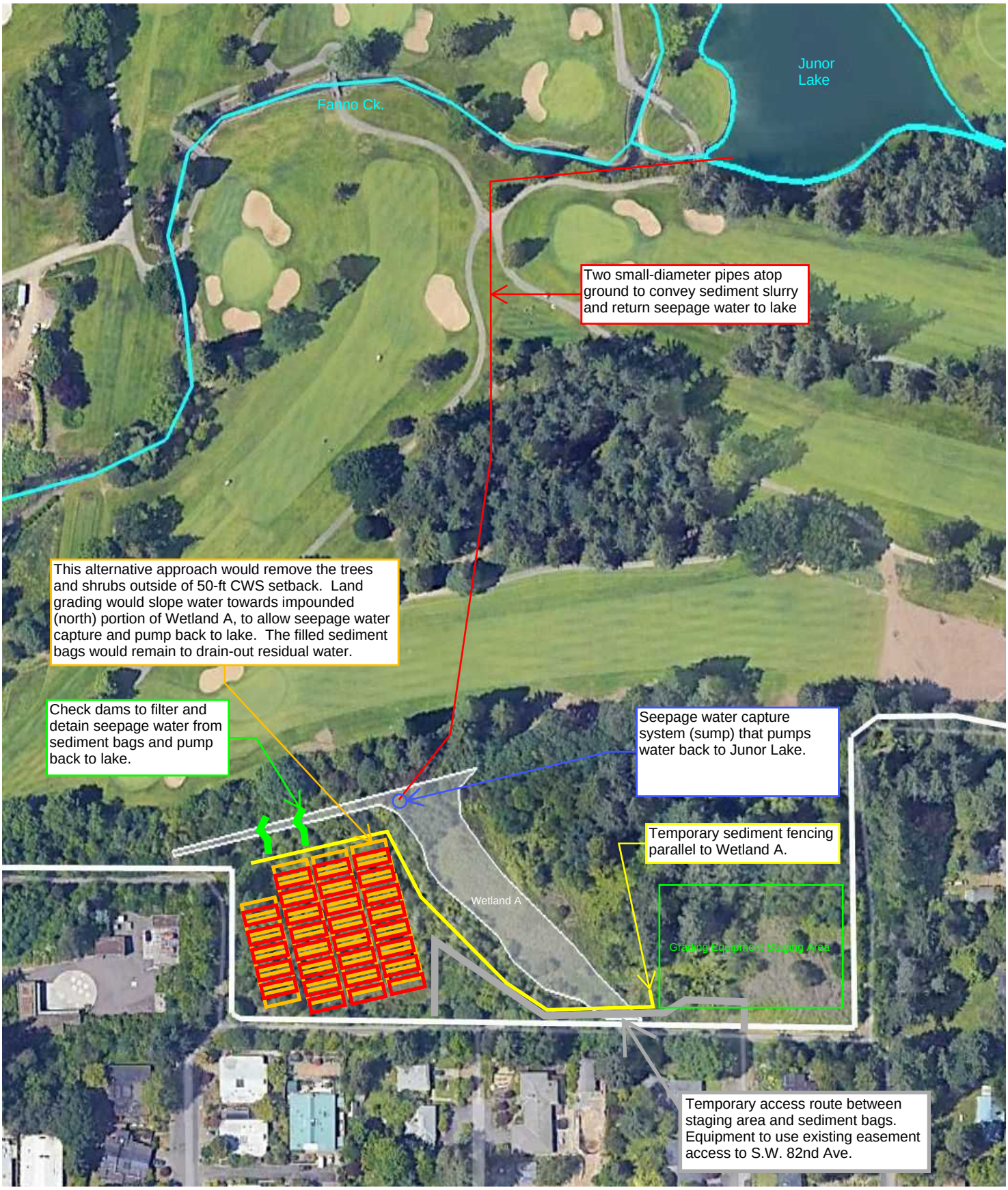
Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

WETLAND "A" SEDIMENT BAG PLACEMENT ALTERNATIVE



Terra Science, Inc.
Soil, Water & Wetland Consultants

GRAPHIC SCALE
0 ft. 140 ft. 280 ft.

ALTERNATIVES ANALYSIS FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SEDIMENT BAG PLACEMENT
WEST OF WETLAND A
ALTERNATIVE

October 16, 2023

Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

I understand that Portland Golf Club is planning a project to remove sediment from Junor Lake on the golf course property. As part of that project, you are considering alternatives for disposal of the removed sediment, as well as potential options for the lake itself. You inquired regarding the following matters:

- The importance of maintaining Junor Lake as a water feature on the property; and
- The impact of storing large volumes (5,300 cubic yards) of silt sediment on the property:
    - Temporarily on top of a fairway for later disposal,
    - Under a fairway or multiple fairways for permanent disposal,
    - Permanently between fairways, or
    - Permanently in the yard debris area, turf farm area, or driving range area.

I have worked with Portland Golf Club as its golf course architect for the past 11 years, as well as working on the property prior to that time, so I am intimately familiar with the golf course property. I was a PGA Professional prior to transitioning to golf course architecture 23 years ago, and, since that transition, I have designed, improved, and worked on numerous golf courses. My experience is further outlined in the attached CV.

Successful golf course design includes numerous interrelated components that function together to provide the elements essential for golf play. Playability is an important component of golf course design, related to the ability of a course to accommodate all types and levels of play, allowing novice and professional golfers, and all in between, to enjoy a golf course. The width of a playing corridor is directly related to playability, allowing golfers to have options when playing a course. The narrower a course, the less options exist, and options are essential to strategy. Good design allows a less experienced player to take more shots to avoid challenging aspects of the course, while an experienced player will be able to make precise shots through the difficult elements of the design. Moreover, the sequencing of golf play requires variability between holes, and highlighting of the best natural features of the property and topography.

This is not to say that golf course design ends with its fairways and greens. Driving ranges and other practice areas are needed for players to improve their golf games. Transitions between holes are similarly part of the design and aesthetic of the course. Hazards should be beautiful and strategic and include variety, including bunkers, water hazards, rough areas, trees, and contours. Golf course must be constructed properly to incorporate all the necessary design elements, while also ensuring that soil and drainage are both appropriate to support the golf course landscaping. Finally, golf courses are supported by other basic components that are essential to upkeep and operations, such as areas for yard debris and growing replacement turf grass – a golf course

without these operational components cannot sustain the vast amount of work that goes into a golf course and its maintenance.

Junor Lake is an essential and central feature of the golf course's design. It is a water hazard, provides natural variety to the course, and serves as the golf course's source of irrigation water. It is extremely important for Portland Golf Club to maintain Junor Lake as part of the golf course's design and to restore and preserve the original depth of the lake to store necessary irrigation water.

Suitable locations for disposal of 5,300 cubic yards of silt do not exist on the golf course portion of Portland Golf Club's property. Portland Golf Club is located on a relatively small property for a modern golf course. Every portion of the golf course is interconnected and functions together to create a playable design. Taking a fairway out of play destroys playability because a 17-hole golf course is not a complete golf course. The areas between fairways are not unused space. To the contrary, the existing slopes and contours of the entire property are part of the design, as well as rough areas, hazards, and trees. Silt material is harmful to golf course drainage. Portland Golf Club employs numerous methods to improve drainage by increasing sand in its soils, and introducing 5,300 cubic yards of silt on the property would be disastrous for proper maintenance of the grounds. Finally, operations on the golf course would be substantially hindered if the yard debris area or turf production area are used for sediment disposal. The Portland Golf Club property would be damaged and less suitable for golf play if large amounts of silt is stored or disposed of within the golf course portion of the property or its necessary accessory areas.

In summary, maintaining Junor Lake is essential to the design of Portland Golf Club's course, and introducing 5,300 cubic yards of silt material within the golf course will damage the golf course design and maintenance. Please let me know if you have any further questions related to the sediment-removal project.

Sincerely,

Dan Hixson

DAN HIXSON
PRINCIPAL
HIXSON GOLF DESIGN
13707 Fielding Road
Lake Oswego OR 97034
503-789-7176
danlhix@yahoo.com

Hixson Golf Design was founded in 2000 by PGA Professional Dan Hixson. A life time of growing up within a golf Professional family provided the thorough understanding of the game and its courses. Initially providing master planning and renovation designs for clubs and courses, new course design was added to the portfolio with the opening of Bandon Crossings in 2008.

The company's philosophy is to combine an economical business sense to architecture with sound and artistically designed golf courses that excite and inspire golfers. Smart creative designs result in courses that people want to play over and over.

CORE KNOWLEDGE & FUNCTIONAL SKILL AREAS:

- Strategic team-oriented approach.
- Provides experience and resources to monitor the project from inception through grow-in.
- 23 years of in-field experience working with builders to carry out intent of plans and vision.
- Experienced in Construction Management and shaping of golf features.
- A thorough knowledge of the game of golf, its history, current trends, players and design strategy.
- Experienced in creation of both Master plans and new course routings of any sizes.
- Financial responsibility to clients through creative problem solving.

PROFESSIONAL HISTORY & CREDENTIALS

- Clackamas Community College 1979-81
- Oregon State University 1982-84
- PGA of America Member since 1990
- Head Golf Professional at Columbia Edgewater Country Club 1990-99
- OGCSA Member since 2010

PORTFOLIO – NEW COURSES

- **6 New Courses,** Bandon Crossings, Wine Valley, Crestview, Silvies Valley Ranch (2), Bar Run and Lake Oswego Municipal Golf Course.
- **Architect of Record -** Creating and implementing Long Range Golf Course Improvement Plans and Master Plans at 21 Golf Courses and Country Clubs in Washington and Oregon.
- **Total Courses Worked on,** to date is 48, with multiple and ongoing projects at many of the courses.
- **Four Original Designs** are continually highly ranked and or have won awards on a National level.
- **Currently working** on a dozen projects of various sizes.

October 14, 2023

Mr. Lonnie Lister
General Manager
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

The purpose of this opinion letter is to address your question concerning the removal of sediment naturally accumulated in one of the lakes on your golf course.

As part of the permitting for that project, I understand that duly authorized government agencies with which you are working have questioned whether the silt dredged from the lake can be incorporated as soil on the golf course. Alternatively, the agencies have also inquired about converting accessory work areas (yard debris area and/or turf farm) to a disposal area for the 5,300 cubic yards of silt you plan to dredge from the lake.

As you know, I am currently a consultant with GGA Partners, a leading advisory services firm which specializes in golf-related matters and, specifically, in the areas of golf course asset development and financing. I was previously the Vice President – Golf for Pulte Homes, which now does business as Pulte Group, the largest developer of golf communities in the US. In that position, I developed 27 golf courses in 10 states, and was responsible for the operation of more than 20 Pulte golf courses. Based on this and other experience, let me answer your questions about best practices when managing golf courses, and the financial implications of certain management decisions.

Silt is a difficult material for golf courses to incorporate, generally speaking. Golf courses require excellent water drainage to support landscaping and surfaces that are suitable for golf play. Silt inhibits drainage because it fills the spaces between the bits of silt between other types of soil. Golf courses typically engage in activities that improve drainage, so I would not advise you to add silt to Portland Golf Club's mixture of soils. Disposing of the silt on the golf course may seem to be a desirable option due to availability and lower expense, but doing so may cause damage to the soil composition and negatively impact turf quality.

The quality of golf course landscaping is of critical importance to the playability of the course itself, and thus the long-term economic health of the business. Golf courses with poor drainage and consequently poor landscaping and playing surfaces offer inferior golf experiences for their golfers. Such golf courses cannot attract or maintain club members. Additionally, event sponsors only select golf courses for tournaments if they exhibit superior design, construction, and maintenance.

Without the ability to attract and retain members and to hold tournaments, a golf course cannot be profitable, and therefore cannot be sustained economically. It is unwise to use silt in the manner being considered as material harm can arise from such an approach.

GGA Partners
2415 East Camelback Road, Suite 700
Phoenix, Arizona 85016

Tel: 1-888-432-9494
Email: info@ggapartners.com
Web: ggapartners.com

Finally, work areas are essential features of all successful golf courses. Those playing the game of golf experience only the golf course itself and other guest areas. However, the work areas are what allow golf course managers to maintain the course and grounds. Golf courses create extensive amounts of yard debris every year and require substantial equipment to complete regular maintenance and repairs. Further, golf course turf requires frequent patching due to wear and infrastructure repairs. If it can be avoided, I would not advise you to convert the yard debris area or turf farm for sediment disposal. Doing so will decrease the function and value of the golf course property and require use of other areas or offsite areas to support the work that goes into managing the golf course.

I stand ready to provide additional insight, if needed. Please advise me if you have any other questions or if I can be of assistance.

Sincerely,

Henry DeLozier

GGA Partners USA LLC

DEACON

901 NE Glisan St. Suite 100
Portland, OR 97232

P: 503.297.8791

deacon.com

OR# 134328 | WA# DEACOC*851BM

November 13, 2023

Mr. Lonnie Lister
General Manager
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Mr. Lister,

I have been asked to evaluate the costs related to the Alternatives Analysis that has been prepared by Portland Golf Club for the pond dredging project. I feel comfortable weighing in on some of the costs, especially the ones related to construction. Other costs, related to repair of the golf course, rebuilding a golf course, etc. are better reviewed by someone qualified in those fields.

I will provide a short summary of my background. I am a 1971 graduate in Civil Engineering from Purdue University. For the next ten years I worked in construction for two large general contractors: Turner Construction and Continental Heller Construction. In 1981 I moved to Portland to start our company, Deacon Construction, a commercial general contractor, where I served as Project Manager, Estimator, CEO and now Chairman of the Board. Our company completes around $500 mil. of projects each year, with offices in Portland, Seattle, Sacramento, and Pleasanton.

I have read the Alternatives Analysis report and feel comfortable providing my opinion of the following costs in the report. I have the advantage of having worked on preliminary concepts for this project, in 2021, and analyzing the options for removing silt from the lake via dredging and excavation.

1. Replacement Bridge: the estimated cost of $250,000 is reasonable, assuming the cost includes engineering, demolition of the existing bridge and upgrading of the existing abutments.

2. Dredging or Excavation Cost: in 2021 our cost estimate for excavation and moving the silt to the Pinger property was approximately $400,000 and the estimate for dredging was around $650,000. This is relatively close to the $550,000 used in the current analysis.

3. Sediment Bag Cost & Grading: the estimated cost of $250,000 is very close to our previous estimate.

4. Partial Dredging or Excavation & Infrastructure Cost: the costs in the report are reasonable, based on what percentage of the overall project is assumed.

5. Temporary Access via SW 82nd Avenue: the $50,000 estimate for this work is reasonable.

6. Sediment Bag Cost & Haul Off of Silt: the estimated cost of $650,000 is reasonable as it would include the $250,000 noted above in Item #3, plus the haul off and dump fees for 5300 CY of silt. This balance of $400,000 equates to a cost of around $75/CY, which is realistic. It will be expensive to haul the silt, after one year of draining, and find a dump site for this material that is mixed with golf balls. It might even require separating the golf balls out of the fill before it can be placed offsite.

Hopefully this information is helpful. Feel free to let me know if there are questions or additional areas you would like feedback about.

Steve Deacon
Chairman
Deacon Construction, LLC

Raleigh Water District

October 13, 2023

Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225

Dear Lonnie,

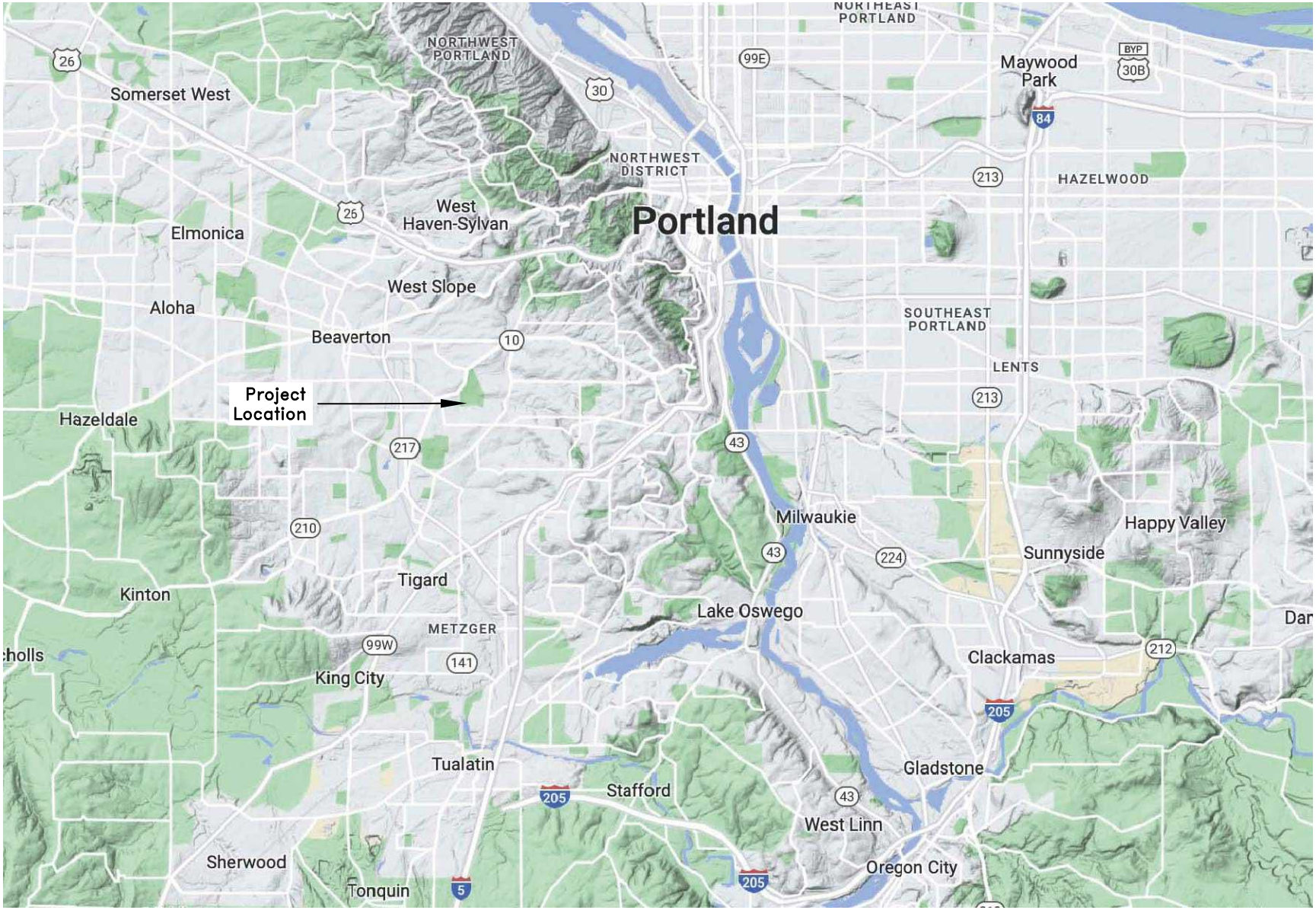
As you know, Portland Golf Club ("PGC") is within the boundaries of the Raleigh Water District (the "District"), which is a domestic water supply district formed under ORS, chapter 264, in the Portland metropolitan area. You inquired about whether the District might be able to supply large volumes of water to PGC on a temporary or permanent basis for its irrigation needs.

In order to supply water to PGC for irrigation, there are a couple hurdles that will need to be figured out. First, the District purchases water from the City of Portland under contract. PGC's large water demand will increase the District's peak water use in the summer, which will increase rates throughout the District and therefore may be expensive for PGC and all District customers. Second, the District receives water through a water line shared with other utilities. In the summer months, the District often reaches capacity for its share of use from the water line. As such, water deliveries to PGC may be restricted to available capacity, PGC may need to restrict its usage to particular times, or infrastructure upgrades may be required. Third, summer interruptible water is an option that is available from the City of Portland. This option would require the District to apply to the City of Portland for a specific amount of water to be purchased during a specified time frame above the contracted amount. This water is billed at a specified rate and is payable to Portland whether it is used or not. This amount would be passed on to PGC. However, the summer interruptible water is not guaranteed and is totally at the discretion of the City of Portland.

The District is willing to further discuss options for water deliveries to PGC. Please note that the District's standard terms for water delivery include the ability to curtail water use when supplies are insufficient for all users, and domestic needs may be prioritized over irrigation. The District is not able to offer guaranteed irrigation water service in large volumes to PGC throughout the year.

Sincerely,

Matt Steidler
District Manager
Raleigh Water District



SOURCE: Google maps, downloaded December 2022.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

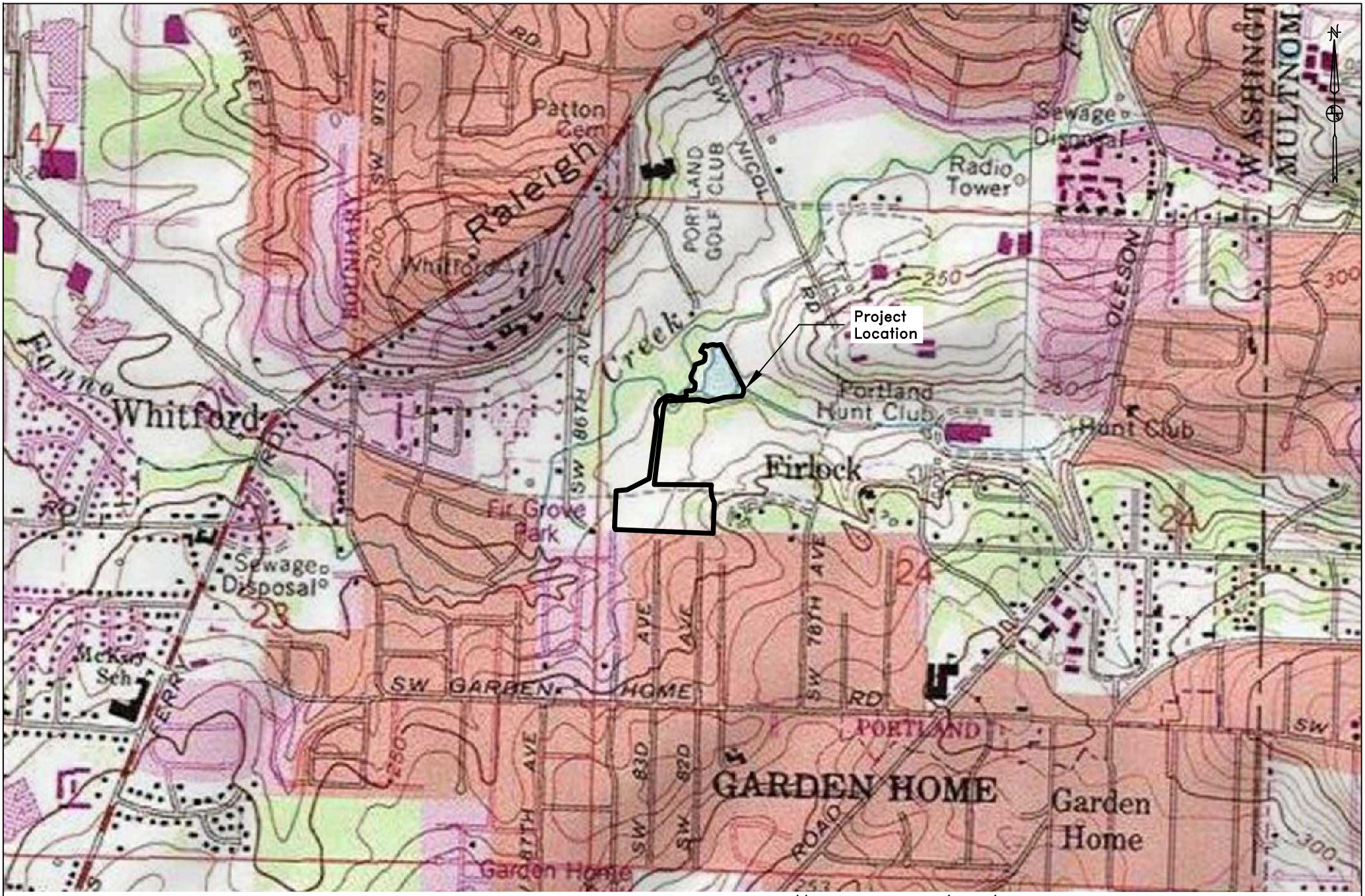
GRAPHIC SCALE
0 1.25 mile 2.5 mi. 5 mi.

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

VICINITY MAP

FIGURE 2



SOURCE: U.S. Department of the Interior, U.S. Geological Survey, The National Map Viewer, 2021. Available at: <https://apps.nationalmap.gov/viewer/>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

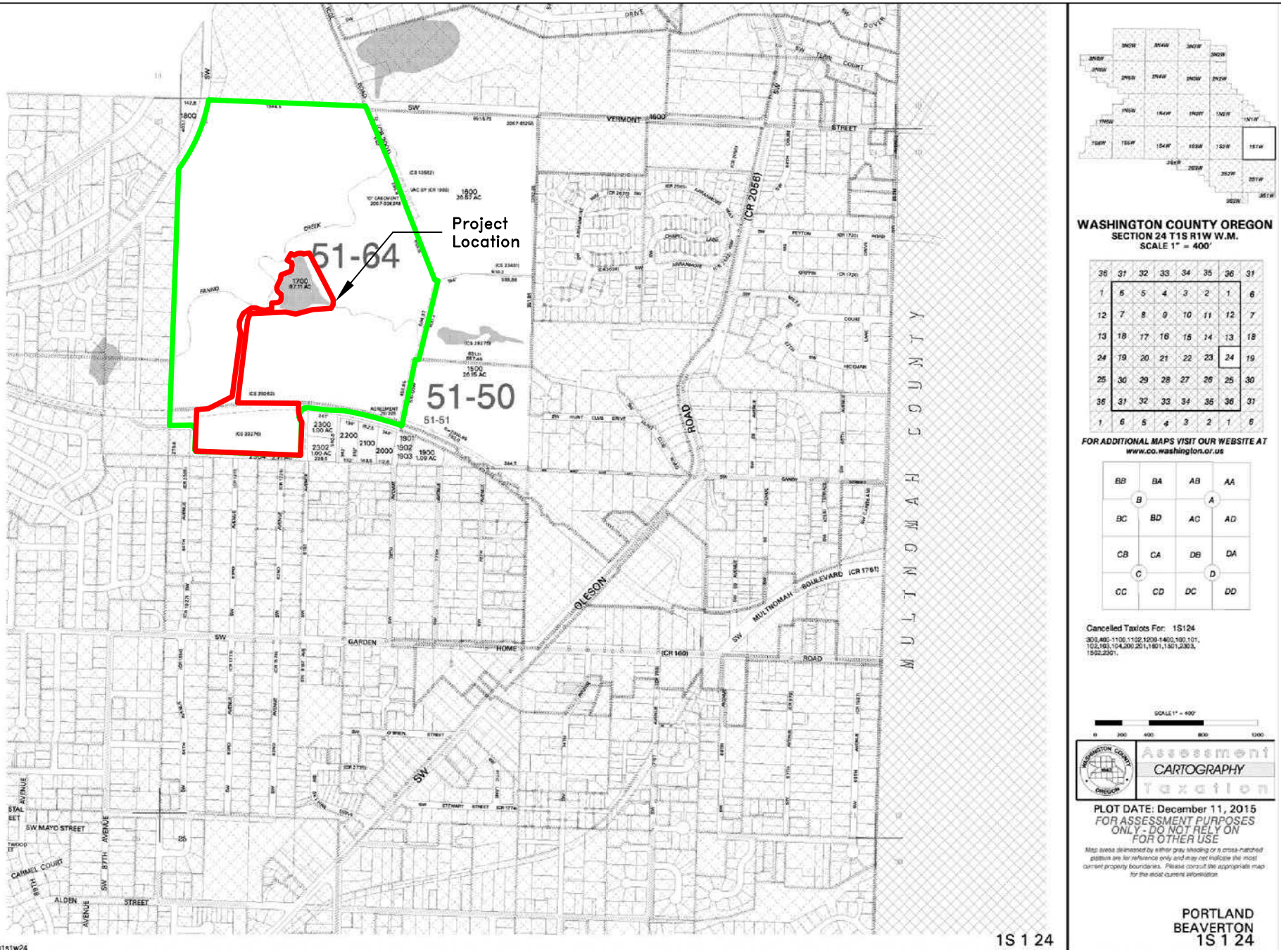
GRAPHIC SCALE
500' 0' 500' 1000' 2000'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

U.S.G.S.
Topography Map

FIGURE 2



SOURCE: ORMAP website, Washington County Assessor's Map 1S 1 24, 2021. Available at: <https://ormap.net/gis/index.html>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
500' 0' 500' 1000' 2000'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

TAX LOT MAP
1S 1 24

FIGURE 3

SOURCE: Google Earth, 2021. Available at: <https://earth.google.com>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

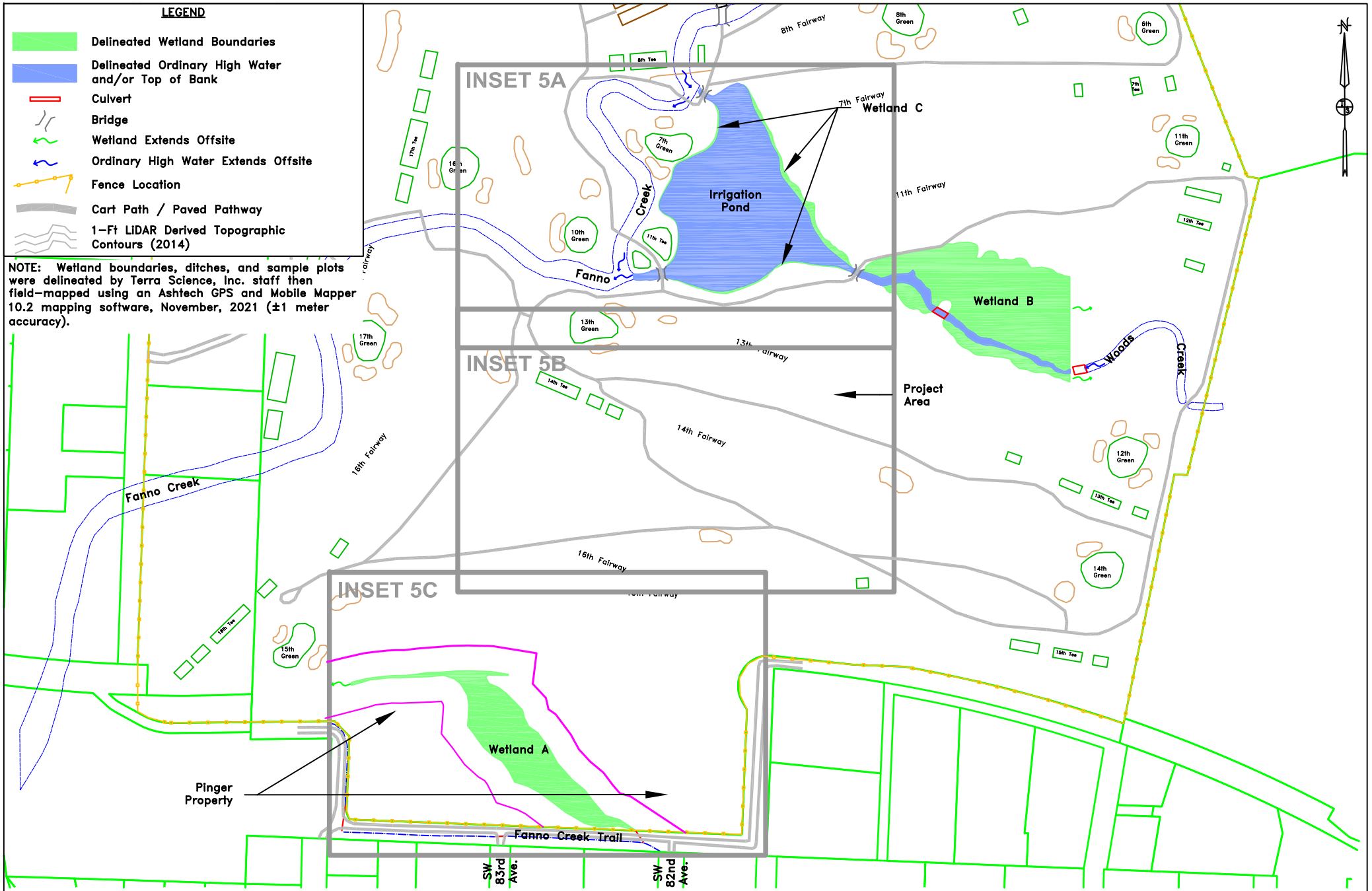
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

JUNE 21, 2021
AERIAL IMAGE

FIGURE 4



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

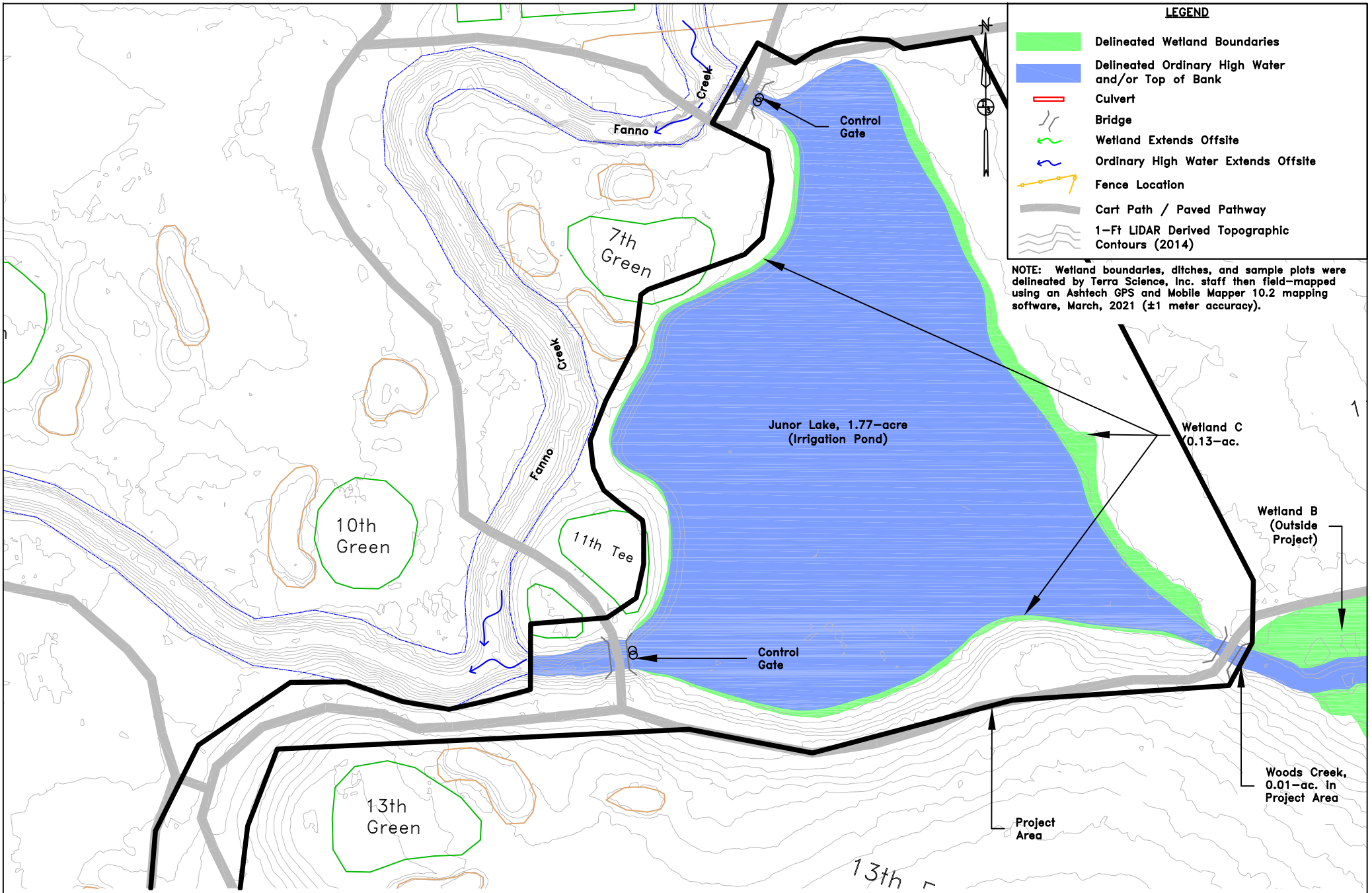
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS INDEX MAP

FIGURE 5



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

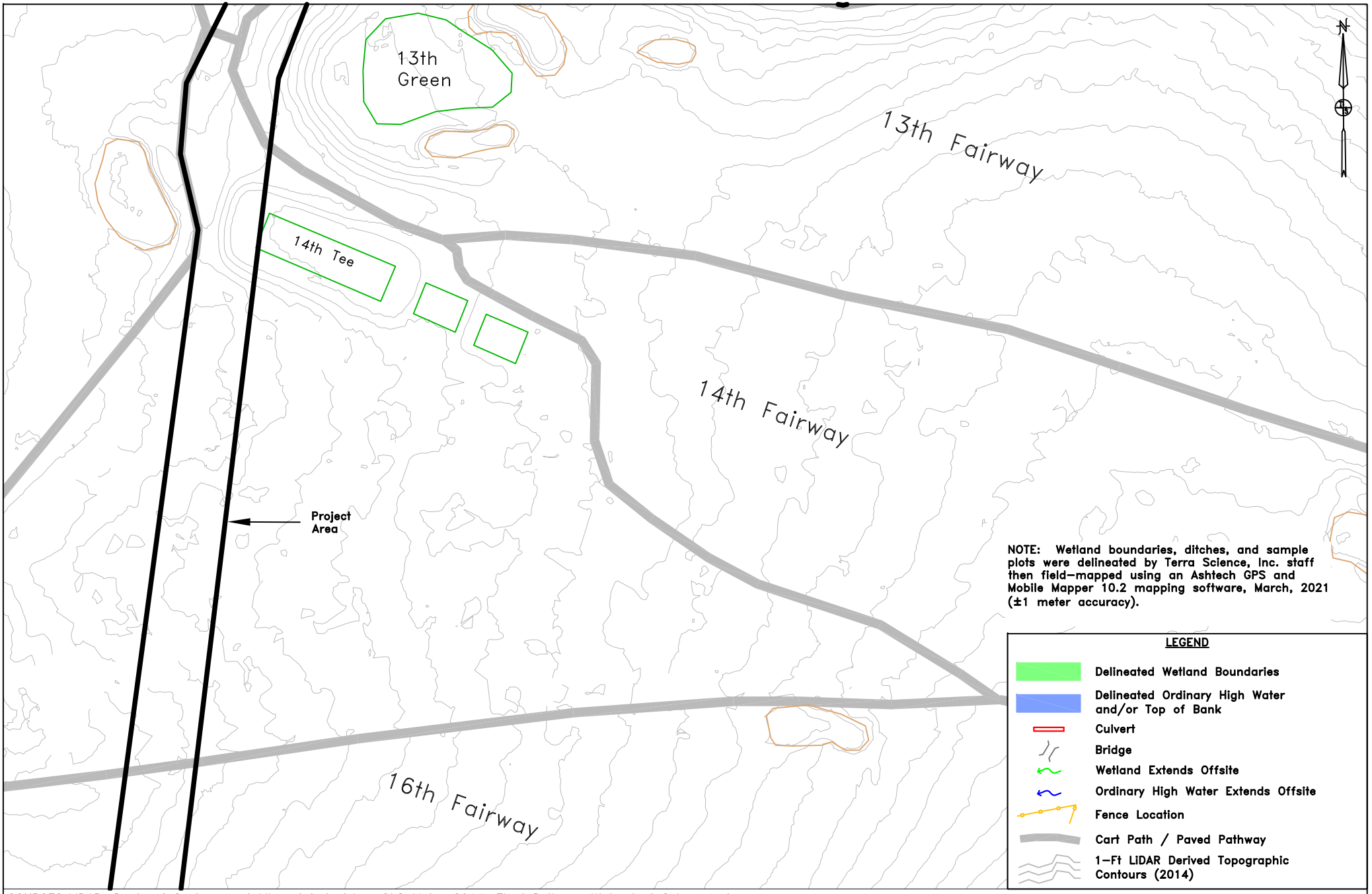
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(SEDIMENT REMOVAL AREA)

INSET 5A



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

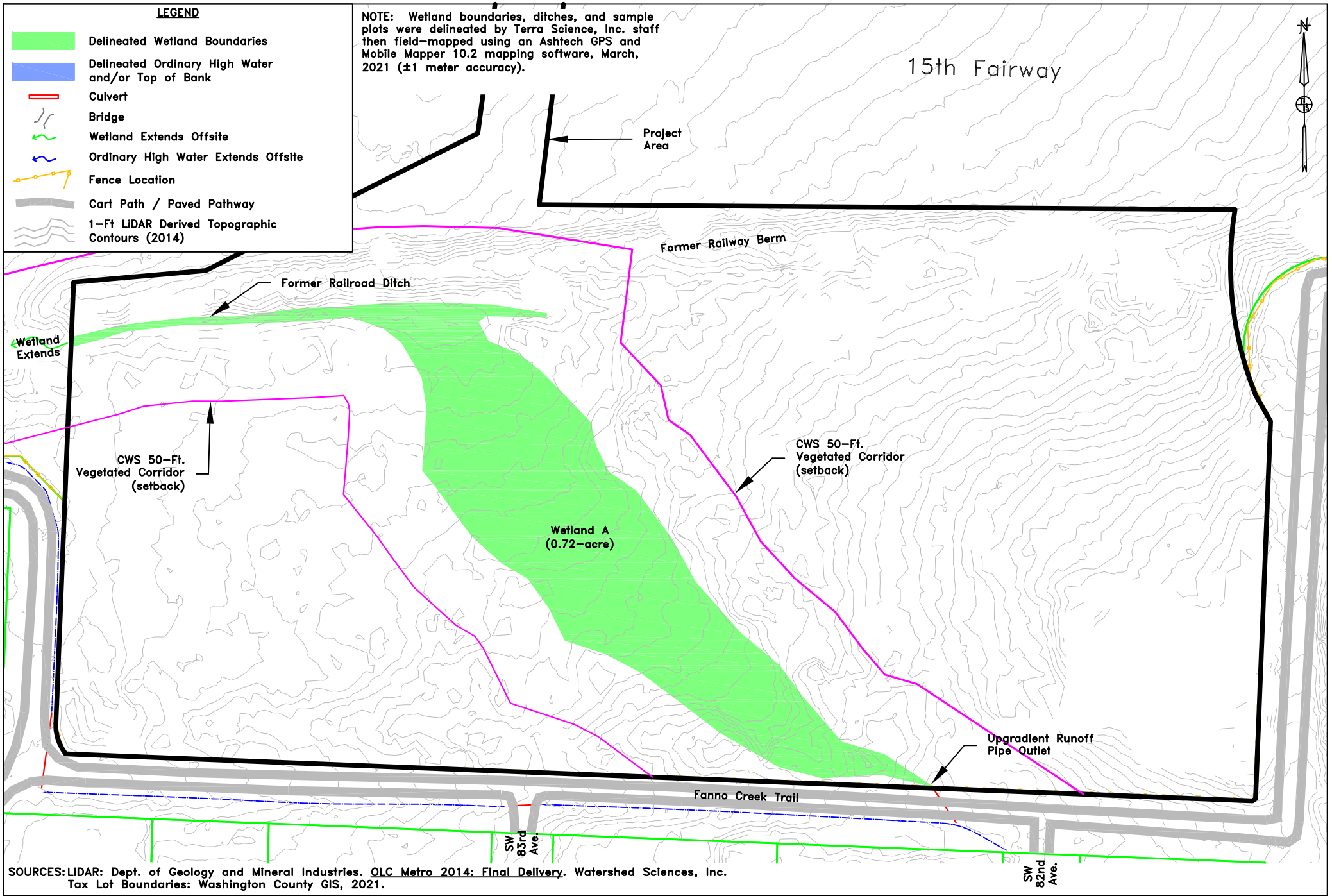
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(FAIRWAYS 13, 14 & 15)

INSET 5B



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

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Soil, Water, & Wetland Consultants

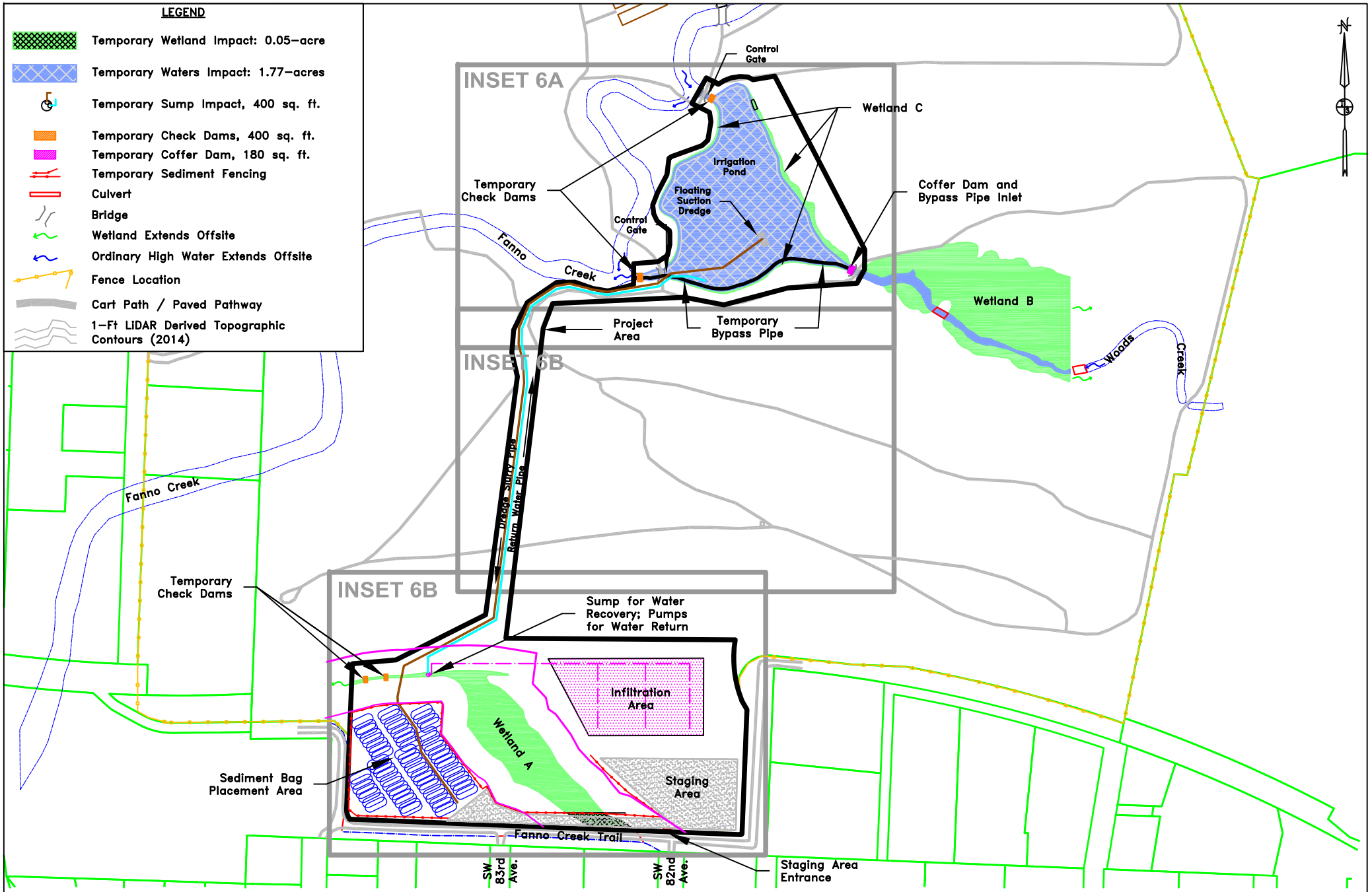
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(SEDIMENT PLACEMENT AREA)

INSET 5C



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

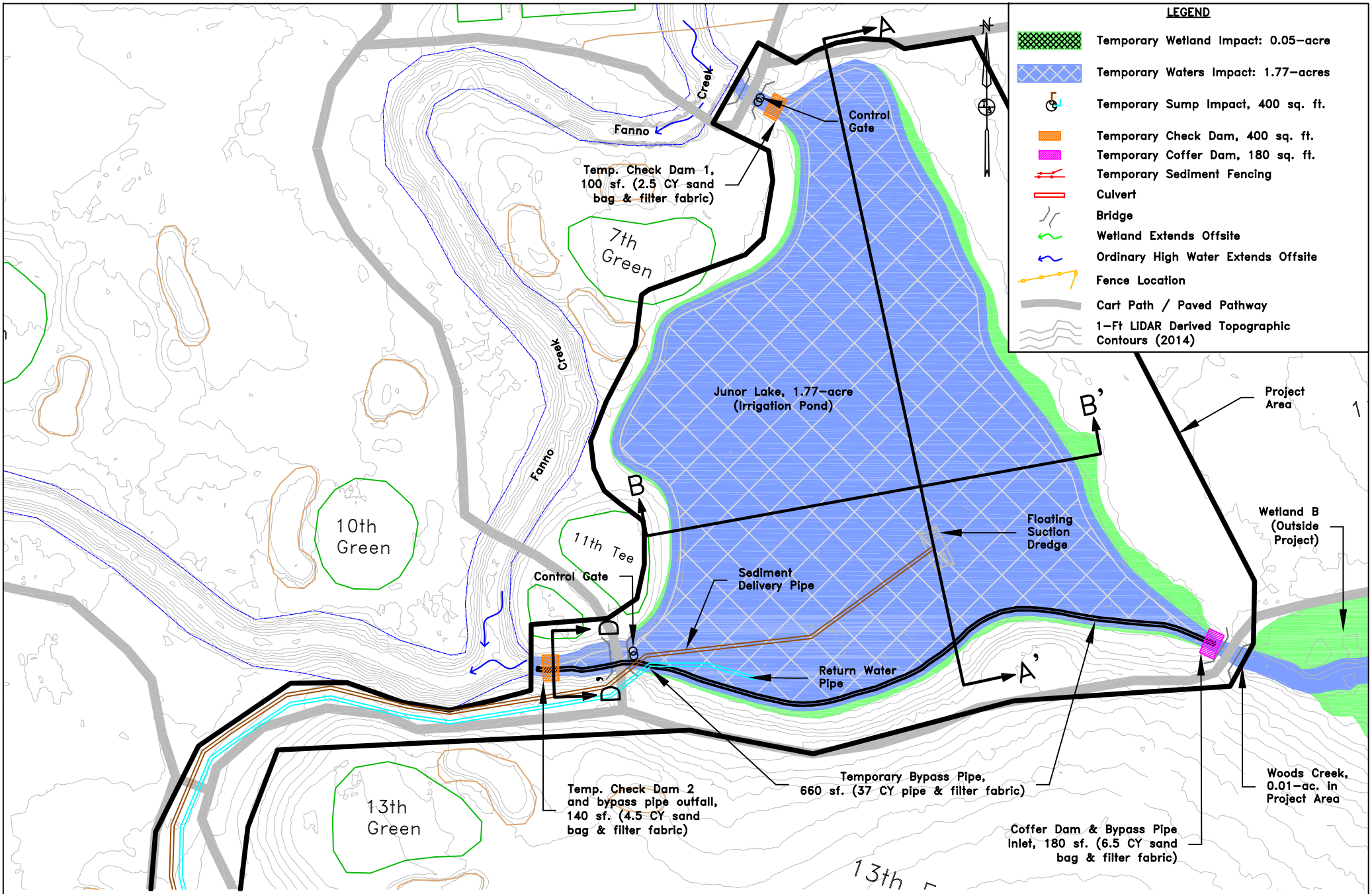
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
INDEX MAP

FIGURE 6



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

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Soil, Water, & Wetland Consultants

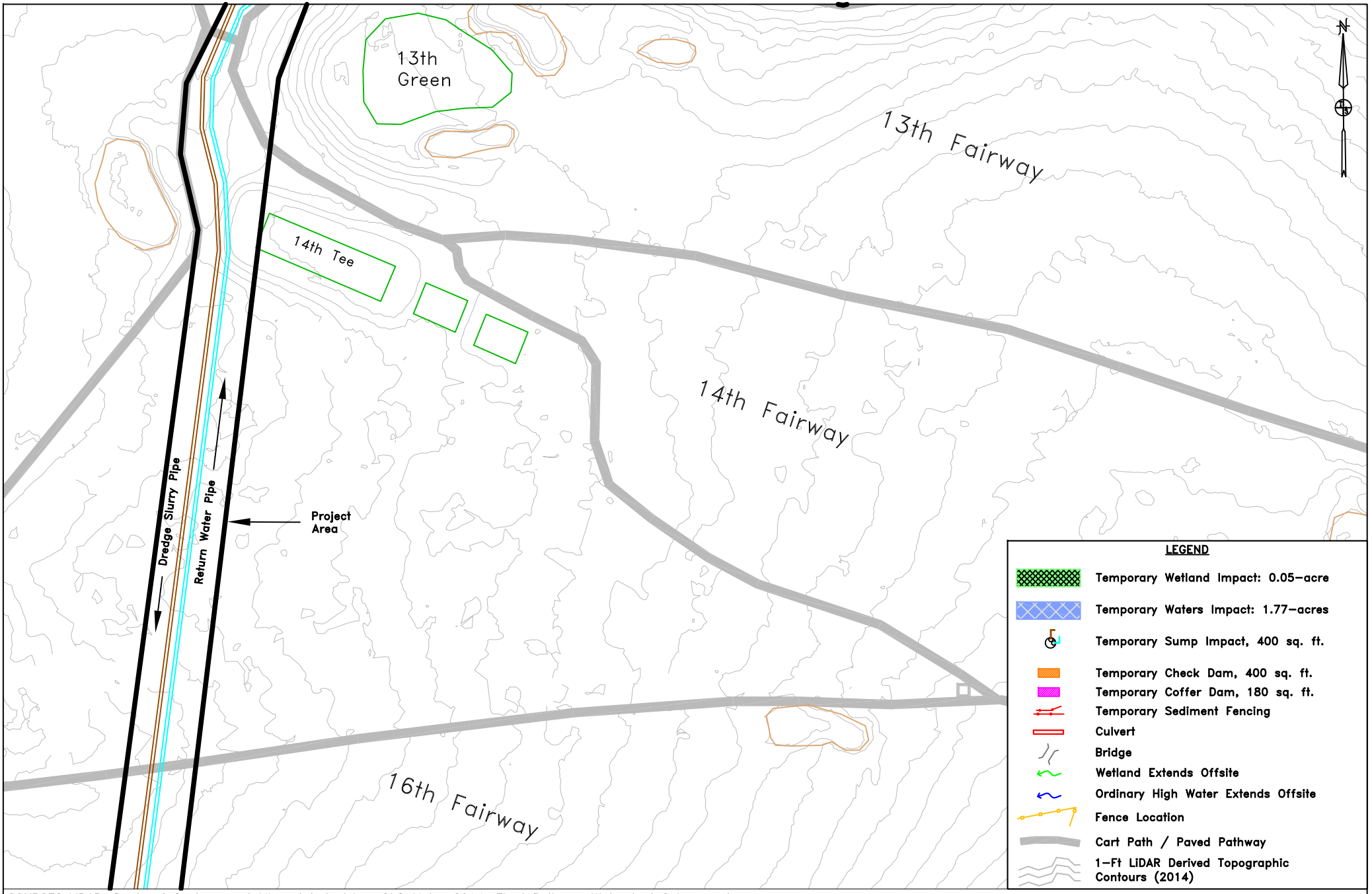
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(SEDIMENT REMOVAL AREA

INSET 6A



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

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Soil, Water, & Wetland Consultants

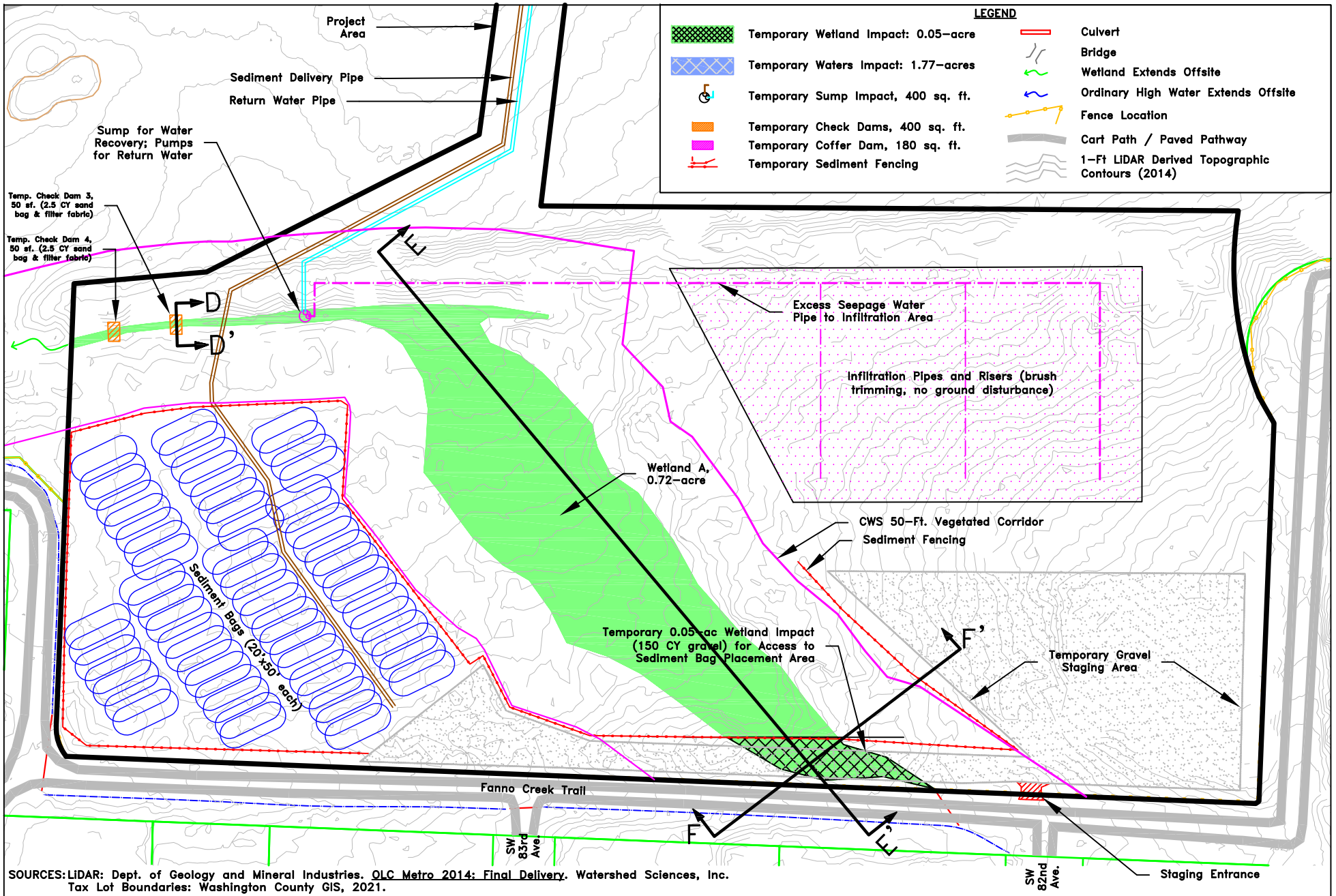
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(FAIRWAYS 13, 14 & 15)

INSET 6B



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

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Soil, Water, & Wetland Consultants

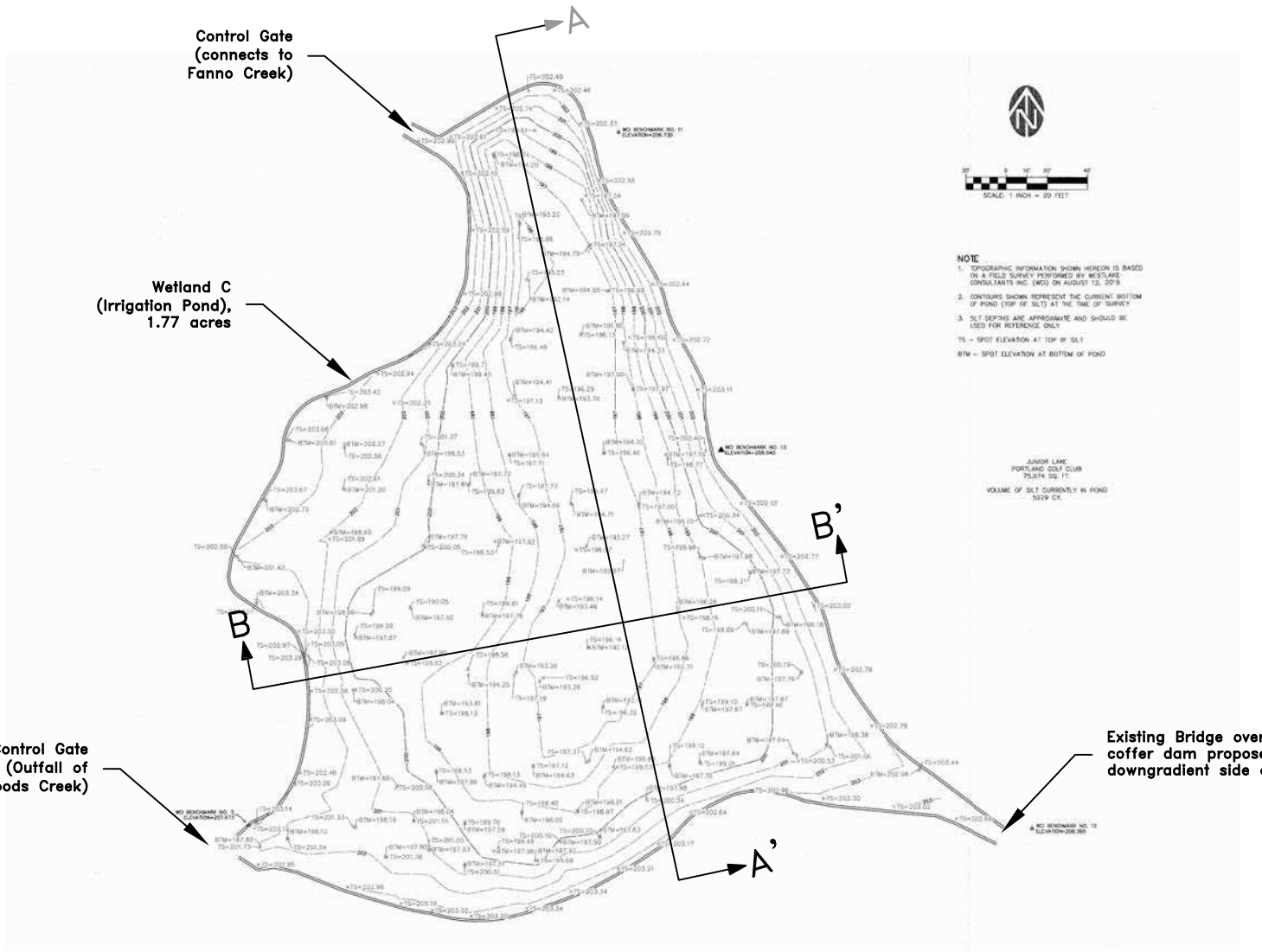
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(SEDIMENT PLACEMENT AREA)

INSET 6C



SOURCES: Westlake Consultants Planning–Engineering–Surveying, September 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

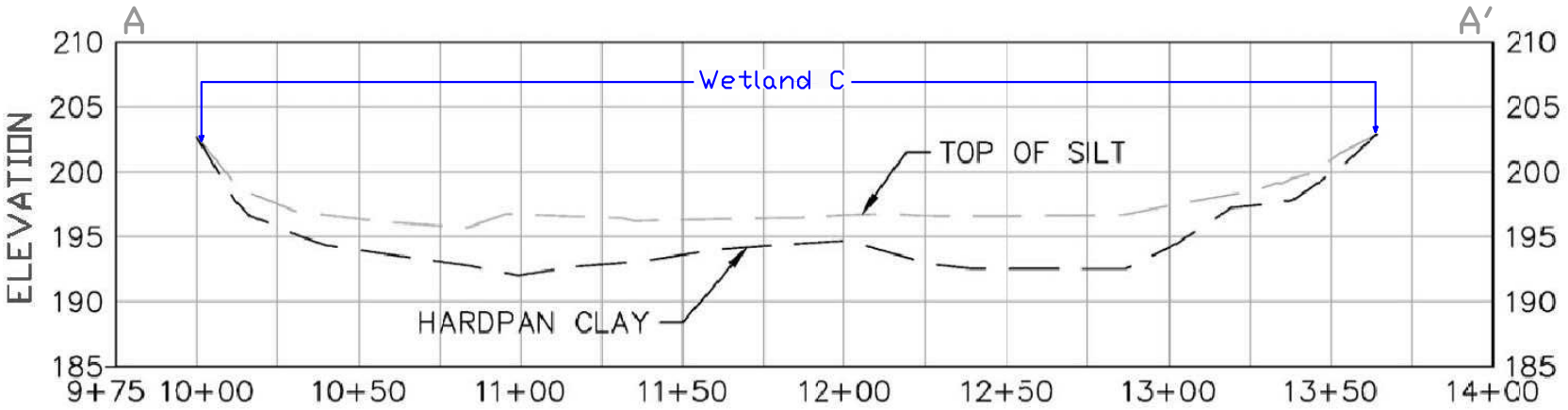
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

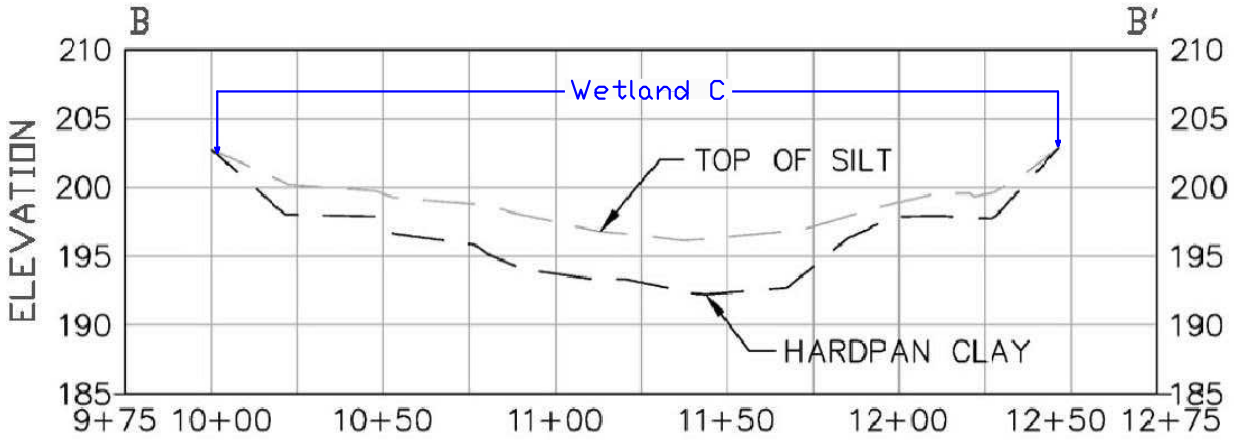
WETLAND C
EXISTING BATHYMETRY
OF IRRIGATION POND

FIGURE 7



CROSS SECTION A

HORIZONTAL SCALE: 1"=60'
VERTICAL SCALE: 1"=15'

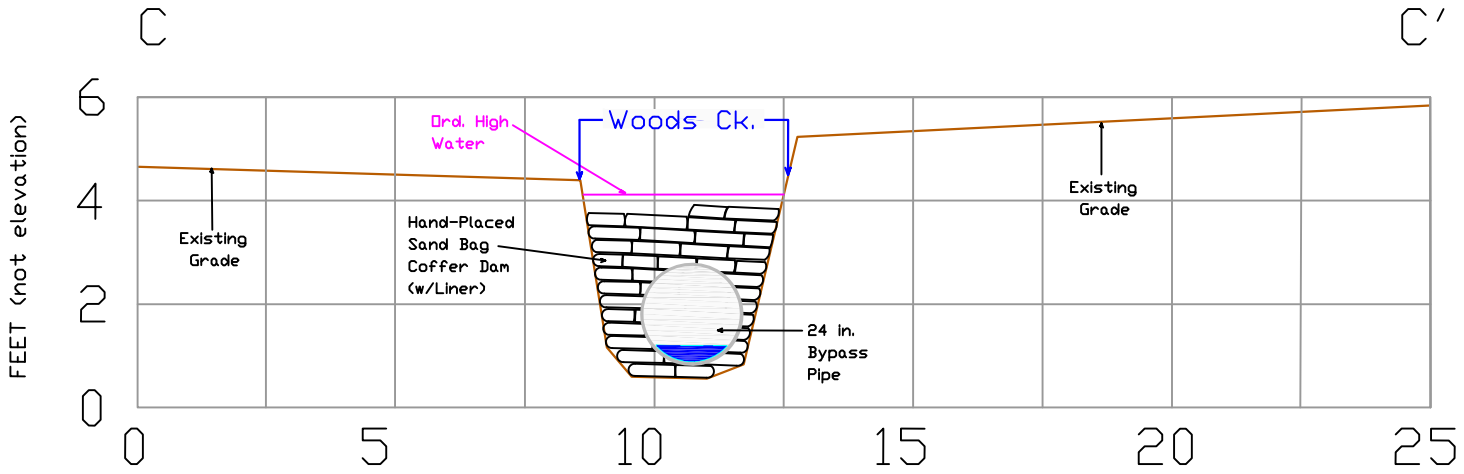


CROSS SECTION B

HORIZONTAL SCALE: 1"=60'
VERTICAL SCALE: 1"=15'

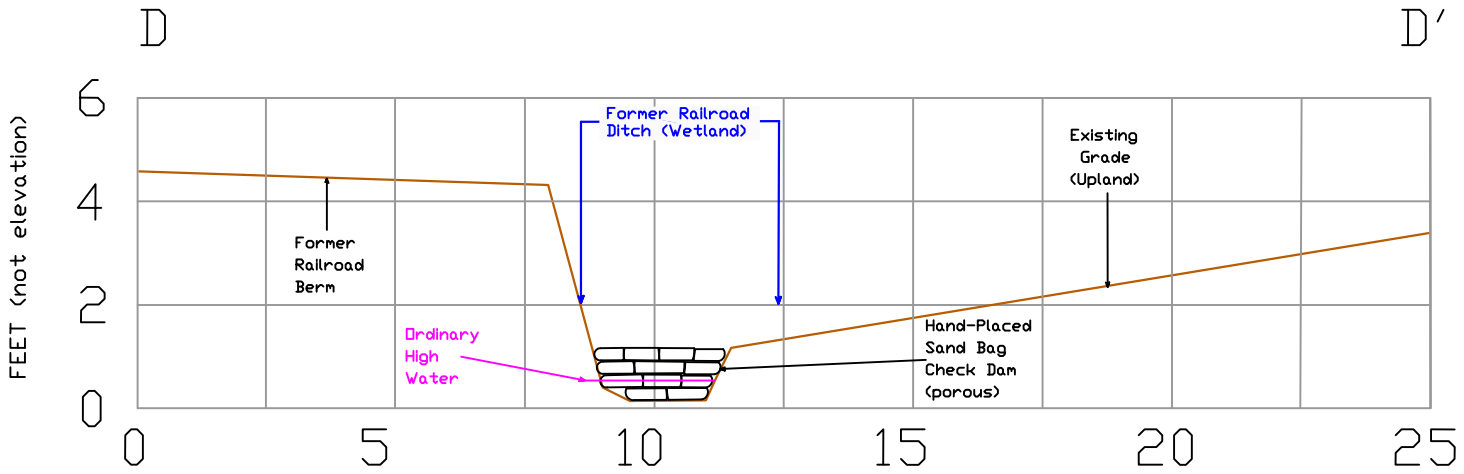
SOURCES: Westlake Consultants Planning–Engineering–Surveying, September 2021.

Terra Science, Inc. Soil, Water, & Wetland Consultants	JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC) Washington County, Oregon	WETLAND C CROSS-SECTIONS WITH ACCUMULATED SEDIMENT
GRAPHIC SCALE – SEE SECTIONS ABOVE	July 2024 (Updated)	FIGURE 7B



CROSS-SECTION C -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 2 ft.



CROSS-SECTION D -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 2 ft.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

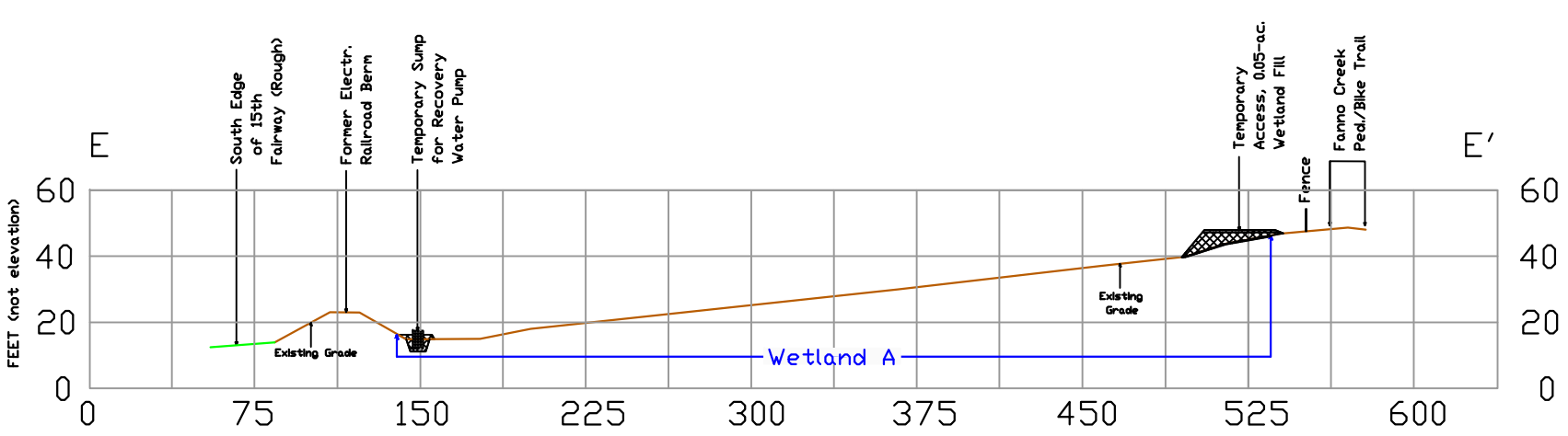
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

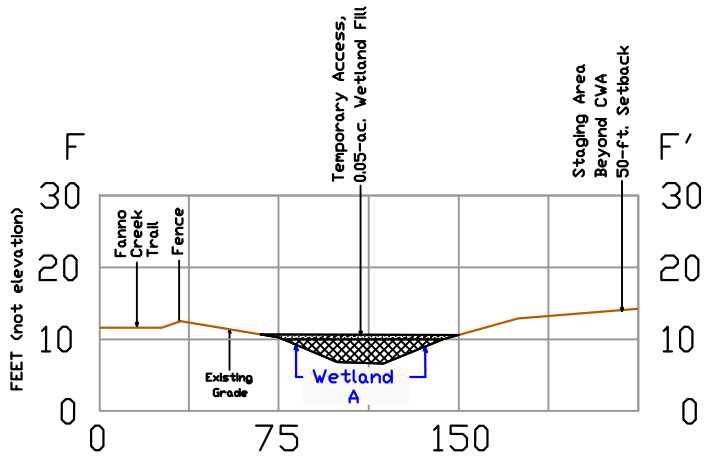
WOODS CREEK SAND BAG COFFER DAM
CROSS-SECTION C-C'
AND RAILROAD DITCH CHECK DAM
CROSS-SECTION D-D'

FIGURE 8.2



CROSS-SECTION E -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 80 ft.



CROSS-SECTION F -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 80 ft.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

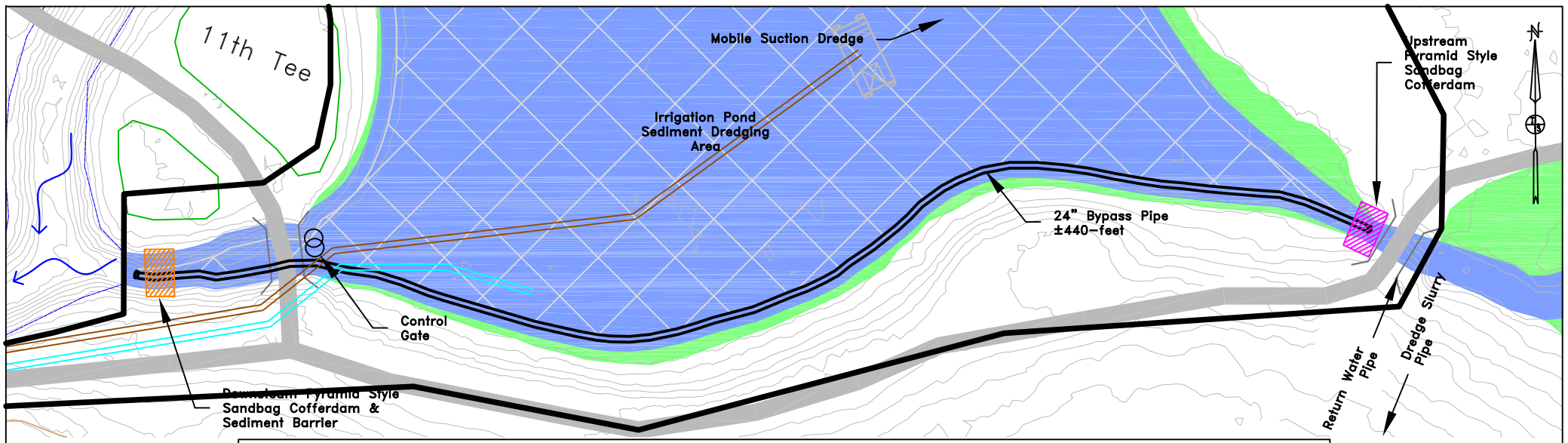
GRAPHIC SCALE
40' 0' 40' 80' 160'

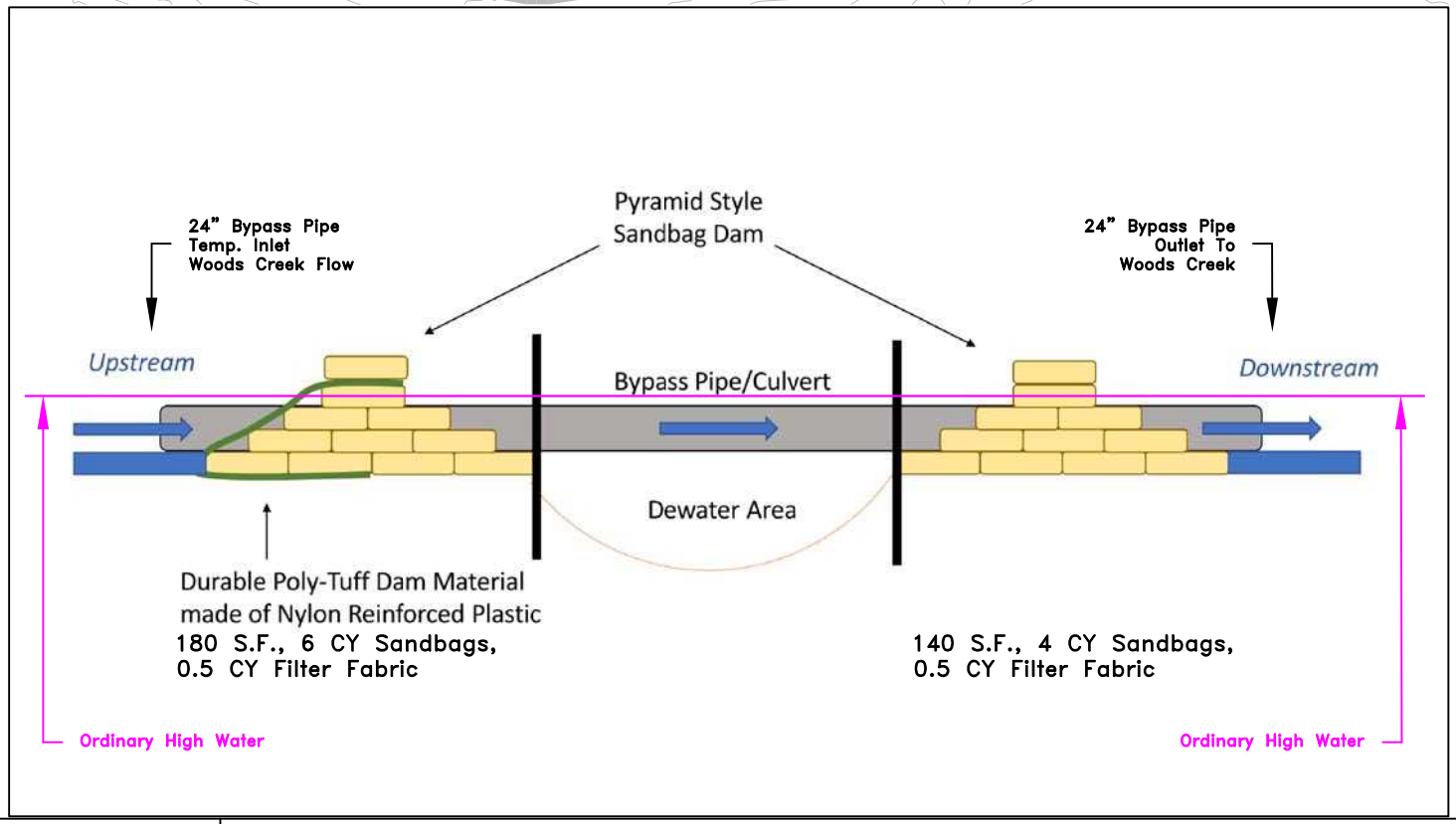
JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

WETLAND A TEMPORARY IMPACTS CROSS-SECTIONS E-E' and F-F'

FIGURE 8





Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
25' 0' 25' 50' 100'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

WETLAND C COFFERDAM
AND BYPASS PIPE DETAIL

FIGURE 9

P.G.C. WATER CONTROL GATE PHOTOGRAPHS (Feb. 22, 2023)

View northwest at water control gate between irrigation pond and Fanno Creek.
View of upgradient side of water control gate, which detains water from Woods Creek.

View southeast at water control gate between irrigation pond and Fanno Creek. View of downgradient side of water control gate. Floating debris from Fanno Creek is stopped from entering irrigation pond.

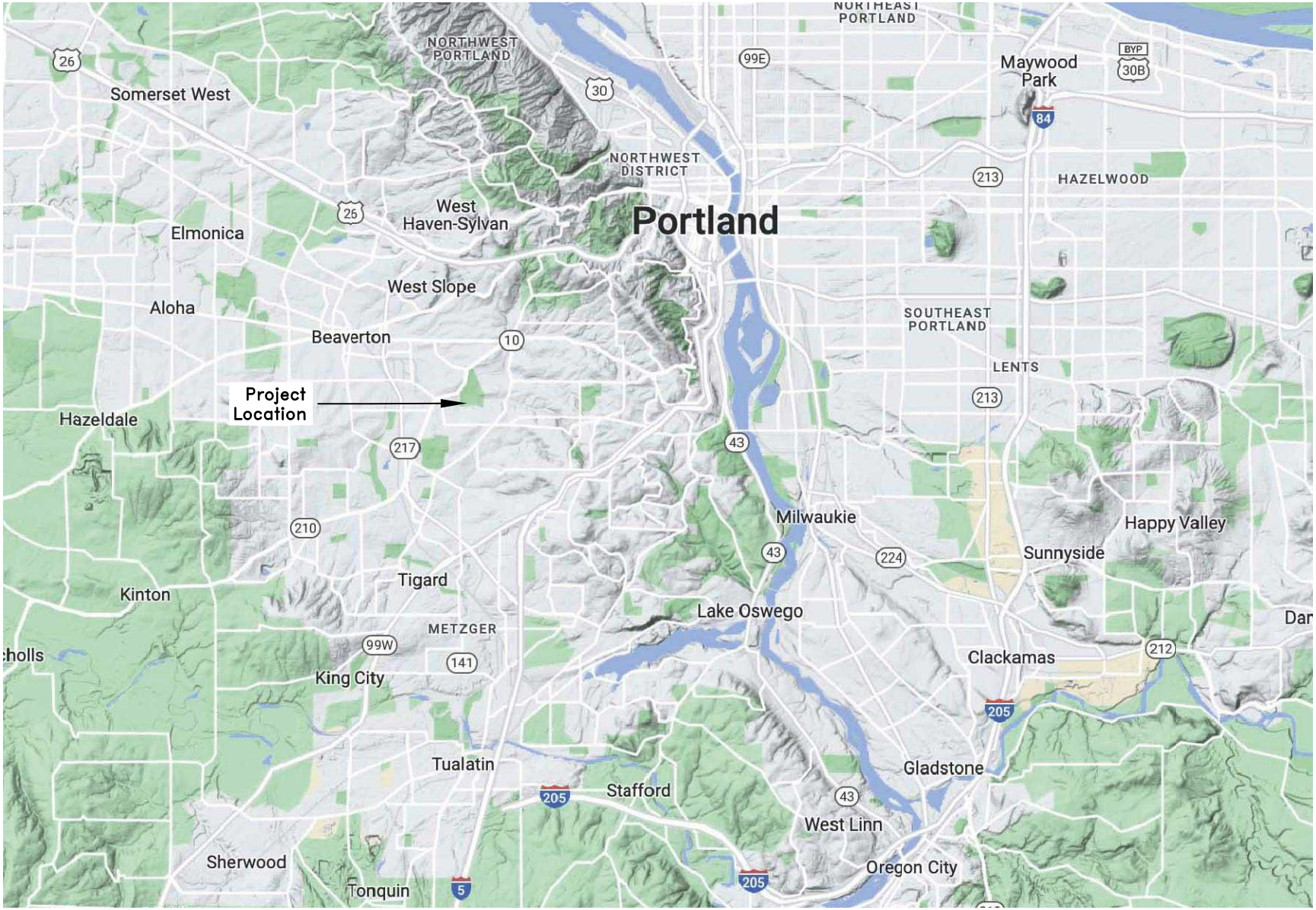
4710 S.W. Kelly Avenue, Suite 100 / Post Office Box 2100 / Portland, OR 97208-2100 / 503-274-2100 / pscoles@terrascience.com

P.G.C. WATER CONTROL GATE PHOTOGRAPHS (cont'd).

View east at water control gate that impounds Woods Creek and detains water for irrigation pond. View of downgradient side of water control gate.

View northwest at water control gate that impounds Woods Creek and detains water for irrigation pond. View of upgradient side of water control gate.

4710 S.W. Kelly Avenue, Suite 100 / Post Office Box 2100 / Portland, OR 97208-2100 / 503-274-2100 / pscoles@terrascience.com



SOURCE: Google maps, downloaded December 2022.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

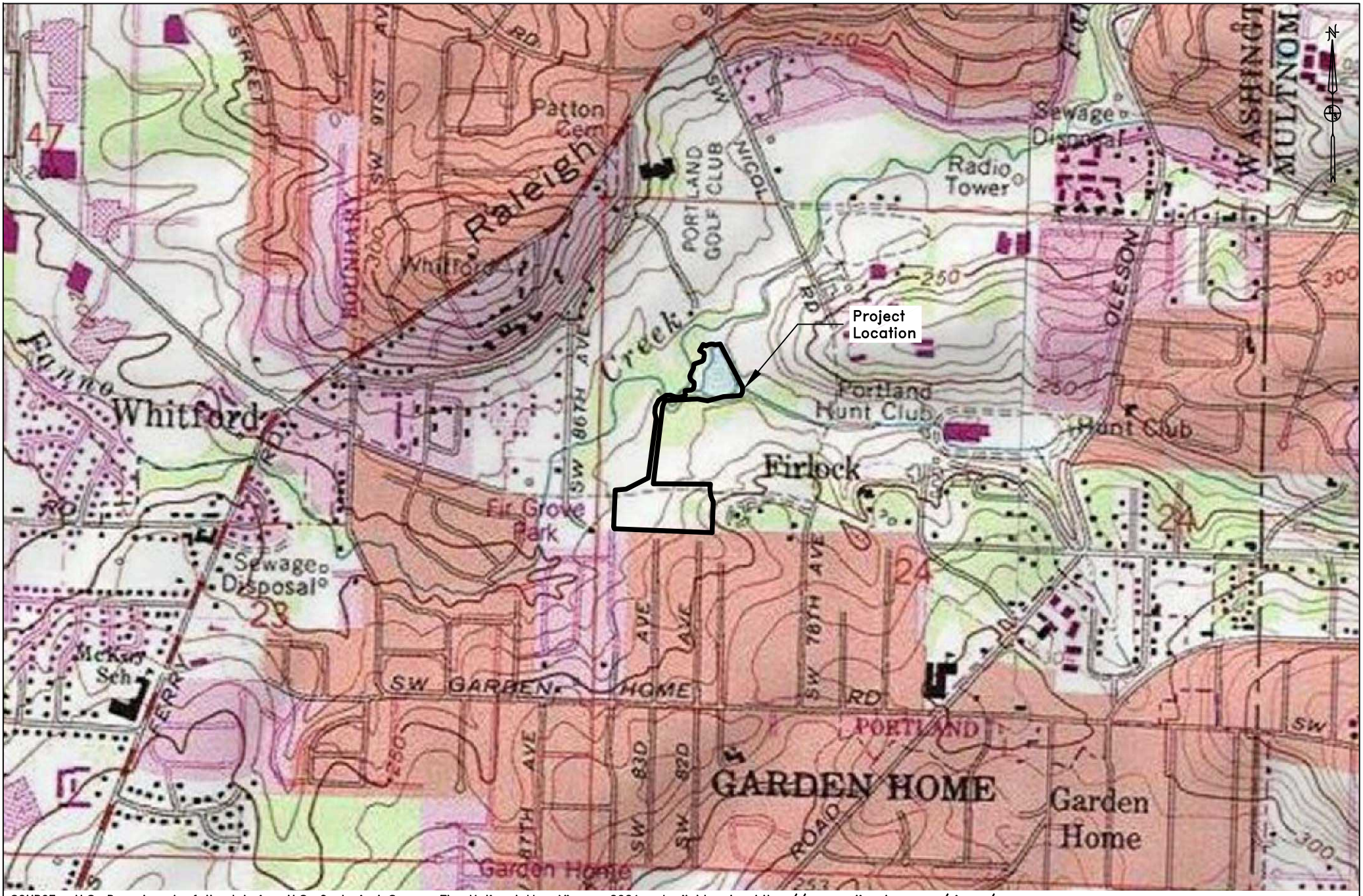
GRAPHIC SCALE
0 1.25 mile 2.5 mi. 5 mi.

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

VICINITY MAP

FIGURE 2



SOURCE: U.S. Department of the Interior, U.S. Geological Survey, The National Map Viewer, 2021. Available at: <https://apps.nationalmap.gov/viewer/>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

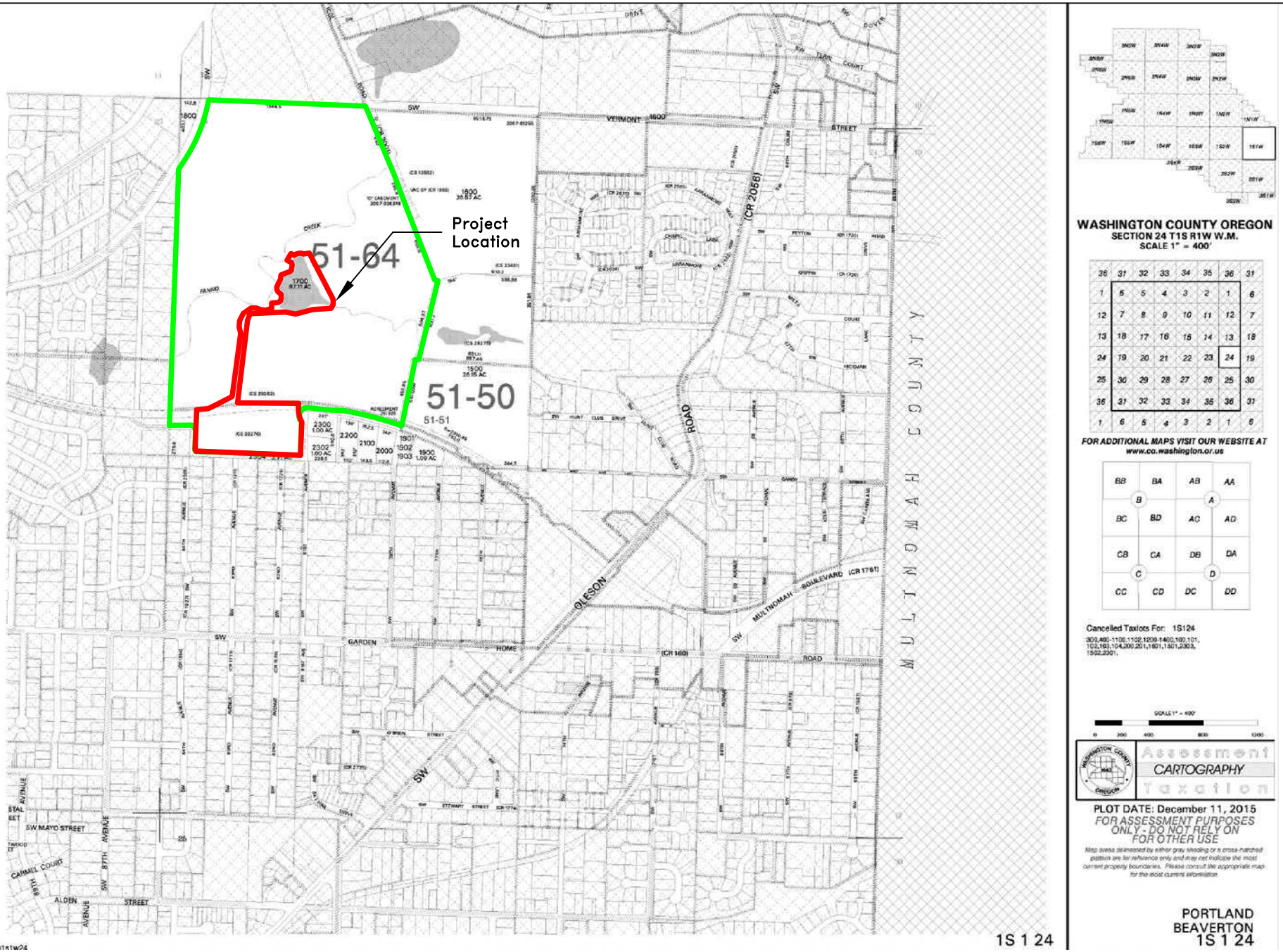
GRAPHIC SCALE
500' 0' 500' 1000' 2000'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

U.S.G.S.
Topography Map

FIGURE 2



WASHINGTON COUNTY OREGON
SECTION 24 T1S R1W W.M.
SCALE 1" = 400'

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT
www.co.washington.or.us

BB	BA	AB	AA
	B	A	
BC	BD	AC	AD
CB	CA	DB	DA
	C	D	
CC	CD	DC	DD

Cancelled Taxlots For: 1S124
300,400-1100,1102,1200-1400,100,101,
102,103,104,200,201,1601,1301,2303,
1502,2001.

SCALE 1" = 400'
0 200 400 800 1200

Assessment
CARTOGRAPHY
Taxation

PLOT DATE: December 11, 2015
FOR ASSESSMENT PURPOSES ONLY - DO NOT RELY ON FOR OTHER USE

Map areas delineated by either gray shading or a cross-hatched pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.

PORTLAND
BEAVERTON
1S 1 24

SOURCE: ORMAP website, Washington County Assessor's Map 1S 1 24, 2021. Available at: <https://ormap.net/gis/index.html>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
500' 0' 500' 1000' 2000'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

TAX LOT MAP
1S 1 24

FIGURE 3

SOURCE: Google Earth, 2021. Available at: <https://earth.google.com>

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Soil, Water, & Wetland Consultants

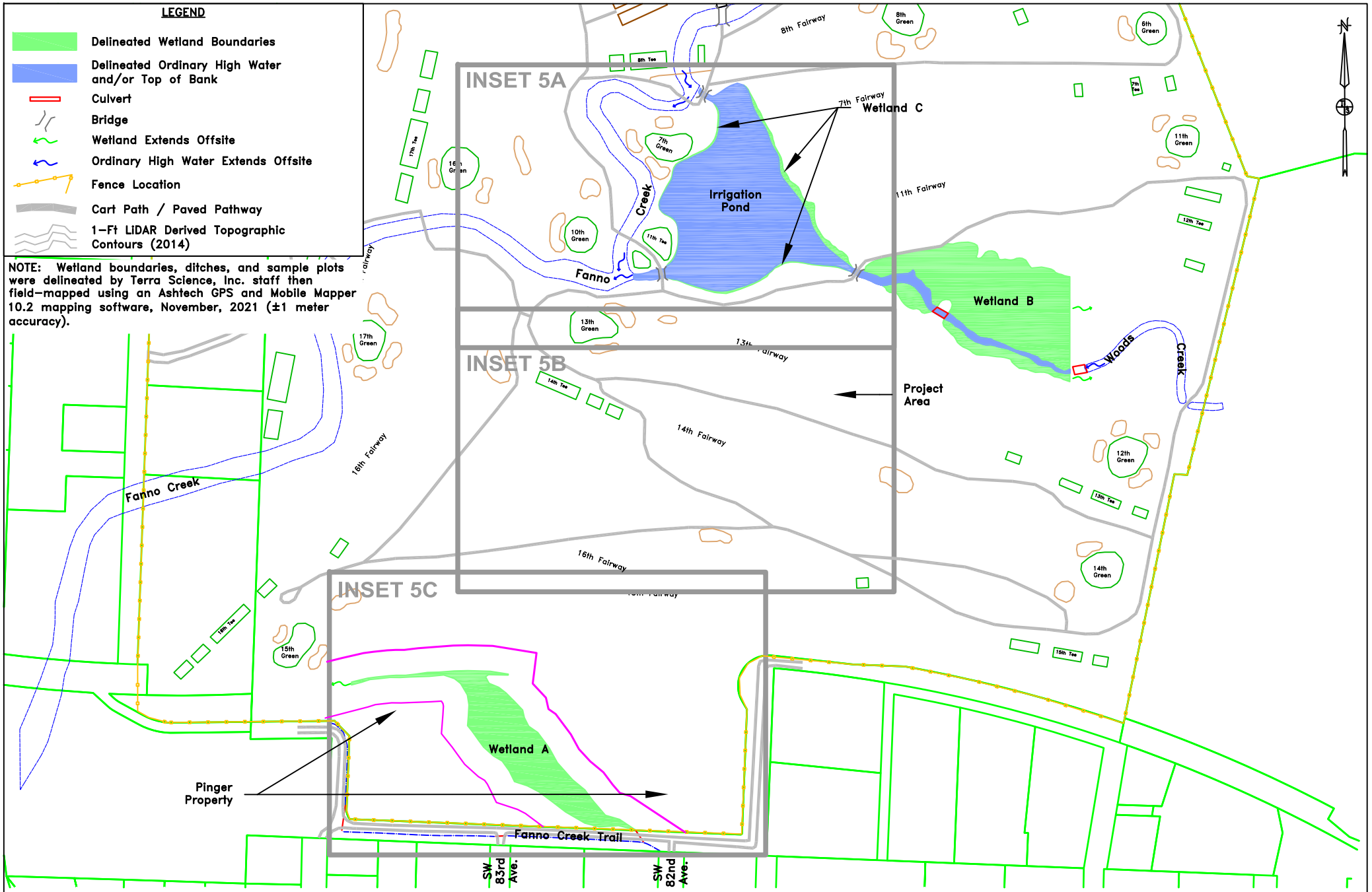
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

JUNE 21, 2021
AERIAL IMAGE

FIGURE 4



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

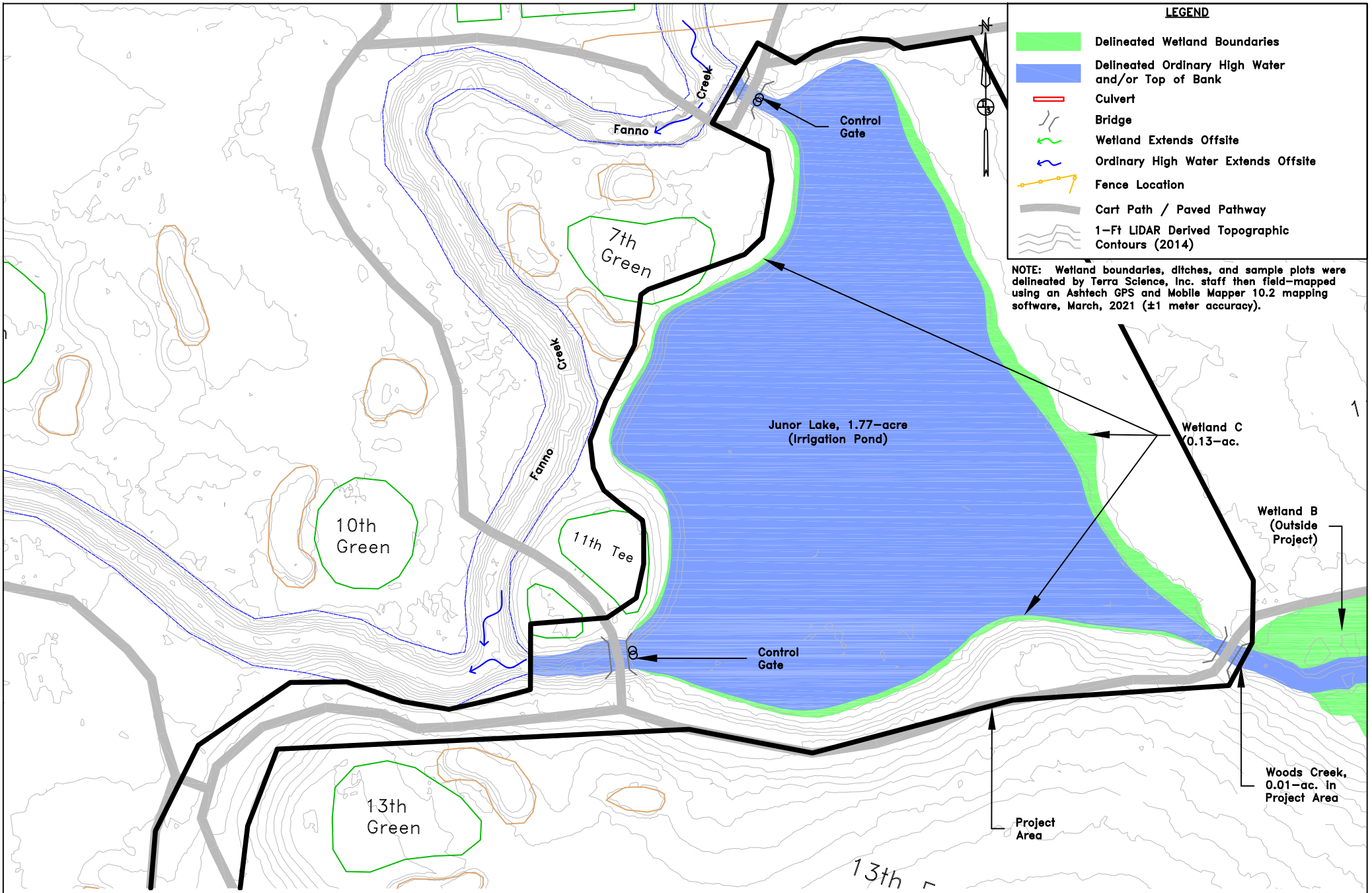
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS INDEX MAP

FIGURE 5



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

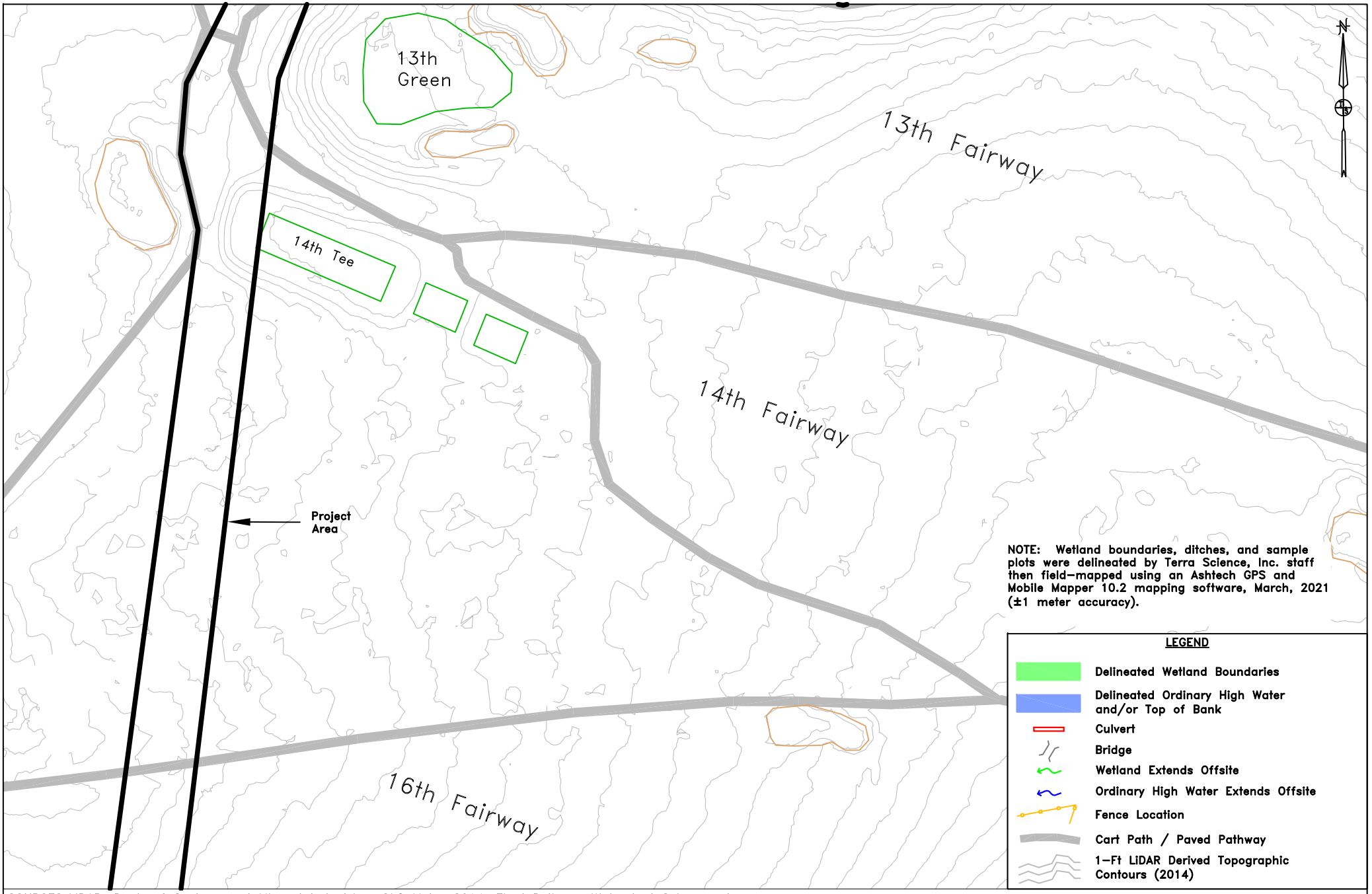
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(SEDIMENT REMOVAL AREA)

INSET 5A



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

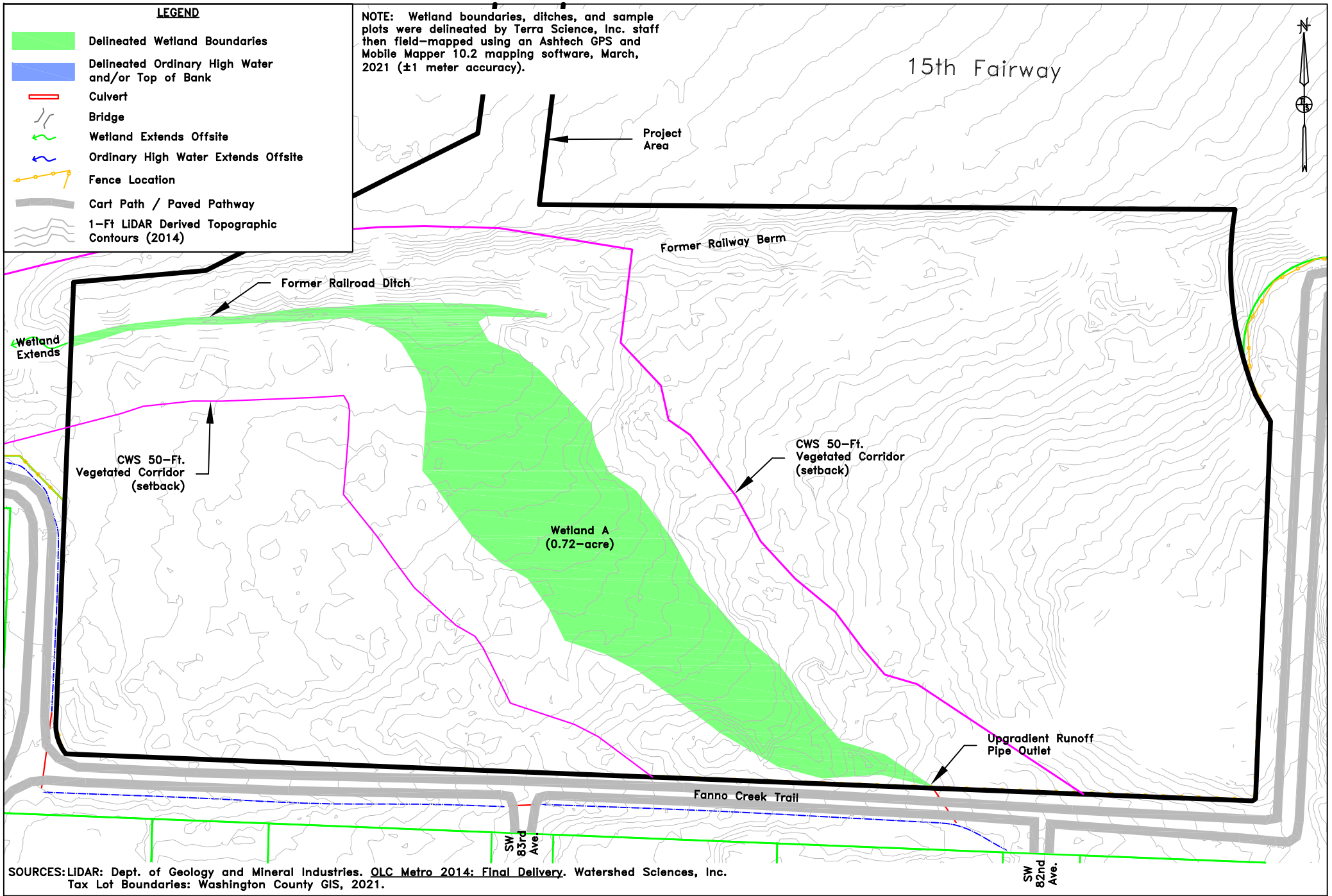
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(FAIRWAYS 13, 14 & 15)

INSET 5B



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

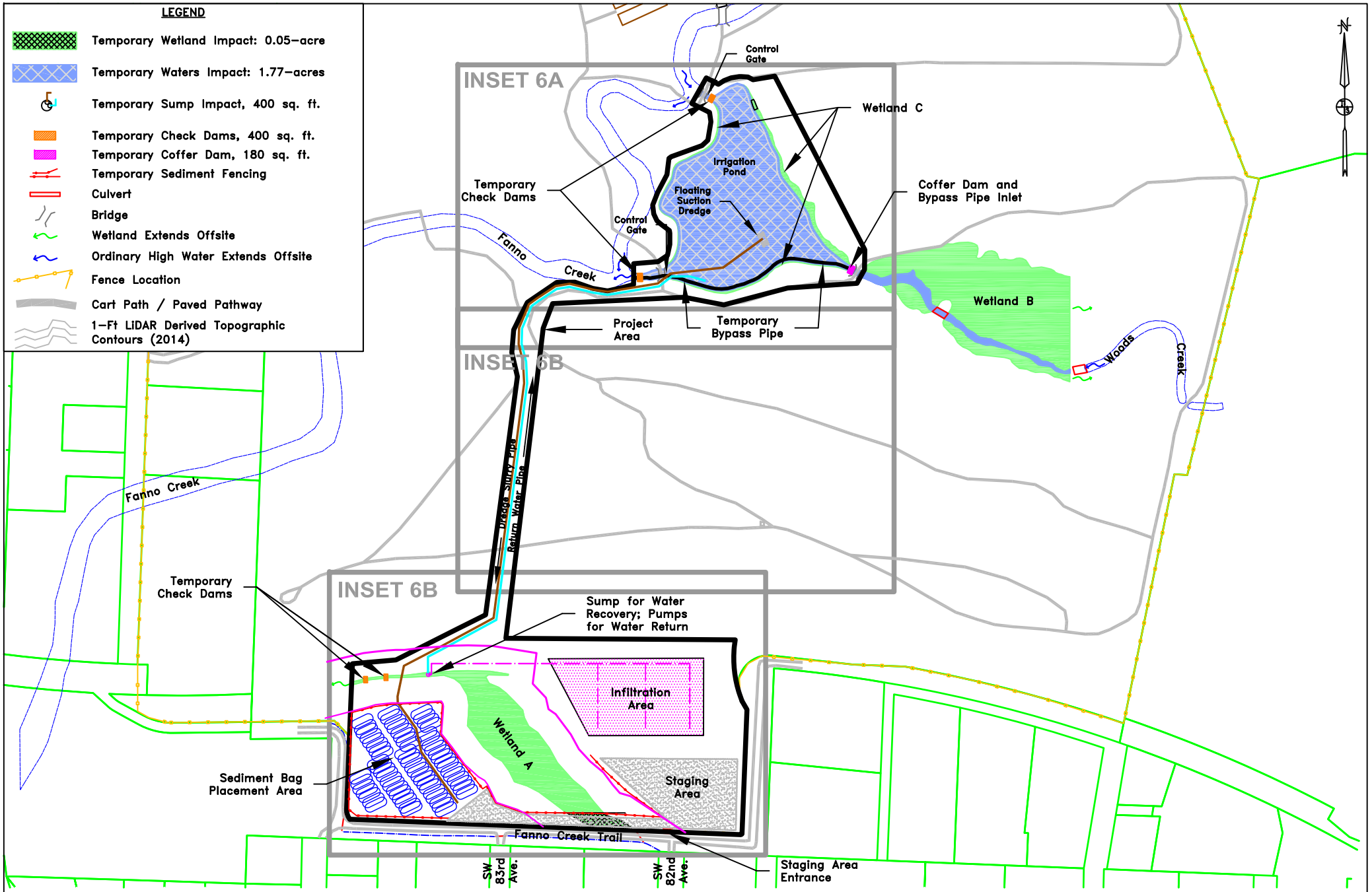
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EXISTING CONDITIONS
(SEDIMENT PLACEMENT AREA)

INSET 5C



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

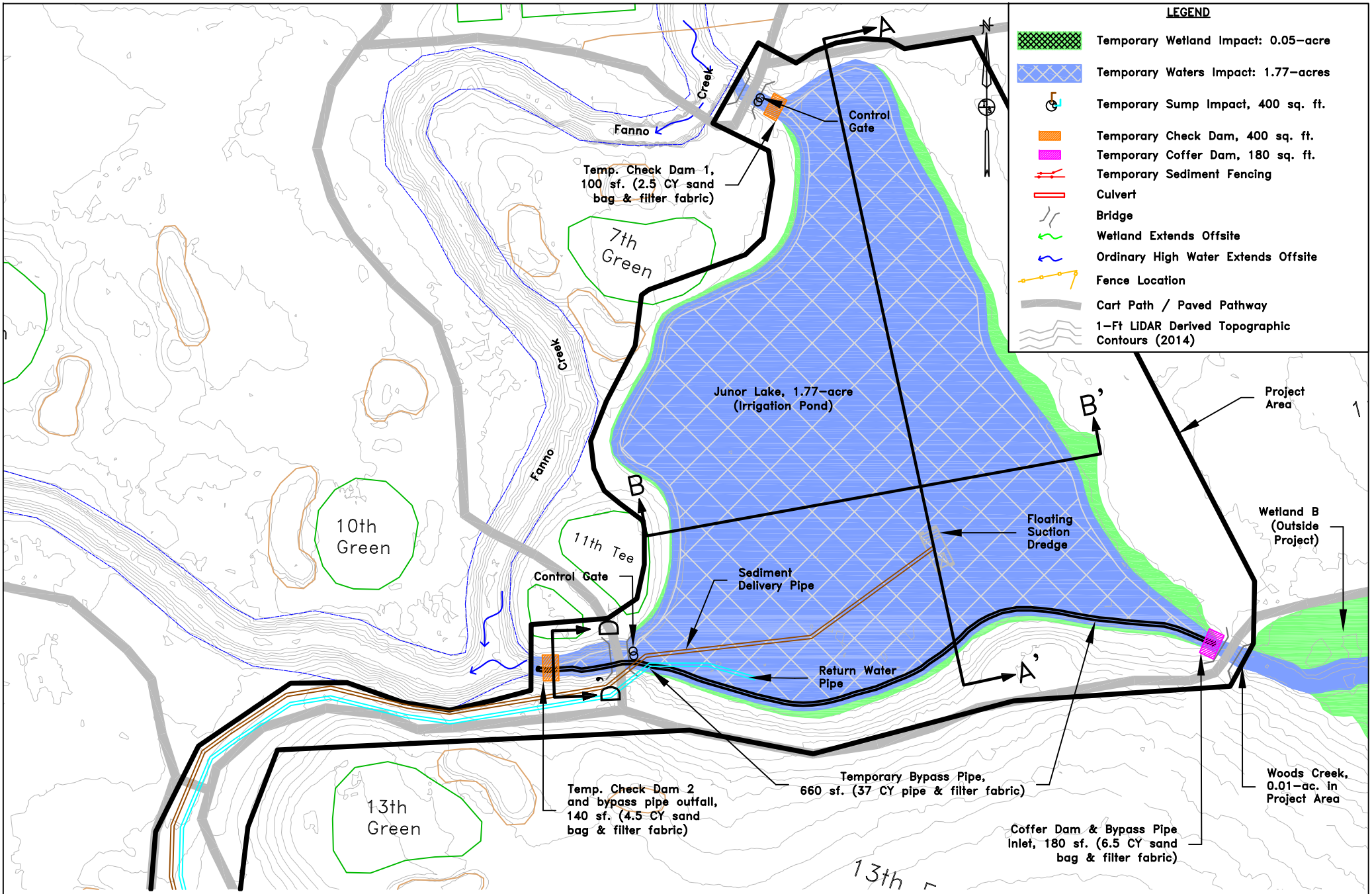
GRAPHIC SCALE
125' 0' 125' 250' 500'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
INDEX MAP

FIGURE 6



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

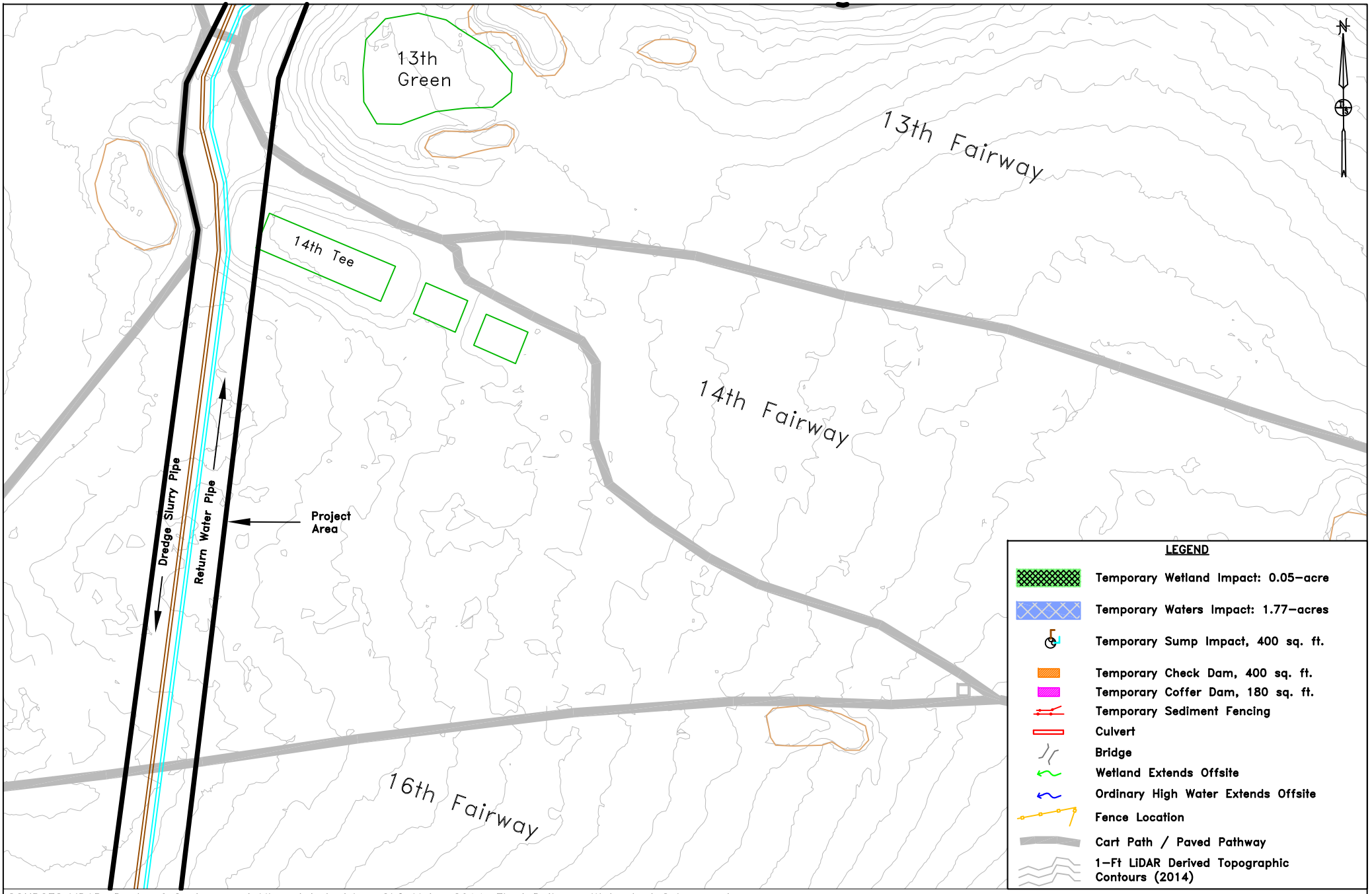
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(SEDIMENT REMOVAL AREA

INSET 6A



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

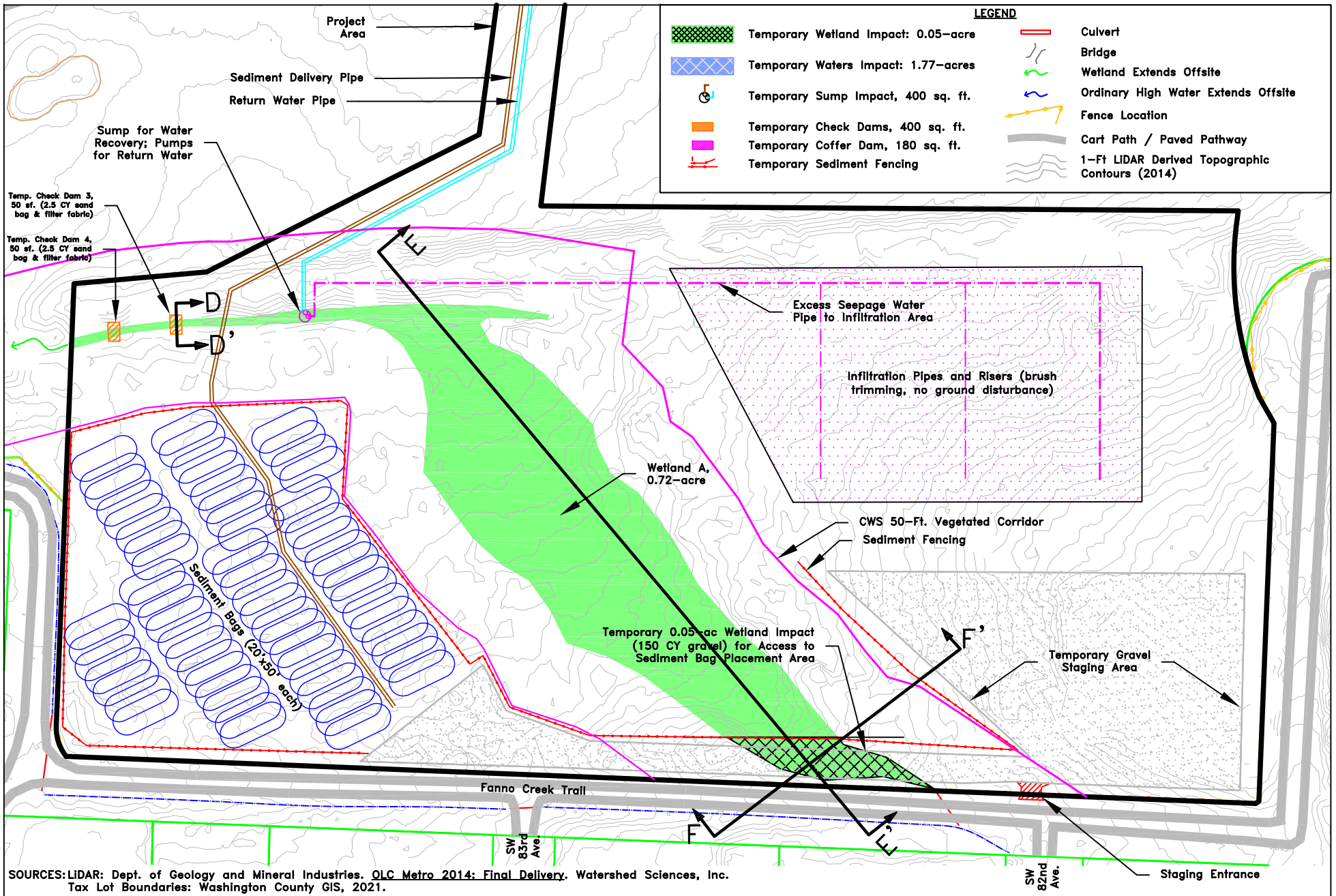
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(FAIRWAYS 13, 14 & 15)

INSET 6B



SOURCES: LiDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

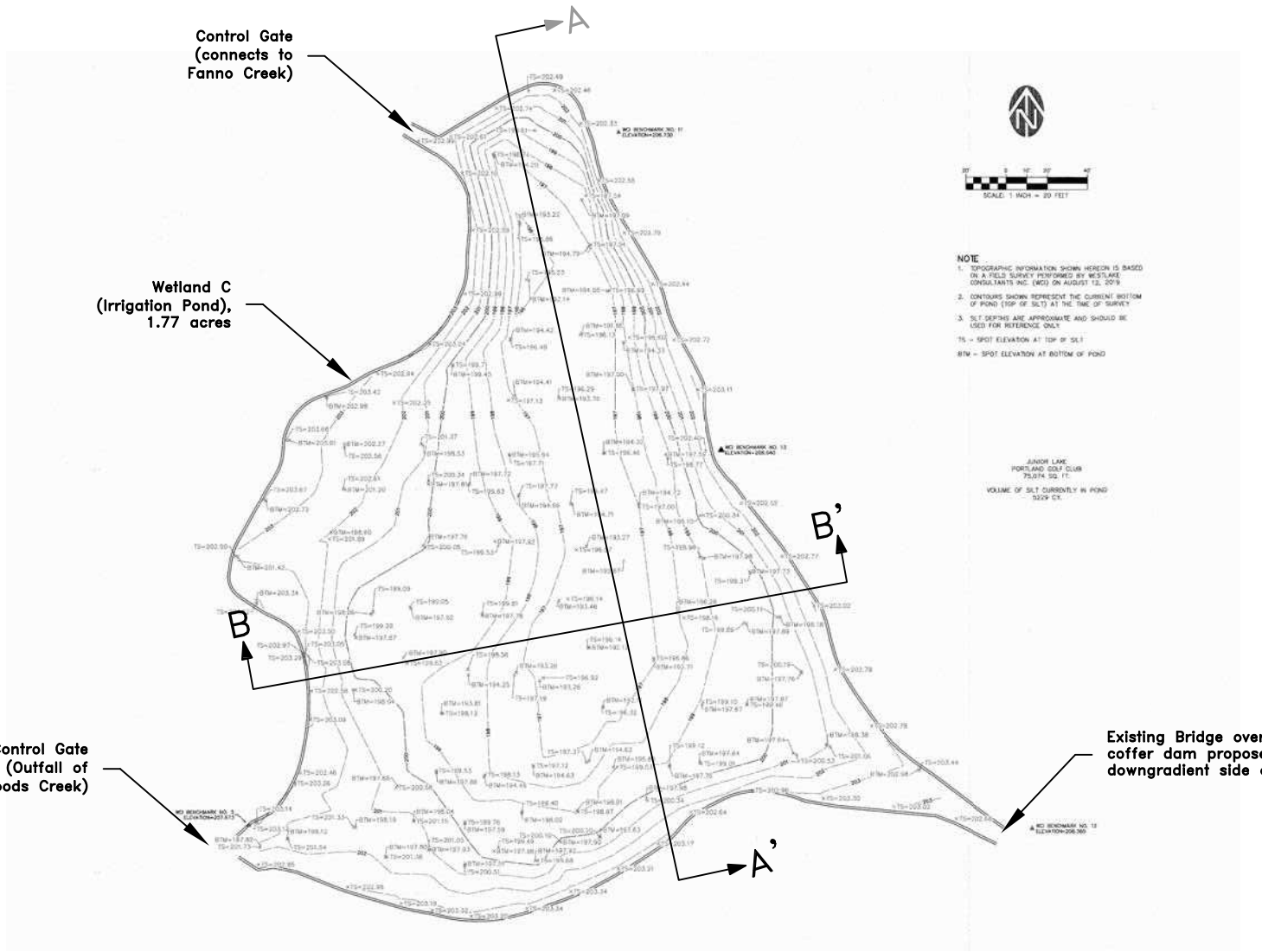
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

SITE PLAN
(SEDIMENT PLACEMENT AREA)

INSET 6C



SOURCES: Westlake Consultants Planning–Engineering–Surveying, September 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

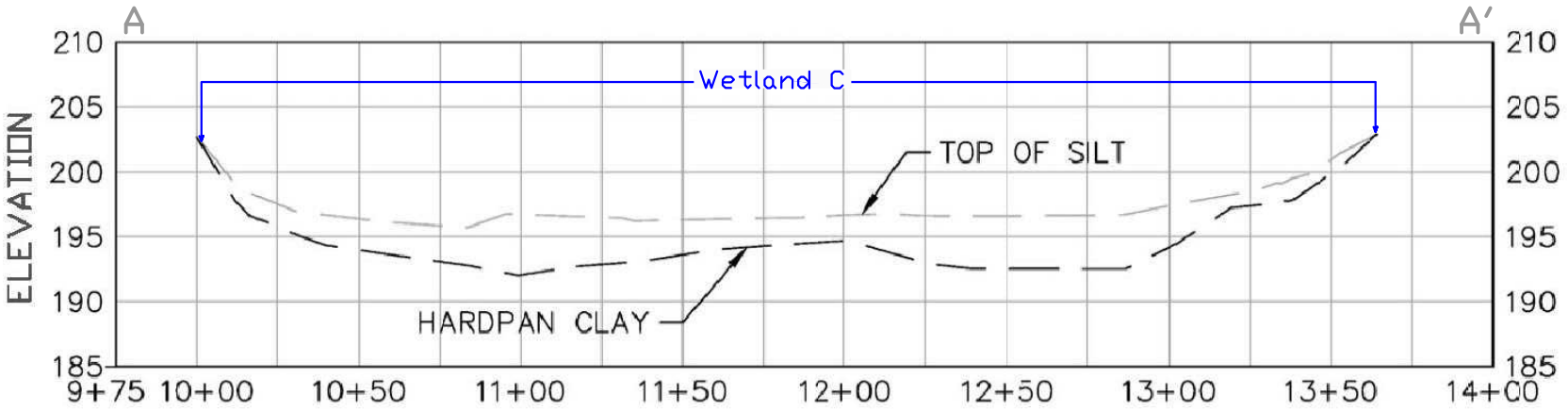
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

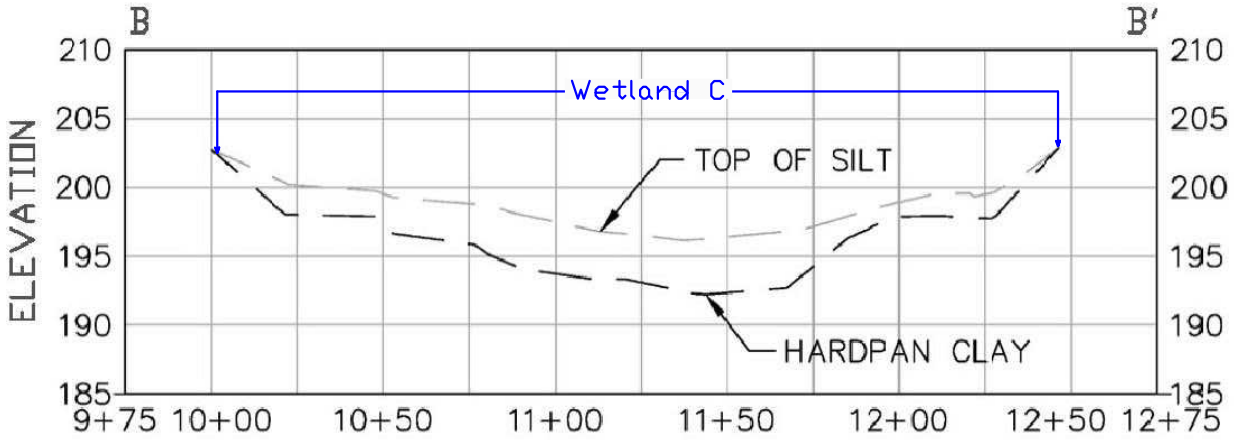
WETLAND C
EXISTING BATHYMETRY
OF IRRIGATION POND

FIGURE 7



CROSS SECTION A

HORIZONTAL SCALE: 1"=60'
VERTICAL SCALE: 1"=15'

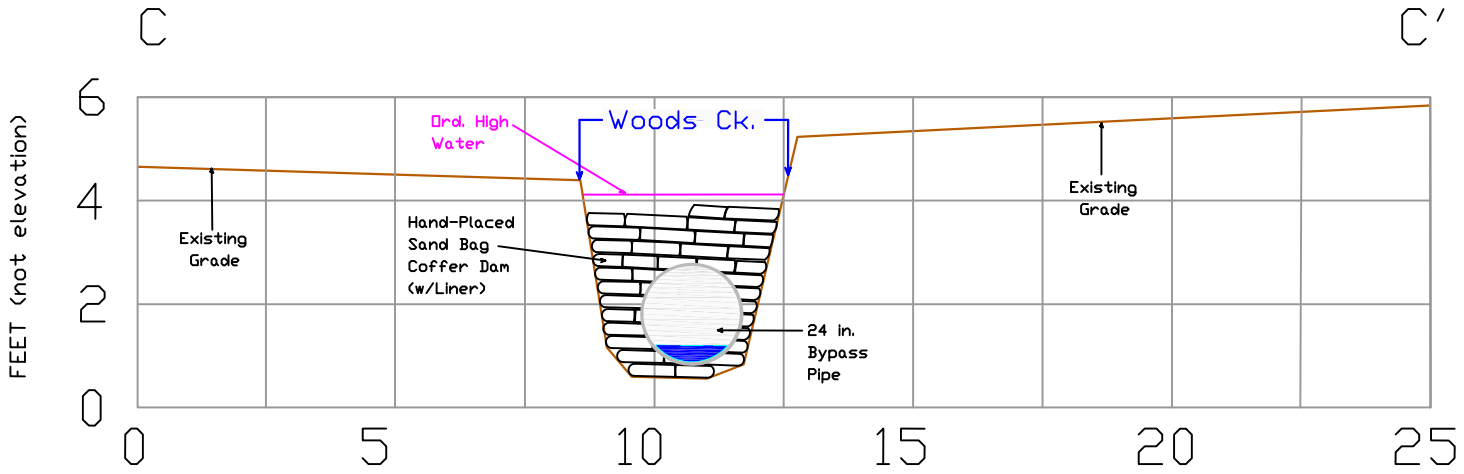


CROSS SECTION B

HORIZONTAL SCALE: 1"=60'
VERTICAL SCALE: 1"=15'

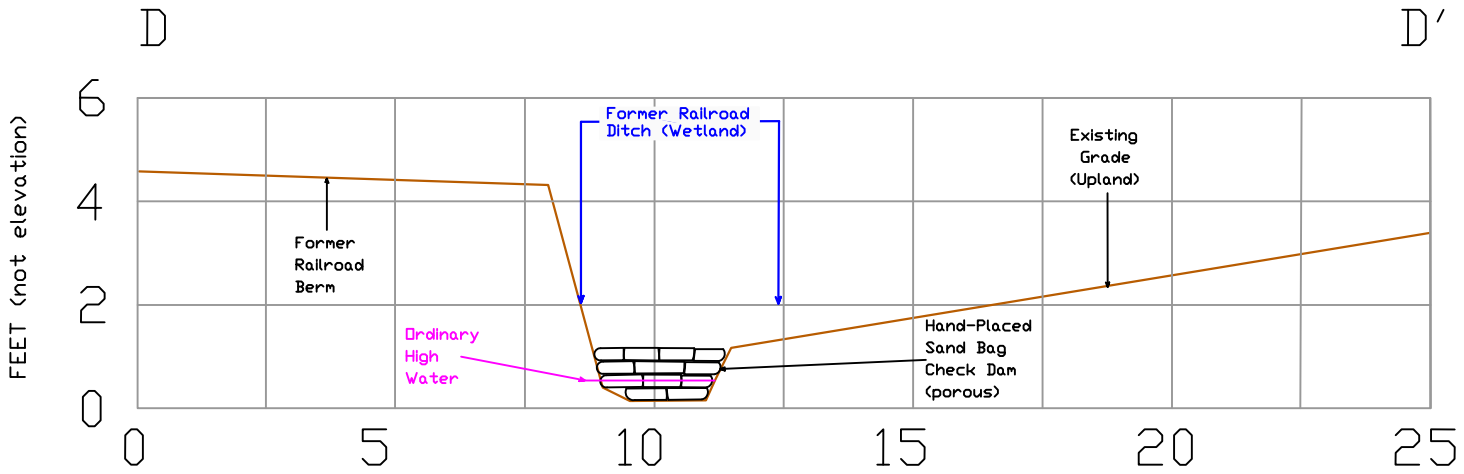
SOURCES: Westlake Consultants Planning–Engineering–Surveying, September 2021.

Terra Science, Inc. Soil, Water, & Wetland Consultants	JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC) Washington County, Oregon	WETLAND C CROSS-SECTIONS WITH ACCUMULATED SEDIMENT
GRAPHIC SCALE – SEE SECTIONS ABOVE	July 2024 (Updated)	FIGURE 7B



CROSS-SECTION C -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 2 ft.



CROSS-SECTION D -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 2 ft.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

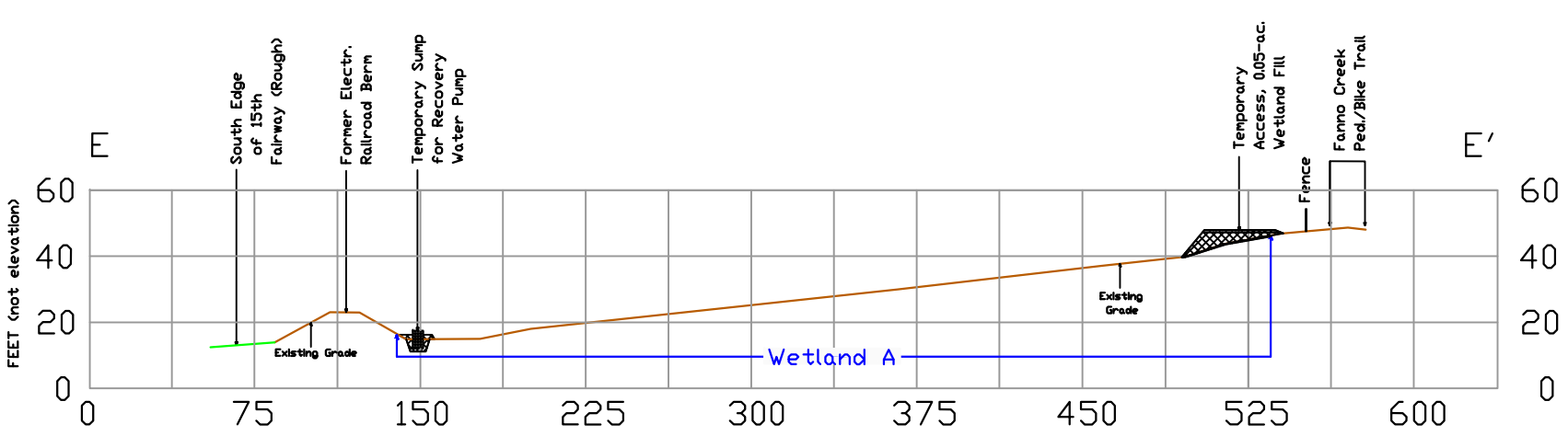
GRAPHIC SCALE
40' 0' 40' 80' 160'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

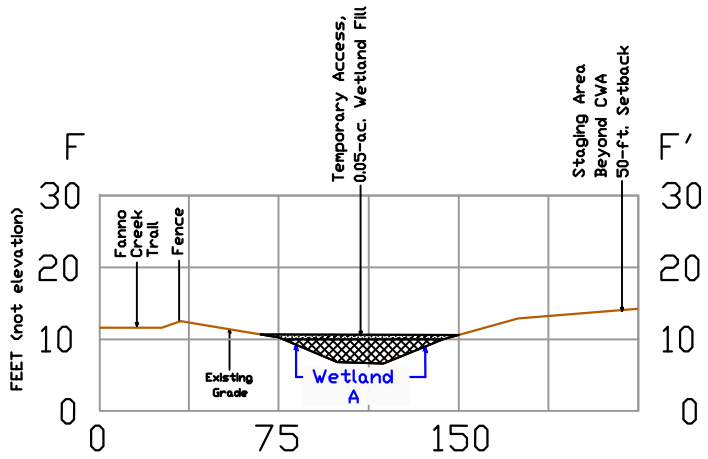
WOODS CREEK SAND BAG COFFER DAM
CROSS-SECTION C-C'
AND RAILROAD DITCH CHECK DAM
CROSS-SECTION D-D'

FIGURE 8.2



CROSS-SECTION E -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 80 ft.



CROSS-SECTION F -- CONCEPTUAL, NOT FOR CONSTRUCTION

Horizontal Scale: 1 in. = 80 ft.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

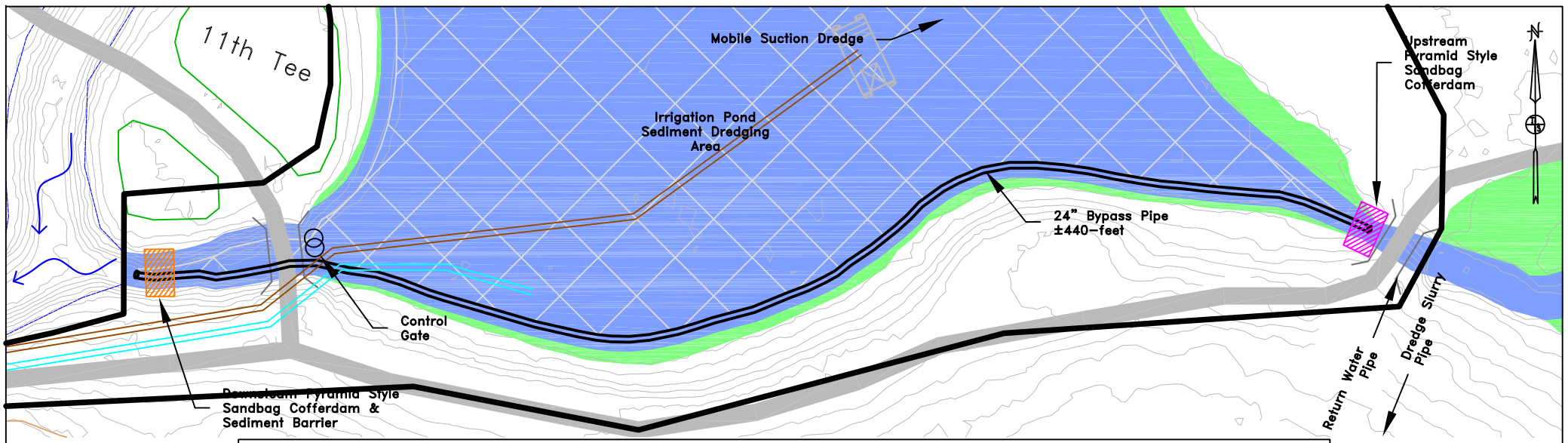
GRAPHIC SCALE
40' 0' 40' 80' 160'

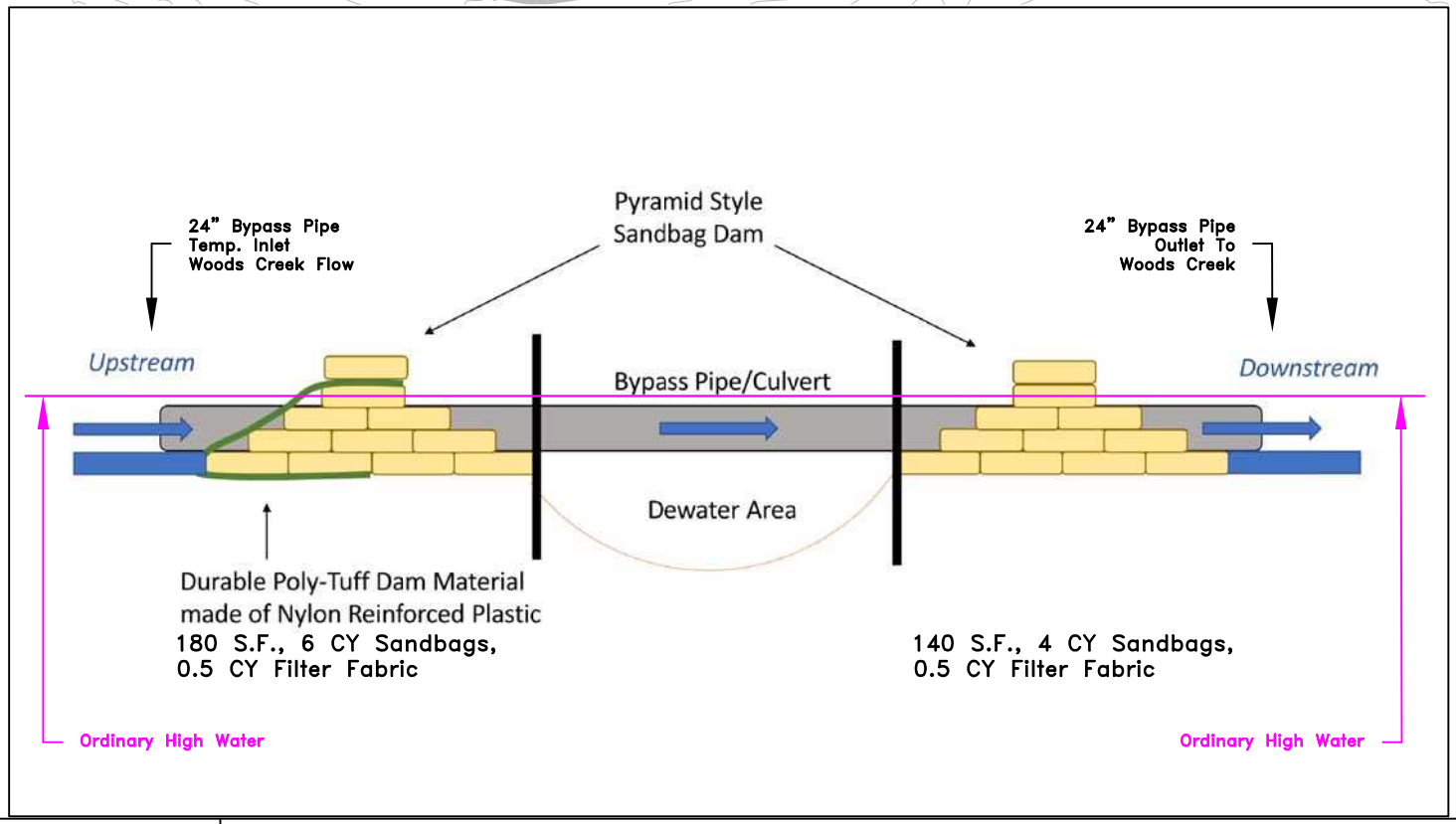
JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

WETLAND A TEMPORARY IMPACTS CROSS-SECTIONS E-E' and F-F'

FIGURE 8





Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
25' 0' 25' 50' 100'

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

July 2024 (Updated)

WETLAND C COFFERDAM
AND BYPASS PIPE DETAIL

FIGURE 9

P.G.C. WATER CONTROL GATE PHOTOGRAPHS (Feb. 22, 2023)

View northwest at water control gate between irrigation pond and Fanno Creek.
View of upgradient side of water control gate, which detains water from Woods Creek.

View southeast at water control gate between irrigation pond and Fanno Creek. View of downgradient side of water control gate. Floating debris from Fanno Creek is stopped from entering irrigation pond.

4710 S.W. Kelly Avenue, Suite 100 / Post Office Box 2100 / Portland, OR 97208-2100 / 503-274-2100 / pscoles@terrascience.com

P.G.C. WATER CONTROL GATE PHOTOGRAPHS (cont'd).

View east at water control gate that impounds Woods Creek and detains water for irrigation pond. View of downgradient side of water control gate.

View northwest at water control gate that impounds Woods Creek and detains water for irrigation pond. View of upgradient side of water control gate.

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APPENDIX F – OREGON RAPID WETLAND ASSESSMENT PROTOCOL (ORWAP) FUNCTIONAL ASSESSMENT REPORT

Oregon Rapid Wetland Assessment (ORWAP) V.3.2.*	Cover Page: Basic Description of Assessment
Site Name:	Portland Golf Club-Sediment Placement
Investigator Name:	P.Scoles
Date of Field Assessment:	Nov. 16, 2021
County:	Washington
Nearest Town:	Tigard
Latitude (decimal degrees):	45.47
Longitude (decimal degrees):	-122.7623
TRS, quarter/quarter section and tax lot(s):	T,01S, R. 01W, Sec. 24 (BC)
Approximate size of the Assessment Area (AA, in acres):	0.72
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100%
If delineated, DSL file number (WD #) if known:	Pending
Cowardin Systems & Classes (indicate all present, based on field visit and/or aerial imagery): Systems: Palustrine =P, Riverine =R, Lacustrine =L, Estuarine =E Classes: Emergent =EM, Scrub-Shrub =SS, Forested =FO, Aquatic Bed (incl. SAV) =AB, Open Water =OW, Unconsolidated Bottom =UB, Unconsolidated Shore =US	PEME
Predominant HGM Class: Estuarine=E, Lacustrine=L, Riverine=R, S= Slope, F= Flats, D= Depressional	Slope
Soil Unit Mapped in Most of the AA:	Aloha silt loam (mapping unit 1)
If tidal, the tidal phase during most of visit:	N/A
What percent (approximate) of the **wetland** were you able to visit?	100
What percent (approximate) of the **AA** were you able to visit?	100
Have you attended an ORWAP training session? If so, indicate approximate month & year.	Aug, 2010
How many wetlands have you assessed previously using ORWAP (approximate)?	16
Comments about the site or this ORWAP assessment (attach extra page if desired):	Subject PEM wetland formerly cleared, now dominated by non-native and invasive grasses. Adjacent ped/bike path is upper limit of contributing watershed. Lower end of wetland impounded by former RR berm. Golf course situated to north, older residential to south.

ORWAP V.3.2 Site Name:	Portland Golf Club-Sediment Placement
Investigator Name:	P.Scoles
Date of Field Assessment:	Nov. 16, 2021

Scores will appear below after data are entered in worksheets OF, F, T, and S. See Manual for definitions and descriptions of how scores were computed and ratings assigned.

Normalized Scores & Ratings for this Assessment Area (AA):

Specific Functions or Values:	**Function** Score	Function Rating	Rating Break Proximity	**Values** Score	Values Rating	Rating Break Proximity	Function Score (raw)	Values Score (raw)
Water Storage & Delay (WS)	4.74	Moderate	LM	0.00	Lower		4.74	0.00
Sediment Retention & Stabilization (SR)	4.85	Moderate		5.44	Moderate	MH	5.08	4.14
Phosphorus Retention (PR)	4.05	Moderate		2.10	Lower		4.28	1.74
Nitrate Removal & Retention (NR)	4.51	Moderate	LM	1.69	Lower		5.56	1.74
Anadromous Fish Habitat (FA)	5.68	Moderate		10.00	Higher		4.99	10.00
Resident Fish Habitat (FR)	0.00	Lower		0.00	Lower		0.00	0.00
Amphibian & Reptile Habitat (AM)	5.95	Moderate		6.67	Moderate	MH	5.40	6.67
Waterbird Nesting Habitat (WBN)	6.70	Moderate	MH	2.56	Moderate		5.56	2.56
Waterbird Feeding Habitat (WBF)	7.65	Higher		3.33	Moderate		6.90	3.33
Aquatic Invertebrate Habitat (INV)	2.18	Lower		2.33	Lower		4.25	2.83
Songbird, Raptor, Mammal Habitat (SBM)	2.33	Lower		3.33	Lower		4.34	3.33
Water Cooling (WC)	2.67	Moderate	LM	9.33	Higher		2.33	8.90
Native Plant Diversity (PD)	0.00	Lower		0.00	Lower		0.00	0.00
Pollinator Habitat (POL)	4.51	Moderate		3.92	Moderate		3.94	3.17
Organic Nutrient Export (OE)	5.94	Moderate					5.26	
Carbon Sequestration (CS)	3.51	Lower	LM				3.58	
Public Use & Recognition (PU)				3.50	Lower	LM		4.10

Other Attributes:	Score	Rating	Rating Break Proximity		
Wetland Sensitivity (SEN)	0.82	Lower			3.53
Wetland Ecological Condition (EC)	1.59	Lower			3.33
Wetland Stressors (STR)	5.07	Moderate	MH		4.67

GROUPS	Selected Function	Function Rating	Rating Break Proximity	Values Rating	Rating Break Proximity
Hydrologic Function (WS)	Water Storage & Delay (WS)	Moderate	LM	Lower	
Water Quality Support (SR, PR, or NR)	Sediment Retention & Stabilization (SR)	Moderate		Moderate	MH
Fish Habitat (FA or FR)	Anadromous Fish Habitat (FA)	Moderate		Higher	
Aquatic Habitat (AM, WBF, or WBN)	Waterbird Feeding Habitat (WBF)	Higher		Moderate	
Ecosystem Support (WC, INV, PD, POL, SBM, or OE)	Water Cooling (WC)	Moderate	LM	Higher	

NOTE: A score of 0 does not always mean the function or value is absent from the wetland. It usually means that this wetland has equal or less capacity than the lowest-scoring one, for that function or value, from among the 200 calibration wetlands that were assessed previously by Oregon Department of State Lands.

Date: Nov. 16, 2021	Name: P. Scoles	Site: Portland Golf Club-Sediment Placement	
Form OF Office Data ORWAP V. 3.2	Conduct an assessment only after reading the accompanying Manual and explanations in column E below. Answering many of the following questions requires viewing aerial imagery and maps, covering an area up to within 2 miles of the AA. **For each affirmative answer, change the 0 in the "Data" column to a "1".** Answer all items except where directed to skip to others. Questions whose cells in "Data" column have a **"W" MUST be answered for the ENTIRE wetland and bordering waters.**	For a list of functions to which each question pertains, see bracketed codes in column E. Codes for functions and their benefits are: WS= Water Storage, WC= Water Cooling, SR= Sediment Retention, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Aquatic Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibians & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PD= Native Plant Diversity, PU= Public Use & Recognition, EC= Ecological Condition, Sens= Sensitivity, STR= Stressors.	For guidance and detailed descriptions of how Excel calculates the numbers in the Scores worksheet, see the Technical Supplement and Appendix C of the Manual. For a documented rationale for each indicator, open each of the worksheet tabs at the bottom (one for each function or value) and see column H.

#	Indicators	Condition Choices	Data	Explanations, Definitions (Column E)	Cell Name	Comments
OF1	Distance to Extensive Perennial Cover (DistPerCov)	The distance from the AA edge to the edge of the closest patch or **corridor** of **perennial cover** (see definition in column E) larger than 100 acres is:		**Corridor** - is simply an elongated patch of perennial cover that is not narrower than 150 ft at any point. **Perennial cover** - is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground is disturbed less than annually, such as hayfields, lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. [AM, WBN, PD, PDv, POL, SBM, Sens, STR]		
		<100 ft.	0			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to <0.5 mile.	0			
		0.5 mile to 2 miles.	0			
		> 2 miles.	1			
OF2	Distance to Tidal Waters (DistTidal)	The distance from the AA edge to the closest body of **tidal water** is:		**Tidal water** - If unclear whether a water body is tidal, check the ORWAP Map Viewer's Headtide layer (expand Hydrology), or check with local sources. Assume Columbia River is tidal east to Bonneville Dam and the Willamette River south to the Oregon City Falls. [WBF]		
		<1 mile.	0			
		1-5 miles.	0			
		>5 miles.	1			
OF3	Distance to Ponded Water (DistPond)	The distance from the AA edge to the closest (but separate) body of nontidal fresh water (wetland, pond, or lake) that is ponded all or most of the year is:		Use field observations, aerial imagery, and/or the ORWAP Map Viewer's Persistent Nontidal layer (expand Wetlands/National Wetlands Inventory). [AM,WBF,WBN,SBM,PD,Sens]		
		<100 ft.	0			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to < 0.5 mile.	1			
		0.5 mile to 2 miles.	0			
		>2 miles.	0			
OF4	Distance to Lake (DistLake)	The distance from the AA edge to the closest (but separate) body of nontidal fresh water (wetland, pond, or lake) that is ponded during most of the year and is larger than 20 acres (about 1000 ft on a side) is:		Use field observations, aerial imagery, and/or the ORWAP Map Viewer's Persistent Nontidal layer (expand Wetlands/National Wetlands Inventory). [WBF,WBN]		
		<1 mile.	0			
		1-5 miles.	0			
		>5 miles.	1			
OF5	Distance to Herbaceous Open Land (DistOpenL)	The distance from the AA edge to the closest patch of **herbaceous openland** larger than 10 acres and in **flat terrain** is:		**Herbaceous openland** - includes both perennial and non-perennial cover. For example, it can include pasture, herbaceous wetland, meadow, prairie, ryegrass fields, row crops, herbaceous rangeland, golf courses, grassed airports, and hayfields. Do not include open water of lakes, ponds, or rivers; or unvegetated surfaces; or areas with woody vegetation. In dry parts of the state, croplands in flat areas are often irrigated and are distinctly greener in aerial images. **Flat terrain** - means slope of less than 5%. [WBF,WBN,POL]		
		<100 ft.	1			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to < 0.5 mile.	0			
		0.5 mile to 2 miles.	0			
		>2 miles.	0			

OF6	Distance to Nearest Busy Road (DistRd)	The distance from the AA center to the nearest road with an average daytime traffic rate of at least 1 vehicle/ minute is:		Estimate this traffic rate threshold using your judgment and considering the road width, local population, distance to densely settled areas, alternate routes, and other factors.		
		<100 ft.	0	[AM,SBM,PD,PUv,STR]		
		100 to <300 ft.	0			
		300 to < 0.5 mile.	1			
		0.5 to <1 miles.	0			
		1 to 2 miles.	0			
		>2 miles.	0			
OF7	Size of Largest Nearby Patch of Perennial Cover (SizePerenn)	Including the AA's vegetated area, the largest patch or corridor that is **perennial cover** and is contiguous with vegetation in the AA (i.e., not separated by roads or channels that create gaps wider than 150 ft), occupies:		**Contiguous** -Abutting, with no major physical separation that prohibits free exchange or flow of surface water (i.e., not separated by roads or channels that create gaps wider than 150 ft)		
		<.01 acre.	0	**Perennial cover** - See OF1.		
		.01 to < 1 acre.	0			
		1 to <10 acres.	1	Disqualify any patch or corridor of perennial cover where it becomes separated from the AA by a gap of >150 ft, if the gap is comprised of unvegetated land or if the corridor narrows to less than 150 ft.		
		10 to <100 acres.	0			
		100 to <1000 acres.	0			
		1000 to 10,000 acres.	0	[AM,SBM,PD,POL,Sens,STR]		
		>10,000 acres.	0			
OF8	Wetland Type Local Uniqueness (UniqPatch)	**Select EACH** of the vegetation types below that comprise more than 10% of the AA AND less than 10% of a 0.5 mile radius around the AA. (See Column E).		This is a 2-part question: (1) if no vegetation class comprises more than 10% of the AA, answer "none of the above."		
		Herbaceous vegetation (perennial grasses, sedges, forbs; not under a woody canopy; not crops).	0			
		Unshaded shrubland (woody plants shorter than 20 ft).	0	(2) If a vegetation class does comprise more than 10%, determine if that vegetation class also comprises less than 10% of a 0.5 mile circle (~50 acres).		
		Trees (woody plants taller than 20 ft).	0	[INVv,AMv,WBFv,WBNv,SBMv,PDv,POLv,Sens]		
		None of above.	1			
OF9	Perennial Cover Percentage (PerCovPct)	Within a 2-mile radius of the AA center, the percentage of land that has **perennial cover** is:		**Perennial cover** - is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground is disturbed less than annually, such as hayfields, lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads.		
		<5% of the land.	0			
		5 to <20% of the land.	0			
		20 to <60% of the land.	1			
		60 to 90% of the land.	0			
		>90% of the land.	0	[FA,AM,SBM,POL,Sens,STR]	PerennAll	
OF10	Forest Percentage (ForestPct)	Within a 2-mile radius of the AA center, the cumulative amount of forest (regardless of **forest patch** sizes, and including any in the AA) is:		**Forested patch -** is a land cover patch that currently has >70% cover of woody plants taller than 20 ft. May be in a plantation.		
		<5% of the circle.	0	[FA,SBM,STR]		
		5 to <20%.	1			
		20 to <50%.	0			
		50 to 80%.	0			
		>80%.	0			
OF11	Herbaceous Open Land Percentage (OpenLpct)	Within a 2-mile radius of the AA center, the amount of **herbaceous openland** in **flat terrain** is:		**Herbaceous openland** - can include both perennial and non-perennial cover. For example, it can include pasture, herbaceous wetland, meadow, prairie, ryegrass fields, row crops, herbaceous rangeland, golf courses, grassed airports, and hayfields. Do not include open water of lakes, ponds, or rivers; or unvegetated surfaces; or areas with woody vegetation. **Flat terrain** - means slope of less than 5%. [WBF,WBN,POL]		
		<5% of the land.	0			
		5 to <20%.	1			
		20 to <50%.	0			
		50 to 80%.	0			
		>80%.	0			

OF12	Landscape Wetland Connectivity (ConnScapeW)	Within a 2-mile radius of the AA center:		**Corridor** - is simply an elongated patch of perennial cover that is not narrower than 150 ft at any point.		
		There are NO other wetlands.	0			
		There are other wetlands (or a wetland), but NONE are connected to the AA by a **corridor** of **perennial** vegetation. The corridor must be at least 150 ft wide along its entire length and not interrupted by roads with **regular traffic**.	0	**Regular traffic** - is at least 1 vehicle per hour during the daytime throughout most of the growing season. Assess this based on local knowledge, type of road, and proximity to developed areas.		
		There are other wetlands (or a wetland), and ALL are connected to the AA by the type of corridor described.	1			
		There are other wetlands (or a wetland), and ONE or MORE (but not all) are connected to the AA by the type of corridor described.	0	**Perennial** - see OF9 for definition. [WBN,SBM,Sens,STR]		
OF13	Local Wetland Connectivity (ConnLocalW)	Within a 0.5 mile radius of the AA center:		**Regular traffic** - is at least 1 vehicle per hour during the daytime throughout most of the growing season. Assess this based on local knowledge, type of road, and proximity to developed areas.		
		There are NO other wetlands.	0			
		There are other wetlands (or a wetland), but NONE are connected to the AA by a **corridor** of **perennial** vegetation. The corridor must be at least 150 ft wide along its entire length and not interrupted by roads with **regular traffic**.	0	**Perennial** - see OF9 for definition.		
		There are other wetlands (or a wetland), and ALL are connected to the AA by the type of corridor described.	1	IF possible, field verify		
		There are other wetlands (or a wetland), and ONE or MORE (but not all) are connected to the AA by the type of corridor described.	0	[AM,WBN,SBM,PD,Sens,STR]		
OF14	Wetland Number & Diversity Uniqueness (HUCbest)	According to the ORWAP Report, this AA is located in one of the HUCs that are listed as having a large diversity, area, or number of wetlands relative to the area of the HUC. **Select All of the following that are true:**		In the ORWAP Report, under the Watershed Information section and the HUC Best table, look at the columns "Is HUC Best?" and "Greatest Criteria Met."		
		Yes, for the HUC8 watershed	0	[AM,WBF,WBN,SBM,Sens]		
		Yes, for the HUC10 watershed	0			
		Yes, for the HUC12 watershed	0			
		None of above.	1			
		Data are inadequate (NWI mapping not completed in HUC).	0			
OF15	Landscape Functional Deficit (GISscore)	In the ORWAP Report, find the HUC 12 Functional Deficit table. **Select All functions below that have a notation for that HUC.**		In the ORWAP Report, under the Watershed Information section, look at the Functional Deficit table. Enter 1 for each of the listed functions that are noted.		
		Water storage (WS)	0			
		Sediment retention (SR)	0	These are HUCs in which a relatively small number, or proportional area, of the wetlands are likely to be performing the named function, thus adding value to those that are.		
		Nutrient transformation (NT)	0			
		Thermoregulation (WC)	0	See ORWAP's Technical Supplement for explanation of how the FuncDeficit was calculated.		
		Aquatic invertebrate habitat (INV)	0			
		Amphibian habitat (AM)	0	[WSv,WCv,SRv,PRv,INVv,FAv,AMv,WBNv]		
		Fish habitat (FH)	0			
		Waterbird habitat (WB)	1			
		None of above.	0			
		No data.	0			
OF16	Conservation Designations of the AA or Local Area (ConDesig)	On the ORWAP Map Viewer, use the layers indicated below to answer. **Select All of the following that are true**:		In the ORWAP Map Viewer, use the applicable layers.		
		(a)The AA is within or connected to a stream or other water body and this stream or water body has been designated as ESH within 0.5 miles of the AA, according to the **Essential Salmonid Habitat (ESH)** layer.	1	Include areas not shown as ESH, if ODFW has confirmed they qualify as ESH. [WCv, FA, FAv]		
		(b)The AA is within or contiguous to a designated **Oregon's Greatest Wetlands,** according to the map layer of that name.	0	Oregon's Greatest Wetlands identifies the most biologically and ecologically significant wetlands in the State of Oregon. [PU]		
		(c)The AA is within an **Important Bird Area (IBA)**, as officially designated, according to the map layer of that name.	0	[WBFv, WBNv]		
		None of above.	0			

OF17	Non-anadromous Fish Species of Conservation Concern (RareFR)	According to the ORWAP Report, the score for occurrences of rare non-anadromous fish species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include Miller Lake lamprey, Goose Lake lamprey, Pit sculpin, Lahontan cutthroat trout, Inland Columbia Basin redband trout, Steelhead (Snake River Basin ESU), Alvord chub, Goose Lake tui chub, Borax Lake chub, Lahontan redside, Oregon chub, Goose Lake sucker, Tahoe sucker, Warner sucker, Shortnose sucker, Lost River sucker. Note that for some of these species, only specific geographic populations are designated. [FRv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or ≥ 0.90 for this group's sum score), or there is a recent (within 5 years) onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.33 for both the maximum score this group's sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF18	Amphibian or Reptile of Conservation Concern (AmphRare)	According to the ORWAP Report, the score for occurrences of rare amphibian or reptile species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Black salamander, California slender salamander, Cope's giant salamander, Rocky Mountain tailed frog, Woodhouse's toad, Foothill yellow-legged frog, Northern leopard frog, Oregon spotted frog, Columbia spotted frog. [AMv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or >0.90 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	1			
		Low (≤ 0.21 for maximum score AND <0.15 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	0			
OF19	Feeding (Non-breeding) Waterbird Species of Conservation Concern (RareWBF)	According to the ORWAP Report, the score for occurrences of rare **non-breeding** (feeding) waterbird species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. **Non-breeding** - mainly refers to waterbird feeding during migration and winter. California brown pelican, Aleutian cackling goose, Dusky Canada goose [WBFv] This question may need to revised after the field visit.		
		High (≥ 0.33 for maximum score, or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Low (< 0.33 for maximum score and for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF20	Nesting Waterbird Species of Conservation Concern (RareWBN)	According to the ORWAP Report, the score for occurrences of rare nesting waterbird species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Horned grebe, Red-necked grebe, Western grebe, Clark's grebe, American white pelican, Least bittern, Snowy egret, Trumpeter swan, White-faced ibis, Harlequin duck, Bufflehead, Yellow rail, Western snowy plover, Upland sandpiper, Franklin's gull, Marbled murrelet. [WBNv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or ≥1.00 for this group's sum score), or there is a recent breeding-season observation of any of these species onsite by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.09 for maximum score and for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species during breeding season by a qualified observer under conditions similar to what now occur.	1			
OF21	Songbird, Raptor, Mammal Species of Conservation Concern (RareSBM)	According to the ORWAP Report, the score for occurrences of rare songbird, raptor, or mammal species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Bald eagle, American peregrine falcon, Arctic peregrine falcon, Greater sage-grouse, Columbian sharp-tailed grouse, Yellow-billed cuckoo, Northern spotted owl, Short-eared owl, Black swift, Lewis's woodpecker, Purple martin, Northern waterthrush, Bobolink, Tricolored blackbird, Fringed myotis, Spotted bat, Townsend's big-eared bat, Pallid bat, Northern sea lion, Fisher, Sea otter, Canada lynx, Columbian white-tailed deer. [SBMv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or >1.13 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.09 for maximum score AND <0.13 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF22	Invertebrate Species of Conservation Concern (RareInvert)	According to the ORWAP Report, the score for occurrences of rare invertebrate species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. See the Supp_Info file's RareAnimals worksheet for list of species addressed by this question. [INVv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or for this group's sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Low (< 0.75 for maximum score AND for this group's sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			

OF23	Plant Species of Conservation Concern (RarePspp)	According to the ORWAP Report, the score for occurrences of rare wetland-indicator plant species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See the Supp_Info's RareWetPlants worksheet for list of species addressed by this question. [PDv,POLv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or > 4.00 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.12 for maximum score AND < 0.20 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF24	River Proximity (RiverProx)	There is a nontidal river within 1 mile and it is adjacent to, OR downslope from, the AA (connected or not). **Enter 1, if true. If not, SKIP to OF27.**	0	**River** - as used here is a channel wider than 50 ft between its banks. In the ORWAP Map Viewer, use the National Hydrography Dataset - Flowline layer (expand Hydrology).[WSv]	NearRiver	
OF25	Floodable Property (FloodProp)	**Select ONE** of the below:		**Row crops** - do not include pasture or other perennial cover. In the ORWAP Map Viewer, use the Floodplain layers. Also, the Seasonal Nontidal Wetland layer (expand Wetlands/National Wetlands Inventory) may indicate some floodplain areas. [WSv] Supplement with field observations at multiple seasons, if possible.		
		Floodplain boundaries within 1 mile downslope or downriver from the AA have not been mapped. **Enter 1 and SKIP TO OF27.**	0			
		Floodplain boundaries within 1 mile downslope from the AA have been mapped BUT there is neither infrastructure nor **row crops** vulnerable to river flooding located within the floodplain and within that distance. **Enter 1 and SKIP TO OF27.**	0			
		Floodplain boundaries have been mapped AND infrastructure or **row crops** are present within 1 mile downslope or downriver and those are not protected from 100-year floods, but actual damage has not been documented.	0			
		Damage to infrastructure or row crops from river flooding has been documented within that distance.	0			
OF26	Type of Flood Damage (DamageType)	The greatest financial damage in the floodplain is (or would be) to:		**Row crops** - do not include pasture or other perennial cover. On the ORWAP Map Viewer, use the Floodplain layers [WSv]		
		Buildings, roads, bridges.	0			
		Row crops (during some years).	0			
OF27	Hydrologic Landscape (Arid)	According to the ORWAP Report, the wetland is in a hydrologic landscape unit classified as:		In the ORWAP Report, under the Location Information table, find the Hydrologic Landscape Class. [AM, AMv, WBNv, SBMv, OE, Sens]		
		Arid.	0			
		Semi-arid.	0			
		Dry.	0			
		Moist.	0			
		Wet.	1			
		Very Wet.	0			
OF28	Input Water - Recognized Quality Issues (WQin)	According to ORWAP Map Viewer's Water Quality Streams layer and Water Quality Lakes layers, ALL of the following are true: **(a)** within 1 mile upstream from the AA edge, a water body or stream reach is labeled as being 303d, Water Quality Limited (categories 3B-5); Potential Concer; or TMDL Approved AND **(b)** the problem concerns one or more of the parameters listed below. **Select All that apply**.		Use the ORWAP Map Viewer's Water Quality Streams layer and the Water Quality Lakes layer (expand Water Quality and Quanity) and the Distance tool. Use the Identy tool to determine the reason for the listings. If the AA receives both inflow and outflow from river flooding, consider the polluted water to be both "upstream" and "downstream". [SRv,PRv,INV,FA,FR,AM,WBF,WBN,STR] This may need to be verified in the field.		
		Total suspended solids (TSS), sedimentation, or turbidity.	0			
		Phosphorus, chlorophyll-a, or algae.	0			
		Nitrates, ammonia, chlorophyll-a, or algae.	0			
		Petrochemicals, heavy metals (iron, manganese, lead, zinc, etc.), other toxins.	0			
		Temperature or dissolved oxygen.	0			
		None of above, or no data. **If true, enter 1 and SKIP to OF30.**	1		NoDataWQup	
OF29	Duration of Connection Beween Problem Area & the AA (ConnecUp)	The upstream problem area mentioned above (OF28) has a surface water connection to the AA:		In the ORWAP Map Viewer, use the National Hydography Dataset (expand Hydrology) and the Persistent, Seasonal, or Saturated nontidal layers (expand Wetlands/National Wetlands Inventory) to determine duration of surface water connection. [SRv,PRv,INV,FA,FR,AM,WBF,WBN,STR] This may need to be determined or verified in the field.		
		For 9 or more continuous months annually.	0			
		Intermittently (at least once annually, but for less than 9 months continually).	0			
		Never (or less than annually).	0			
OF30	Downslope Water Quality Issues (ContamDown)	According to ORWAP Map Viewer's Water Quality Streams layer and Water Quality Lakes layer, ALL of the following are true: (**a**) within 1 mile downhill or downstream from the AA's edge, a water body is labeled as being 303d, Water Quality Limited (categories 3B-5); Potential Concern; or TMDL Approved AND **(b)** the problem concerns one or more of the parameters listed below. **Select All that apply**.		Use the ORWAP Map Viewer's Water Quality Streams layer and the Water Quality Lakes layer (expand Water Quality and Quanity) and the Distance tool. Use the Identy tool to determine the reason for the listings. [WCv,SRv,PRv,FA]		
		Total suspended solids (TSS), sedimentation, or turbidity.	0			
		Phosphorus, chlorophyll-a, or algae.	0			
		Nitrates, ammonia, chlorophyll-a, or algae.	0			
		Petrochemicals, heavy metals (iron, manganese, lead, zinc, etc.), other toxins.	0			
		Temperature or dissolved oxygen.	0			
		None of above, or no data. **Enter 1 and SKIP to OF32.**	1		NoDataWQdo	
OF31	Duration of Connection Beween AA & Water Quality Problem Area (ConnDown)	The connection between the downstream problem area mentioned above (OF30) and the AA:		In the ORWAP Map Viewer, use the National Hydography Dataset (expand Hydrology) and the Persistent, Seasonal, or Saturated nontidal layers (expand Wetlands/National Wetlands Inventory) to determine duration of surface water connection. [WCv,SRv,PRv,FA]		
		Is a stream or water body that connects these areas for 9 or more continuous months annually.	0			
		Is a stream or water body that connects these areas intermittently (at least once annually, but for less than 9 months continually).	0			

		Is a probable groundwater connection, or connection via direct runoff only (no channel connection).	0	This may need to be determined or verified in the field.		
		Never exists (a topographic ridge probably prevents all the AA's runoff and groundwater from reaching the problem area).	0			
OF32	Drinking Water Source (DEQ) (DWsource)	According to ORWAP Map Viewer's Surface Water Drinking Water Source Areas layer and the Ground Water Drinking Water Source Areas layer, the AA is within:		In the ORWAP Map Viewer, use the water source layers (expand Water Quality and Quantity). [NRv]		
		The source area for a surface-water drinking water (DW) source.	0			
		The source area for a groundwater drinking water source.	0			
		Neither of above.	1			
OF33	Groundwater Risk Designations (GWrisk)	According to ORWAP Map Viewer's Groundwater Management Areas layer and the Sole Source Aquifer layer, the AA is: **Select All that apply**		In the ORWAP Map Viewer, use the DEQ Groundwater Management Areas layer and the Sole source Aquifer layer (expand Water Quality and Quantity). [NRv]		
		Within a designated Groundwater Management Area (ODEQ).	0			
		Within a designated Sole Source Aquifer area (EPA): the North Florence Dunal Aquifer.	0			
		Neither of above.	1			
OF34	Relative Elevation in Watershed (Elev)	In the ORWAP Map Viewer, based on the Hydrologic Boundaries 4th Level (HUC 8) layer (expand Hydrology), determine if the AA is: (See Column E)		1) Consider which end of the HUC is the bottom. Where streams join, the "V" that they form on the map points towards the bottom of the HUC. 2) If the AA is closer to the HUC's outlet than to its upper end, and is closer to the river or large stream that exits at the bottom of the HUC than it is to the boundary (margin) of the HUC, then check "lower 1/3" If not near that river, check "middle 1/3". 3) If the AA is not in a 100-yr floodplain, is closer to the HUC upper end than to its outlet, and is closer to the boundary (margin) of the HUC than to the river or large stream that exits at the bottom of the HUC, then check "upper 1/3" 4) For all other conditions, check "middle 1/3". [WSv, PRv, FA, FR, WCv, OF, Seps, SRv]		
		In the upper one-third of its watershed.	0			
		In the middle one-third of its watershed.	0			
		In the lower one-third of its watershed.	1		LowerShed	
OF35	Runoff Contributing Area (RCA) - Wetland as % of (WetPctRCA)	Delimit the wetland's Runoff Contributing Area (RCA) using a topographic base map. The area of the AA's wetland is:	W	See the ORWAP Manual for specific protocol for delimiting the RCA (Section 4.1 Step 5). The RCA includes only the areas that potentially drain directly to the AA's wetland rather than to channels that flow or flood into that wetland. Exact precision in drawing the boundary is not required. [WS, WSv, SR, SRv, PR, PRv, WCv]		
		<1% of its RCA.	0			
		1 to <10% of its RCA.	0			
		10 to 100% of its RCA.	1			
		Larger than the area of its RCA. **Enter 1 and SKIP TO OF39.**	0		NoRCA	

OF36	Unvegetated % in the RCA (ImpervRCA)	The proportion of the RCA comprised of buildings, roads, parking lots, exposed bedrock, and other surface that is usually unvegetated at the time of peak annual runoff is about:	W	In the ORWAP Map Viewer, use an Aerial layer to determine the proportion of the RCA comprised of buildings, roads, parking lots, exposed bedrock, and other surfaces that are usually unvegetated at the time of peak annual runoff. [WSv,WCv,SRv,PRv,INV,FA,Sens,STR]		
		<10%.	1			
		10 to 25%.	0			
		>25%.	0			
OF37	Transport From Upslope (TransRCA)	A relatively large proportion of the precipitation that falls farther upslope in the RCA reaches this wetland quickly as indicated by the following: **(a)** RCA slopes are steep, and/or **(b)** upslope wetlands historically present have been filled or drained extensively, and/or **(c)** land cover is mostly non-forest, and/or **(d)** most RCA soils are shallow. This statement is:	W	Refer to aerial imagery and/or consult local sources. See the ORWAP Manual for instructions. [WSv,SRv,PRv,STR]		
		Mostly true.	0			
		Somewhat true.	0			
		Mostly untrue.	1			
OF38	Upslope Soil Erodibility Risk (ErodeUp)	Use the ORWAP Report or the Map Viewer to determine if the erosion hazard rating of the soil within 200 ft away and upslope of the AA is:		If the soil unit is the same as the AA, the Erosion Hazard can be obtained from the ORWAP Report's Soil Information section. If the soil unit is different than the AA, use ORWAP Map Viewer's Oregon Soil layer and see the ORWAP Manual for instructions on how to determine the erosion hazard rating. [SRv,PRv,STR]		
		Slight.	0			
		Moderate.	0			
		Severe.	0			
		Very severe.	0			
		Could not determine.	0			
OF39	Streamflow Contributing Area (SCA) - Wetland as % of (WetPctSCA)	Delimit (or visualize, for large river basins) the wetland's Streamflow Contributing Area (SCA) using a topographic base map. The area of the AA's wetland is:	W	See the ORWP Manual for specific protocol for delimiting the SCA (section 4.1, Step 6). The SCA is all upland areas that drain into streams, rivers, and lakes that feed the AA's wetland either directly or during semi-annual floods. In addition, for wetlands intercepted by a mapped stream, the SCA can be delineated automatically and its area reported at this USGS web site: https://streamstats.usgs.gov/ss/. Enter the coordinates, select Oregon, select Delineate, zoom to level 15 or finer, and click on a stream.		
		<1% of its SCA, or wetland is in the floodplain of a major river.	0			
		1 to <10% of its SCA.	0			
		10 to 100% of its SCA.	0			
		Larger than the area of its SCA. **Enter 1 and SKIP TO OF41.**	0		NoSCA1	
		Wetland lacks tributaries and receives no overbank water. **Enter 1 and SKIP to OF41.**	1		NoSCA	
OF40	Unvegetated % in the SCA (ImpervSCA)	The proportion of the SCA comprised of buildings, roads, parking lots, exposed bedrock, and other surface that is usually unvegetated at the time of peak annual runoff is about :	W	See the ORWAP Manual for instructions. [WCv,SRv,PRv,FA,STR]		
		<10%.	0			
		10 to 25%.	0			
		>25%.	0			
OF41	Upland Edge Shape Complexity (EdgeShape)	Most of the edge between the AA's wetland and upland is **(select one)**:	W	See ORWAP Manual for instructions and illustrations. [NR, SBM, Sens]		
		Linear: a significant proportion of the wetland's upland edge is straight, as in wetlands bounded partly or wholly by dikes or roads, or the AA is entirely surrounded by water or other wetlands.	0			
		Intermediate: Wetland's shape is (a) ovoid, or (b) mildly ragged edge, and/or (c) contains a lesser amount of artificially straight edge.	1			
		Convoluted: Wetland perimeter is many times longer than maximum width of the wetland, with many alcoves and indentations ("fingers").	0			
OF42	Zoning (Zoning)	According to ORWAP Map Viewer's Zoning layer, the dominant zoned land use designation for currently undeveloped parcels upslope from the AA and within 300 ft. of its upland edge is:		See the ORWAP Manual for instructions on how to determine the zoning designation. If information is not provided, check local zoning maps. [WSv,WCv,SRv,PRv,INVv,FAv,FRv,AMv,WBFv,WBNv,SBMv,PDv,POLv,PUv]		
		Development (Commercial, Industrial, Urban Residential, etc.), or no undeveloped parcels exist upslope from the AA.	1			
		Agriculture or Rural Residential.	0			
		Forest or Open Space, or entirely public lands.	0			
		Not zoned, or no information.	0			

OF43	Growing Degree Days (GDD)	According to ORWAP Map Viewer's Growing Degree Days layer, the long term normal Growing Degree Days category at the approximate location of the AA is:		See the ORWAP Manual for instructions on how to determine the growing degree days category. [NR, FR, AM, WBN, SBM, WCv, OE, CS, Sens]		
		<256.	0			
		256 - 1020.	0			
		1021-1785.	0			
		1786 - 2550.	0			
		2551 - 3315.	1			
		3316 - 4079.	0			
		> 4079.	0			

Date: Nov. 16, 2021	Name: P.Scoles	Site: Portland Golf Club-Sediment Placement	
Form F Field Data (nontidal Wetlands) ORWAP V 3.2	Conduct an assessment only after reading the accompanying Manual and explanations in column E below. **For each affirmative answer, change the 0 in the "Data" column to a "1".** Answer all items except where directed to skip to others. Questions whose cells in "Data" column have a **"W" MUST be answered for the ENTIRE wetland and bordering waters.**	For a list of functions to which each question pertains, see bracketed codes in column E. Codes for functions and their benefits are: WS= Water Storage, WC= Water Cooling, SR= Sediment Retention, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Export, INV= Invertebrates, FA= Anadromous Fish, FR= Resident Fish, AM= Amphibians, WBF= Feeding Waterbirds, WBN= Nesting Waterbirds, SBM= Songbirds, Mammals, & Raptors, POL= Pollinators, PH= Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sens= Sensitivity, STR= Stressors.	For guidance and detailed descriptions of how Excel calculates the numbers in the Scores worksheet, see the Technical Supplement and Appendix C of the accompanying Manual. For a documented rationale for each indicator, open each of the worksheet tabs at the bottom (one for each function or value) and see column H.

#	Indicators	Condition Choices	Data	Explanations, Definitions (Column E)	Cell Name	Comments
F1	Tidal Wetland (Tidal)	This is a tidal wetland (either freshwater or saltwater). **If yes, GO TO worksheet " T ".** Do not enter any data here. **If nontidal, continue with F2.**		**Tidal wetland -** a wetland that receives tidal water at least once during a normal year, regardless of salinity, and dominated by emergent or woody vegetation. Tidal flooding occurs on a 6-hour cycle DURING THE TIME it is flooded by tide, which may be as infreuent as once per year. If NWI map shows the wetland with a code beginning with E (for estuarine), assume the wetland to be tidal. However, some wetlands lacking that code are also tidal.		
F2	Ponded Condition (Lentic)	At least once every 2 years, some part of the AA contains a cumulative total of >900 sq.ft. of surface water that is ponded. The water persists for >6 days and may be hidden beneath emergent vegetation or scattered in small pools. **Enter 1, if true.**	1	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). [AM,WBF,WBN]	Lentic	
Reminder: For all questions, the AA should include all persistent waters in ponds smaller than 20 acres that are **adjacent** to the AA. The AA should also include part of the water area of adjacent lakes or rivers larger than 20 acres -- specifically, the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone.				**Adjacent** - is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.		
F3	Water Regime (Hydropd)	The water regime (hydroperiod) of the most permanent (usually deepest) part of the AA is: **Select only ONE.** [To meet any of the definitions other than Ephemeral, there must be >100 sq ft of surface water for the duration described, otherwise mark the type listed above it.]		In the NRCS county soil survey, the Water Features table provides information about periods of flooding, ponding, and highwater table depths. Descriptions of the soil units may include information on saturation persistence. Also consider the hydroperiod label on NWI wetland polygons. [WS, FA, FR, WBN, WBF, WC]		
		Ephemeral. Surface water in the wettest part of the AA is present for fewer than 7 consecutive days during an average growing season. Includes some of the areas mapped as Saturated Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F25.**	0		NeverWater	
		Temporary. Surface water present for 1-4 weeks consecutively during an average growing season, OR if persists for longer, it is almost entirely in scattered pools, each smaller than 1 sq.m. Dries up completely during part of most average years. Includes some of the areas mapped as Saturated Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F25.**	0		TempWet	
		Seasonal. Surface water present for 5-17 weeks (1-4 months) consecutively during an average growing season, but dries up completely during part of most average years. Includes some of the areas mapped as Seasonal Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F5.**	1		ShallowType	
		Semi-Persistent. Surface water present for more than 17 weeks (4 months) consecutively during an average growing season, but dries up completely during part of most average years. Includes some of the areas mapped as Seasonal Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F5.**	0		DeepType	
		Permanent. Does not dry up completely during most average years. Includes some of the areas mapped as Persistent Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and continue.**	0	**Permanent** - usually has significant groundwater input, higher conductivity, less annual water level fluctuation. No woody vegetation in most persistently flooded parts. Often with extensive open water and subsurface aquatic plants.	PermType	

F4	Flooded Persistently - % of AA (PermW)	Identify the parts of the AA that still contain surface water even during the **driest times of a normal year** . At that time, the percentage of the AA that still contains surface water is:		**driest times of a normal year -** i.e., when the AA's surface water is at its lowest annual level. Sites fed by unregulated streams that descend on north-facing slopes, tend to remain wet longer into the summer. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [WS,PR,NR,CS,INV,FR,AM,WBF,WBN]		
		1 to <25% of the AA.	1			
		25 to <50% of the AA.	0			
		50 to 95% of the AA.	0			
		>95% of the AA.	0		AllPermWater	
F5	Depth Class (Predominant) (DepthDom)	When water is present in the AA, the depth most of the time in most of inundated area is: [Note: NOT necessarily the maximum spatial or annual depth]		This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the AA is brief, the answer will be based on the depth of the most persistently inundated part of the AA. Include surface water in channels and ditches as well as ponded areas. In the ORWAP Manual, se the diagram in Appendix B. [WC,SR,PR,CS,OE,INV,FA,FR,WBF,WBN,PD,Sens]		
		>0 to <0.5 ft.	1			
		0.5 to < 1 ft deep.	0			
		1 to <3 ft deep.	0			
		3 to 6 ft deep.	0			
		>6 ft deep.	0			
F6	Depth Class Distribution (DepthEven)	Within the area described above, and during most of the time when surface water is present, the water area has: **Select only one.**		Estimate these proportions by considering the gradient and microtopography of the site. In the ORWAP Manual, see the diagram in Appendix B. [INV,FR,WBF,WBN,PD]		
		One depth class covering >90% of the AA's inundated area (use the classes in the question above).	0			
		One depth class covering 51-90% of the AA's inundated area (use the classes in the question above).	0			
		Neither of above. There are 3 or more depth classes and none occupy >50%.	1			
F7	Emergent Plants -- Area (EmArea)	Consider just the area that has surface water for >1 week during the growing season. Herbaceous plants (not moss, not woody) whose foliage extends above a water surface in this area (i.e., emergents) cumulatively occupy an annual maximum of:	W	If multiple small patches are separated by less than 150 ft, they may be combined when evaluating this question. [SR,PR,OE,INV,FR,WBF,WBN,SBM,PD]		
		<0.01 acre (< 400 sq.ft). **Enter 1 and SKIP TO F10,** unless only part of a wetland is being assessed.	0		NoEm	
		0.01 to < 0.10 acres (3,920 sq. ft).	1			
		0.10 to <0.50 acres (21,340 sq. ft).	0			
		0.50 to <5 acres.	0			
		5 to 50 acres.	0			
		>50 acres.	0			
F8	% Emergent Plants (EmPct)	Emergent plants occupy an annual maximum of:		[WC,SR,PR,NR,CS,OE,INV,PD,FA,FR,AM,WBF,WBN,SBM]		
		<5% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		5 to <30% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		30 to <60% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		60 to 95% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		>95% of the parts of the AA that are inundated for >7 days at some time of the year.	1			
F9	Cattail or Tall Bulrush Cover (Cttail)	The percentage of the emergent vegetation cover in the AA that is cattail (*Typha* spp.) or tall bulrush is:		[WBN, SBM]		
		<1% of the emergent vegetation, or cattail and bulrush are absent.	1			
		1 to <25% of the emergent vegetation.	0			
		25 to 75% of the emergent vegetation.	0			
		>75%, of the emergent vegetation.	0			

F10	Water Shading by AA's Woody Vegetation - Driest (WoodyDryShade)	During an average growing season, when water levels are lowest (but surface water still occupies >400 sq ft or >1% of the AA), the percentage of the remaining surface water within the AA that is shaded by trees and/or shrubs located within the AA is:		[WC,FA,WBN,SBM]		
		<5% of the water, and fewer than 10 woody plants taller than 3 ft shade it, or all surface water is flowing.	1			
		<5% of the water, but more than 10 woody plants taller than 3 ft shade it.	0			
		5 to <25% of the water.	0			
		25 to <50% of the water.	0			
		50 to 95% of the water.	0			
		>95% of the water.	0			
F11	Open Water - Extent	During most of the growing season, the largest patch of **open water** that is in or adjacent to the AA is >1 acre and mostly deeper than 1 ft. **Enter 1, if true.**	0	**Open Water** - is surface water of any depth that contains no emergent herbaceous or woody vegetation (may contain floating-leaved or completely submersed plants). It may be partially	OpenW	
F12	All **Ponded** Water as Percentage - Wettest (PondWpctWet)	When water levels are highest, during a normal year, the surface water that is **ponded** continually for >6 days occupies:		**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle).		
		<1% or none of the AA. Surface water is completely or nearly absent then, or is entirely flowing. **Enter 1 and SKIP TO F22.**	0		NoPond	
		1 to <5% of the AA.	1	[WS,WC,CS,OE,INV,AM,WBF,WBN]		
		5 to <30% of the AA.	0			
		30 to <70% of the AA.	0			
		70 to 95% of the AA.	0			
		>95% of the AA.	0			
F13	Ponded Open Water Area - Wettest (OWareaWet)	When water levels are highest, during a normal year, the AA's **ponded open water** occupies a cumulative area of:	W	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle).		
		<0.10 acre (< 4356 sq. ft) of the AA and adjacent ponded waters. **Enter 1 and SKIP TO F16.**	1		NoPondOW	
		0.10 to <0.50 acres (21,340 sq. ft) of the AA and adjacent ponded waters.	0	**Open water -** is surface water of any depth that contains no emergent herbaceous or wood vegetation (may contain floating-leaved or completely submersed species). It may be partially shaded by a tree canopy.		
		0.50 to <1 acres of the AA and adjacent ponded waters.	0			
		1 to <5 acres of the AA and adjacent ponded waters.	0			
		5 to <50 acres of the AA and adjacent ponded waters.	0			
		50 to <640 acres (1 sq. mi) of the AA and adjacent ponded waters.	0	[WS,WBF]		
		640 to <1000 acres of the AA and adjacent ponded waters.	0			
		1000 to <2500 acres of the AA and adjacent ponded waters.	0			
		>2500 acres (>4 sq.mi) of the AA and adjacent ponded waters.	0			
F14	Ponded Open Water **Distribution** - Wettest (WaterMixWet)	When water levels are highest, during a normal year, the distribution (in aerial view) of ponded open water patches larger than 0.01 acre (400 sq. ft) within the AA is (must meet both a and b criteria):		[NR,AM,WBF,WBN,PD,SBM]		
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) **AND (b)** There are many small patches of open water scattered widely within vegetation or many small vegetation clump "islands" scattered widely within open water. Typical (for example) of some extensive bulrush and cattail marshes.	0			
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) **AND (b)** There are only **a** few (or no) small patches of open water scattered widely within vegetation or a few small vegetation clump "islands" scattered widely within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) **AND (b)** There are several small patches of open water scattered within vegetation or several small vegetation clump "islands" scattered within open	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) **AND (b)** Open water is mostly in a single area (e.g., center of the wetland) and vegetation is in the rest (e.g., periphery), with almost no intermixing. (Typical of many ponds excavated for livestock watering, stormwater treatment, mineral extraction as well as many wetlands that are inundated only temporarily each year)	0			
F15	Width of Vegetated Zone - Wettest (WidthWet)	When water levels are highest, during a normal year, the width of the **vegetated wetland** that separates the largest patch of open water within or bordering the AA from the closest adjacent uplands, is predominantly: [Note: This is not asking for the maximum width.]		**Vegetated wetland** - in this case does not include underwater or floating-leaved plants, i.e., aquatic bed. In farmed wetlands that have different crops from year to year, consider vegetation condition as it probably existed during most of the past 5 years.		
		<5 ft, or no vegetation between upland and open water.	0			
		5 to <30 ft.	0	If open water exists as many patches, use the distance between the majority of those patches and uplands.		
		30 to <50 ft.	0			
		50 to <100 ft.	0	[WC,SR,PR,NR,CS,OE,AM,WBF,WBN,SBM,PD,Sens,EC]		
		100 to 300 ft.	0			
		> 300 ft.	0			

F16	All Ponded Water as a Percentage (Driest) (PondWpctDry)	When water levels are lowest during a normal year, but surface water still occupies >1,076 sq feet (100 sq meter) OR >1% of the AA (whichever is more), the water that is **ponded** (either visible or concealed by vegetation) in the AA		**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). [WC,FA,FR,AM,WBN,Sens]		
		<1% or none. Surface water is completely or nearly absent then, or is entirely flowing. **Enter 1 and SKIP TO F22.**	1		NoPond2	
		1 to <5% of the AA.	0			
		5 to <30% of the AA.	0			
		30 to <70% of the AA.	0			
		70 to 95% of the AA.	0			
		>95% of the AA.	0			
F17	Ponded Open Water **Area** (Driest) (OWareaDry)	When water levels are lowest during a normal year, the AA's **ponded open water** occupies a cumulative area, including adjacent ponded waters, of:	W	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). **Open water -** is surface water of any depth that contains no emergent herbaceous or wood vegetation (may contain floating-leaved or completely submersed species). It may be partially shaded by a tree canopy. [WBN,PUv]		
		<0.10 acre (< 4356 sq. ft). **Enter 1 and SKIP TO F24.**	0		NoPondOW2	
		0.10 to <0.50 acres (21,340 sq. ft).	0			
		0.50 to <1 acres.	0			
		1- 4 acres.	0			
		5 to <50 acres.	0			
		50 to <640 acres (1 sq. mi).	0			
		640 to <1000 acres.	0			
		1000 to 2500 acres.	0			
		>2500 acres (>4 sq.mi).	0			
F18	Ponded Open Water Distribution - (Driest) (WaterMixDry)	When water levels are lowest, during a normal year, the distribution of ponded open water patches larger than 0.01 acre (400 sq. ft) within the AA is:		[NR,INV,AM,WBN]		
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) AND **(b)** There are many small patches of open water scattered widely within vegetation or many small vegetation clump "islands" scattered widely within open water. Typical (for example) of some extensive bulrush and cattail marshes.	0			
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) AND **(b)** There are only a few (or no) small patches of open water scattered widely within vegetation or a few small vegetation clump "islands" scattered widely within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) AND **(b)** There are several small patches of open water scattered within vegetation or several small vegetation clump "islands" scattered within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) AND **(b)** Open water is mostly in a single area (e.g., center of the wetland) and vegetation is in the rest (e.g., periphery), with almost no intermixing. Typical of many ponds excavated for livestock watering, stormwater treatment, mineral extraction as well as many wetlands that are inundated only temporarily each year.	0			
F19	Floating Algae & Duckweed (Algae)	At some time of the year, most of the AA's otherwise-unshaded water surface is covered by floating mats of algae, or small (<1 inch) floating plants such as duckweed, *Azolla*, *Wolffia*, or *Riccia*. **Enter 1, if true.**	0	This includes most nontidal wetlands labeled as Aquatic Bed (AB) on NWI maps. If wetland can be visited only during winter, it may not be possible to answer this question with much certainty unless local sources are contacted or indicators (e.g., dried remains of algae) are		
F20	Floating-leaved & Submerged Aquatic Vegetation (SAV)	**SAV** (submerged & floating-leaved aquatic vegetation, excluding the species listed above) occupies an annual maximum of:		**SAV** - are herbaceous plants that characteristically grow at or below the water surface, i.e., whose leaves are primarily and characteristically under or on the water surface during most of the part of the growing season when surface water is present. Some species are rooted in the sediment whereas others are not. If pond lily (*Nuphar*) is the predominant species, consider its maximum extent only during the period when surface water is present beneath the leaves. [PR,OE,INV,FR,AM,WBF,WBN]		
		none, or <5% of the water area.	0		NoSAV	
		5 to <25% of the water area.	0			
		25 to <50% of the water area.	0			
		50 to 95% of the water area.	0			
		>95% of the water area.	0			
		many SAV plants present, but impossible to select from the above categories.	0			
F21	Width of Vegetated Zone (Driest) (WidthDry)	When water levels are lowest, during a normal year, but surface water still occupies >400 sq feet or >1% of the AA (which ever is more), the width of the v**egetated wetland** that separates the largest patch of open water within or bordering the AA from the closest adjacent uplands, is predominantly:		Measure the width perpendicular to the open water part. **Vegetated wetland -** in this case does not include underwater or floating-leaved plants, i.e., aquatic bed. In farmed wetlands that have different crops from year to year, consider vegetation condition as it probably existed during most of the past 5 years. Note: For most sites larger than 1 acre and with persistent water, measure the width using aerial imagery rather than estimating in the field. [WBN]		
		<5 ft, or no vegetation between upland and open water.	0			
		5 to <30 ft.	0			
		30 to <50 ft.	0			
		50 to <100 ft.	0			
		100 to 300 ft.	0			
		> 300 ft.	0			

F22	Beaver (Beaver)	Use of the AA by beaver during the past 5 years is: **Select most applicable ONE.**		**Valley width** - is delimited by an abrupt increase in slope on both sides of the channel.		
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, or lodges.	0	[AM,WBN,SBM,PD,Sens]		
		Very likely based on known occurrence in this part of the region and proximity to ALL of the following **(a)** a persistent freshwater wetland, pond, or lake, or a perennial low-gradient (<5%) channel, and **(b)** average valley width is > 150 ft and **(c)** >20% cumulative cover of aspen, cottonwood, alder, and willow in vegetated areas within 150 ft of the AA's edge. Or there is evidence of beaver just outside the AA.	0			
		Somewhat likely based on known occurrence in this part of the region and proximity to ALL of the following **(a)** a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and **(b)** average valley width is >50 ft, and **(c)** >20% cumulative cover of hardwood trees and shrubs in vegetated areas within 150 ft of the AA's	0			
		Unlikely because site characteristics above are deficient, and/or this is an area where beaver are routinely removed. But beaver occur within 2 miles.	0			
		None. Beaver are absent from this part of the region.	0			
F23	Isolated Island (Island)	During June, the wetland contains (or is part of) an island that is isolated from the shore by water depths >3 ft. The island may be solid, or it may be a floating vegetation mat suitable for nesting waterbirds. The island must be larger than 400 sq.ft and without inhabited buildings. **Enter 1, if true.**	0	[WBF,WBN]		
F24	Ice-free (IceDura)	During most years, most of the AA's surface water (if any) does **not** freeze, or freezes for fewer than 4 continuous weeks. **Enter 1, if true.**	1	[PR,FR,WBF]		

F25	Water Fluctuation Range - Maximum (Fluctu)	The **maximum vertical fluctuation** in surface water within the AA, during a normal year is:		**maximum vertical fluctuation** - is the difference between the highest annual and lowest annual water level during an average year. Use field indicators to assess this indicator. [WS,SR,PR,NR,CS,OE,INV,AM,WBN,PD]		
		<0.5 ft or stable.	1			
		0.5 to < 1 ft.	0			
		1 to <3 ft.	0			
		3 to 6 ft.	0			
		>6 ft.	0			
F26	% Only Saturated or Seasonally Flooded (SeasPct)	Identify the parts (if any) of the AA that never contain surface water (only saturated soil) or where the water (either ponded or flowing) usually remains on the land surface for less than the entire growing season. The percentage of the AA containing such areas is:		If you can identify plants, use their wetland indicator status to infer the possible extent of seasonal-only inundation within a wetland. Vegetation may be patterned in concentric or parallel zones, as one moves outward & away from the deepest part of the wetland or channel. Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) may be evident when not fully inundated. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualizing where that would intercept the land along the river. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. Although useful only as a general guide, the NRCS county soil survey descriptions of the soil units and water feature table usually includes information on flooding frequency and saturation persistence. [SR,NR,CS,OE,INV,FA,WBF,WBN,POI, SBM,PD,Sens,EC]		
		<5% of the AA, or none (i.e., all water persists for >4 months).	0		NoSeasonal	
		5 to <25% of the AA.	0			
		25 to <50% of the AA.	0			
		50 to 75% of the AA.	0			
		>75% of the AA.	1			
F27	Salinity, Alkalinity, Conductance (Salin)	The AA's surface water is mostly:		Saline or brackish conditions are commonly indicated by a prevalence of particular plant species. Consult the ORWAP SuppInfo file's P_Salt worksheetfor a list of these. **Brackish or saline** - conductance of >5000 µS/cm, or >3200 ppm TDS **Slightly brackish** - conductance of 500- 5000 µS/cm, or 320 - 3200 ppm TDS **Fresh** - conductance of < 500 µS/cm, or <320 ppm TDS [PR,CS,AM]		
		Brackish or saline. Plants that indicate saline conditions dominate the vegetation. Salt crust may be obvious around the perimeter and on flats.	0			
		Slightly brackish. Plants that indicate saline conditions are common. Salt crust may or may not be present along	0			
		Fresh. [Note: *Assume this to be the condition unless wetland is known to be a playa or there is other contradicting evidence].*	1		FreshW	
		Unknown.	0			
F28	Fish & Waterborne Pests (FishAcc)	**Select All that apply**:		[INV,FA,FR,AM,WBF]		
		A regularly-used boat dock is present within or contiguous to the AA.	0			
		A regularly-used boat dock is not within the AA, but there is one within 300 ft. of the AA and there is a persistent surface connection between the dock and the AA.	0			
		Fish (native or stocked) are known to be present in the AA, or can access it during at least one day annually.	0			
		None of the above, and could not estimate fish presence/absence.	1			
F29	Non-native Aquatic Animals (PestAnim)	The following are known or likely to have reproducing populations in this AA, its wetland, or in water bodies within 300 ft that connect to the AA at least seasonally. **Select All that apply:**		Assume non-native fish to be present if wetland is associated with a nearby reservoir, fish pond, or perennial stream flowing through an agricultural or residential area. Assume bullfrog, nutria, and/or carp to be present if (a) the AA contains persistent water or is flooded seasonally by an adjoining body of permanent water, and (b) not a forested wetland, and (c) in western Oregon, elevation is lower than about 3000 ft. In the ORWAP_SuppInfo file, see Inverts_Exo worksheet for more complete list of non-native invertebratesf or Oregon, and WetVerts worksheet for more complete list of fish that are not native to Oregon. You may also consult: http://nas.er.usgs.gov/queries/default.aspx http://www.dfw.state.or.us/conservationstrategy/invasive_species.asp [FA,FR,AM,EC]		
		Non-native amphibians (e.g., bullfrog) or reptiles (e.g., red-ear slider).	0			
		Carp.	0			
		Non-native fish that prey on tadpoles or turtles (e.g., bass, walleye, crappie, brook trout).	0			
		Non-native invertebrates (e.g., New Zealand mudsnail, mitten crab, rusty crayfish).	0			
		Nutria.	0			
		None of above.	1			

F30	Shorebird Feeding Habitats (Shorebd)	The extent of mudflats, very shallow waters, or shortgrass meadows, within the AA, that meet the definition of **shorebird habitat** for at least 3 months during the period of late summer through the following May is:		**Shorebird habitat** - areas must have **(a)** grasses shorter than 6", or a mudflat, during any part of this period, **AND (b)** soils that either are saturated or covered with <2 inches of water during any part of this period, **AND (c)** no detectable surrounding slope (e.g., not the bottom of an incised dry channel), **AND (d)** not shaded by shrubs or trees. See photograph in Appendix A of manual. This addresses needs of most migratory sandpipers, plovers, curlews, and godwits. [WBF]		
		None, or <100 sq. ft.	1			
		100 to <1000 sq. ft. within AA.	0			
		1000 to 10,000 sq. ft. within AA.	0			
		>10,000 sq. ft. within AA.	0			
F31	Outflow Duration (OutDura)	The most persistent surface water connection (outlet channel, pipe, ditch, or overbank water exchange) between the AA and the closest stream or lake located downslope is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of its wetland, OR the surface connection between the AA's wetland and a mapped stream or lake located within 300 ft downslope	W	The emphasis is on the connection to a mapped stream network. A larger difference in elevation between the wetland-upland boundary and the bottom of the wetland outlet (if any) indicates shorter outflow duration. Do not rely only on topographic maps or NWI maps to show this; inspect while in field if possible, and ask landowner. The durations given are only approximate and are for a "normal" year. The connection need not occur during the growing season. Assume that depressions with effective nearby ditches or tile drains will connect for shorter periods. [WS,WCv,SR,PR,NR,CS,OE,FA,FR,Sens]		
		Persistent (>9 months/year).	0			
		Seasonal (14 days to 9 months/year, not necessarily consecutive).	1			
		Temporary (<14 days, not necessarily consecutive).	0			
		None -- no surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. **Enter 1 and SKIP TO F33.**	0		NoOutlet	
F32	Outflow Confinement (Constric)	During **major runoff events**, in the places described above where surface water exits the AA, it:	W	**Major runoff events -** would include biennial high water caused by storms and/or rapid snowmelt. **Impeded** - means causing a delay or reduction in water velocity or volume. [WS,SR,PR,NR,CS,OE,Sens,STR]		
		Is **impeded** as it mostly passes through a pipe, culvert, tidegate, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography).	1			
		Leaves mainly through natural surface exits, not largely through artificial or temporary features which **impede** or accelerate outflow.	0			
		Is exported more quickly than usual as it mostly passes through ditches or pipes intended to accelerate drainage. They may be within the AA or connected to its outlet or within 30 ft of the AA's edge.	0			
F33	Tributary or Overbank Inflow (Inflow)	At least once annually, surface water from upstream or another water body moves into the AA. It may enter directly, or as unconfined overflow from a contiguous river or lake. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. **Enter 1, if true. If false, SKIP to F36.**	0	[SRv,PRv, PD]	Inflow	
F34	Input Channel Gradient (SlopeInChan)	The gradient of the tributary with the largest inflow, averaged over the 150 ft. before it enters the AA (but excluding any portion of the distance where water travels through a pipe) is:		[SRv, PRv]		
		<1%.	0			
		1 to <3%.	0			
		3 to 6%.	0			
		>6%.	0			
F35	Throughflow Complexity (ThruFlo)	**[Skip this question if the AA lacks both an inlet and outlet.]** During peak annual flow, water entering the AA in channels encounters which of the following conditions as it travels through the AA: **Select the ONE encountered most.**		This mainly refers to surface water that moves between the inlet and outlet. Some judgment is required in assessing straight vs. indirect flow path. See ORWAP Manual Appendix B diagram. [WS,SR,PR,NR,OE,INV,FA,FR,WBF,WBN,PD]		
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel within unvegetated (often incised) channels and has minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0			
		Bumps into **h**erbaceous vegetation but mostly remains in fairly straight channels.	0			
		Bumps into herbaceous vegetation and mostly spreads throughout, or follows a fairly indirect path (in widely meandering, multi-branched, or braided channels).	0			
		Bumps into **t**ree trunks and/or shrub stems but mostly remains in fairly **s**traight channels.	0			
		Bumps into tree trunks and/or shrub stems and follows a fairly indirect path (meandering, multi-branched, or braided) from entrance to exit.	0			

F36	Internal Gradient (Gradient)	The gradient from the lowest to highest point of land within the AA (**or** from outlet to inlet) is:		Wetlands with no outlet, and wetlands where most surface water is impounded on site, should be considered flat (<2%). For other wetlands, estimate gradient as the elevation difference between the inlet and outlet (if any) divided by the distance between them, or the difference between the highest and lowest points in the wetland divided by the distance between them. [WS,SR,PR,NR,CS,OE,AM,WBF,WBN]		
		<2% (internal flow is absent or barely detectable; basically flat).	0			
		2 to <6%.	1			
		6 to 10%.	0		TooSteep1	
		>10%.	0		TooSteep2	
F37	Groundwater Strength of Evidence (Groundw)	**Select first one that applies:**		[WS,WC,NR,CS,OE,INV,FA,FR,PD]		
		In the AA or its wetland: **(a)** Springs are observed, OR **(b)** Water is markedly cooler in summer and warmer in winter (e.g., later ice formation) than in other local wetlands, OR **(c)** Measurements from shallow wells indicate groundwater is discharging to the wetland, OR **(d)** Water visibly seeps into pits dug within the AA during the driest time of the year and located >30 ft from the closest surface water.	0			
		The AA's wetland: **(a)** Is very close to the base of a natural slope steeper than 15% and longer than 300 ft or is located at a geologic fault, OR **(b)** Has no persistently flowing tributary AND one or more is true: (b1) Is on a natural slope of >5%, OR (b2) Has rust deposits ("iron floc"), colored precipitates, or dispersible natural oil sheen, OR	0			
		The AA is not in an **Arid or Semi-arid hydrologic unit**, but has persistent ponded water, no tributary, and is not fed by wastewater, concentrated stormwater, or irrigation water, or by an adjacent river or lake.	0	**Arid or Semi-arid hydrologic unit** - See the ORWAP Report's Hydrologic Landscape Class (under Location Information).		
		None of above is true, OR AA contains a hot spring. Some groundwater may nonetheless discharge to or flow through the wetland.	1			
F38	Unshaded Herbaceous Vegetation (Extent) (HerbExpos)	The annual maximum areal cover of herbaceous vegetation (excluding SAV, ferns, and mosses, but including forbs & graminoids) that is not beneath a woody canopy reaches:		Do not include submersed and floating-leaved aquatics (SAV) in the category of "herbaceous vegetation", or when defining the "vegetated part" of the site. For sites larger than 10 acres, this should be determined from aerial imagery rather than estimated in the field. [WBF,WBN]		
		<5% of the vegetated part of the AA. **Enter 1 and SKIP to F42.**	0		NoHerb	
		5 to <25% of the vegetated part of the AA.	0			
		25 to <50% of the vegetated part of the AA.	0			
		50-95% of the vegetated part of the AA.	0			
		>95% of the vegetated part of the AA.	1			
F39	Forb Cover (Forb)	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of **forbs** reaches an annual maximum of:		**Forbs -** are flowering non-woody vascular plants (excludes grasses, sedges, ferns, mosses). [POL]		
		<5% of the herbaceous part of the AA.	0			
		5 to <25% of the herbaceous part of the AA.	1			
		25 to <50% of the herbaceous part of the AA.	0			
		50 to 95% of the herbaceous part of the AA.	0			
		>95% of the herbaceous part of the AA.	0			
F40	Species Dominance - Herbaceous (HerbDom)	Determine which two native herbaceous (forb, fern, and graminoid) species comprise the greatest portion of the herbaceous cover that is unshaded by a woody canopy. **Then select one:**		[INV,WBF,SBM,PD,POL,Sens,EC]		
		Those species together comprise more than half of the areal cover of native herbaceous plants at any time during the year, i.e., one dominant species or two co-dominants. **Also mark this if <20% of the vegetated cover is native**	1			
		Those species together comprise less than half of the areal cover of native herbaceous plants at any time during the	0			

F41	Invasive or Non-native - % of Vegetative Cover (Invas)	Vegetative cover (annual maximum) is:		In the ORWAP_SuppInfo, see P_Invas worksheet for list of invasives and P_Exo for non-native species list. Examples of woody invasives are Himalayan blackberry, English ivy, scotch broom, and gorse. For known distributions of invasive plants in your area see: http://inr.oregonstate.edu/orbic/invasive-species and http://www.weedmapper.org/maps.html but do not limit your answer based only on that information. Consider most crops to be non-native. [WBF,PD,POL,Sens,EC]		
		Overwhelmingly (>80% cover) non-native species AND >10% of the herbaceous cover is invasive species. (See ORWAP SuppInfo file for species designations).	1		InvasDom	
		Overwhelmingly (>80% cover) non-native species AND <10% of the herbaceous cover is invasive species; OR 50-80% of cover is non-native species regardless of invasiveness.	0			
		Mostly (50-80%) native species.	0			
		Overwhelmingly (>80%) native species.	0			
F42	Mowing, Grazing, Fire (VegCut)	There is evidence that grazing by domestic or wild animals -- or mowing (multiple times per year), plowing, herbicides, harvesting, or fire -- has **repeatedly** reduced the AA's vegetation cover (plants that normally grows taller than 4") to less than 4 inches, or has created an obvious browse line, over the following extent:		**Repeatedly** - means the condition occurred in at least half of the last 10 years. [SR,AM,WBN,SBM,PD,EC]		
		0% (No evidence of such activities).	1		NoMowGraze	
		Trace to 5% of the normally vegetated AA (grazing, mowing, or fire have occurred but vegetation height effects are mostly unnoticeable).	0			
		5 to <50% of the normally vegetated AA.	0			
		50 to 95% of the normally vegetated AA.	0			
		>95% of the normally vegetated AA.	0			
F43	Historically Lacking Trees (HistVeg)	According to the ORWAP Report, the presettlement vegetation class in the vicinity of the AA was prairie, sagebrush, or other open lands not dominated by trees. In addition, the AA is not within the biennial floodplain of a river where trees and shrubs typically dominate when conditions are unaltered. **Enter 1, if true.**	0	In the ORWAP Report's Location Information table. This question is used as a classification variable mainly to set appropriate expectations for the extent of forest cover.	HistOpenland	
F44	Moss Wetland (Moss)	The AA's ground cover is primarily a deep layer of moss, and/or soils are mainly peat or organic muck. Also, the soil remains water-saturated to within 3 inches of the surface during most of a normal year. Surface water within the AA often is absent or confined to small scattered pools or ditches. **Enter 1, if true.**	0	Includes most bogs and fens. May be a floating island. [NR,CS,OE,WBF,WBN,Sens]		
F45	Woody Extent (WoodyPct)	Within the vegetated part of the AA, woody vegetation (trees, shrubs, **robust vines**) taller than 3 ft occupies:		**Robust vines** - include Himalayan blackberry and others that are generally erect and taller than 1 ft.		
		<5% of the vegetated AA, and fewer than 10 trees are present. **Enter 1 and SKIP to F51.**	1		NoWoody	
		<5% of the vegetated AA, but more than 10 trees are present.	0	**Vegetated part** - should not include floating-leaved or submersed aquatics.		
		5 to <25% of the vegetated AA.	0			
		25 to <50% of the vegetated AA.	0	For sites larger than 1 acre, this should be determined from aerial imagery rather than estimated only in the field. [NR,WC,CS,SBM,PD,Sens]		
		50 to 95% of the vegetated AA.	0			
		>95% of the **vegetated part** of the AA.	0			
F46	Woody Diameter Classes (TreeDiams)	**Select All the types** that comprise >5% of the woody canopy cover in the AA or >5% of its **wooded upland edge** if any:		**Wooded upland edge**- includes woody plants located within one tree-height of the wetland-upland boundary.		
		Deciduous 1-4" diameter (DBH) and >3 ft tall.	0			
		Evergreen 1-4" diameter and >3 ft tall.	0	**DBH** is the diameter of the tree measured at 4.5 ft above the ground.		
		Deciduous 4-9" diameter.	0			
		Evergreen 4-9" diameter.	0	[CS,SBM,POL,Sens]		
		Deciduous 9-21" diameter.	0			
		Evergreen 9-21" diameter.	0			
		Deciduous >21" diameter.	0			
		Evergreen >21" diameter.	0			

F47	Snags (Snags)	The number of large **snags** (diameter >12 inches) in the AA plus 100 ft uphill of its edge is:		**Snags -** are standing trees at least 20 ft tall that are mainly without bark or foliage. [SBM,POL]		
		Few or none.	0			
		Several.	0			
F48	Abovewater Wood (WoodOver)	The number of horizontal wood pieces thicker than 4 inches that are partly submerged during most of the spring or early summer, thus potentially serving as basking sites for turtles, birds, or frogs and cover for fish is:		Only the wood that is at or above the water surface is assessed because of the impracticality of assessing underwater wood accurately when using a rapid assessment method. [FA,FR,AM]		
		None.	0			
		Few.	0			
		Several (e.g., >3 per 300 ft of channel or shoreline).	0			
F49	Downed Wood (WoodDown)	The number of downed wood pieces longer than 6 ft and with diameter >4 inches that are not submerged during most of the growing season, is:		Exclude temporary "burn piles." [INV,AM,SBM,POL]		
		Few or none.	0			
		Several.	0			
F50	Exposed Shrub Canopy (ShrExpos)	Within the **vegetated part** of the AA, shrubs shorter than 20 ft that are not overtopped by trees occupy: Select first statement that is true.		**Vegetated part** - should not include floating-leaved or submersed aquatics. [SBM,PD]		
		<5% of the vegetated AA and <0.01 acre (400 sq ft).	0			
		5 to <25% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		25 to <50% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		50 to 95% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		>95% of the vegetated part of the AA or the water edge (whichever is greater in early summer).	0			
F51	N Fixers (Nfix)	The percentage of the vegetated area in the AA or along its water edge (whichever has more) that contains nitrogen-fixing plants (e.g., alder, baltic rush, scotch broom, lupine, clover, alfalfa, other legumes) is:		For a more complete list, see ORWAP_SuppInfo, worksheet NFIX (includes native and non-native species). Do not include algae. [OE,INV,Sens]		
		<1% or none.	1			
		1 to <25%.	0			
		25 to <50%.	0			
		50 to 75%.	0			
		>75%.	0			
Note for the next four questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter and outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.						
F52	Upland Perennial Cover - % of Perimeter (PerimPctPer)	The percentage of the AA's edge (perimeter) that is comprised of a band of upland **perennial cover** wider than 10 ft and taller than 6 inches, during most of the growing season is:		**Perennial cover** - vegetation that includes wooded areas, native prairies, sagebrush, as well as relatively unmanaged commercial lands in which the ground is disturbed less frequently than annually such as perennial ryegrass fields, hayfields, lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, row crops (vegetable, orchards, Christmas tree farms), residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. [WCv,SRv,PRv,INV,FA,AM,WBF,WBN,SBM,PD,POL,POLv,Sens,STR]		
		<5%.	0			
		5 to <25%.	0			
		25 to <50%.	1			
		50 to <75%.	0			
		75 to 95%.	0			
		>95%.	0			

F53	Upland Perennial Cover - Width (Buffer) (BuffWidth)	Along the greatest extent of the AA's **upland edge**, the width of **perennial cover** taller than 6 inches that extends upslope from the AA until mostly shorter or non-perennial cover is reached is: [NOTE: the width is not necessarily the maximum width. Base on vegetation that occurs most of the growing season.]		**Upland edge** - is the land within 3 ft of the wetland's perimeter that is not wetland. [WCv,SRv,PRv,INV,FA,AM,WBN,SBM,PD,POL,Sens,STR]		
		< 5 ft, or none.	0		NoUpPerCov	
		5 to <30 ft.	0			
		30 to <50 ft.	0			
		50 to <100 ft.	1			
		100 to 300 ft.	0			
		> 300 ft.	0		AllUpPerren	
F54	Upland Trees as % of All Perennial Cover (UpTreePctPer)	Within 100 f.t landward from the AA's edge (perimeter), the percentage of the upland perennial cover that is woody plants taller than 20 ft is:		Base this on the cumulative canopy width of the trees. [WSv,FA,WBF,WBN,SBM]		
		<5%, or there is no upland perennial cover along the upland edge.	0			
		5 to <25% of perennial cover.	1			
		25 to <50% of perennial cover.	0			
		50 to <75% of perennial cover.	0			
		75 to 95% of perennial cover.	0			
		>95% of perennial cover.	0			
F55	Weeds - % of Upland Edge (UpWeed)	Along the AA's edge (perimeter), the cover of invasive woody or herbaceous plants occupies: [If vegetation is so senesced that apparently-dominant edge species cannot be identified even to genus, answer "none"]		See ORWAP_SuppInfo file, worksheet P_Invas. Some of the most common invaders along upland edges of Oregon wetlands are Himalayan blackberry, knotweed, sweetbrier rose, Russian olive, English ivy, nightshade, pepperweed, medusahead, white clover, ryegrass, quackgrass, false brome, bentgrass, dandelion, oxeye daisy, pennyroyal, bull and creeping thistles, tansy ragwort, poison hemlock, and teasel. If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an invasive species, assume the unidentified plant to also be invasive. [PD,STR]		
		<5%, or none.	0			
		5 to <25%.	0			
		25 to <50%.	1			
		50 to <75%.	0			
		75 to 95%.	0			
		>95%.	0			
F56	Bare Ground & Accumulated Plant Litter (Gcover)	Consider the parts of the AA that go dry during a normal year. Viewed from 6 inches above the soil surface, the condition in most of that area just before the year's longest inundation period begins is:		**Bare ground-** includes unvegetated soil, rock, sand, or mud between stems if any. Bare ground under a tree or shrub canopy should be counted. Wetlands that are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [WS,WC,SR,PR,NR,CS,OE,INV,AM,SBM,POL,Sens,EC]		
		Little or no (<5%) **bare ground** is visible between erect stems or under canopy and there is little or no dead detached plant tisuse (thatch) remaining on top of the ground surface and ground surface is extensively blanketed by moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1			
		Some (5-20%) bare ground or remaining thatch is visible. Herbaceous plants have moderate stem densities and do not closely hug the ground.	0			
		Much (20-50%) bare ground or thatch is visible. Low stem density and/or tall plants with little living ground cover during early growing season.	0			
		Mostly (>50%) bare ground or thatch.	0			
		Not applicable. All of the AA is inundated throughout most years.	0			
F57	Ground Irregularity (Girreg)	In parts of the AA that lack persistent water, the number of small pits, raised mounds, hummocks, boulders, upturned trees, animal burrows, islands, natural levees, wide soil cracks, and microdepressions is:		**Microtopography** - refers mainly to vertical relief of <3 ft and is represented only by inorganic features, except where plants have created depressions or mounds of soil. Consider the microtopography to be "few or none" if one could walk easily through most of the AA once any slash and logs are removed. Consider it to be "several" if one has to constantly look down and check balance. [WS,SR,PR,NR,INV,AM,SBM,PD,POL,EC]		
		Few or none, or the entire AA is always water-covered. Minimal **microtopography**; <1% of the AA, e.g., many flat sites having a single hydroperiod.	1			
		Intermediate.	0			
		Several (extensive micro-topography).	0			
F58	Soil Composition (SoilTex)	Based on digging into the substrate and examining the surface layer of the soil (2 inch depth) that was mapped as being predominant, its composition (excluding **duff** and living roots) is mostly:		Do not base the texture on soil maps unless the AA is inaccessible. See ORWAP Manual's protocol (Step 2 of section 5.3 and the soil chart in Appendix B). Judge which soil type is predominant only in the part of the AA that is not inundated at the time of your visit. **Duff** - is loose organic surface material, e.g., dead plant leaves and stems). Organic soils are much less common in floodplains. [WS,PR,NR,CS,OE,PD,Sens]		
		Loamy: includes silt, silt loam, loam, sandy loam.	1			
		Clayey: includes clay, clay loam, silty clay, silty clay loam, sandy clay, sandy clay loam.	0			
		Organic: includes muck, mucky peat, peat, and mucky mineral soils (blackish or grayish). Exclude live roots unless they are moss.	0			
		Coarse: includes sand, loamy sand, gravel, cobble, stones, boulders, fluvents, fluvaquents, riverwash.	0			
F59	Cliffs or Banks (Cliff)	Within 300 ft of the AA, there are elevated terrestrial features such as cliffs, bluffs, talus slopes, or unarmored stream banks that extend at least 6 ft nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. **Enter 1, if true.**	0	[SBM,POL]		

F60	Restored or Created Wetland (NewWet)	The AA is (or is within, or contains) a "new" wetland resulting from human actions (e.g., excavation, impoundment) or other factors affecting what was upland (non-hydric) soil. Or, some part of the AA was originally a wetland, was artificially drained for many years, and has since had its water regime partly or wholly restored or rehabilitated (e.g., by ditch plugs, berms, tile breakage, non-maintenance).		Include wetlands whose area was likely expanded by road berms which impeded runoff, but do not include wetlands created by beaver dams except for the part where flooding affected uplands (not just existing wetlands and streams). Determine this using historical aerial photography, old maps, soil maps, consultation with landowners, and/or permit files as available. See ORWAP Map Viewer's Hydric Soil layer (expend Soils). Also, locations of some restoration wetlands can be found in the ORWAP Map Viewer under Restoration. Another potential source is the Conservation Registry: https://oregonexplorer.info/content/conservation-registry?topic&ptopic.	
		Yes, and constructed or restored mostly within last 3 years.	0		
		Yes, and constructed or restored mostly 3-7 years ago.	0		
		Yes, and constructed or restored mostly >7 years ago.	0		
		Yes, but time of origin or restoration unknown.	0		
		No.	1		NotNewWet
		Unknown if wetland is constructed, restored, or natural.	0		
F61	Ownership (Ownership)	Most of the AA is:		An initial indication of ownership can be found on the ORWAP Map Viewer under the Land Ownership layer (expand Land Classification). However, it is advisable to ask local sources or use local maps with higher precision. [PUv]	
		Publicly owned (municipal, county, state, federal).	0		
		Owned by non-profit conservation organization or easement holder who allows public access to this AA.	0		
		Other private ownership, including tribal. **Enter 1 and SKIP to F63.**	1		PrivateOwn
F62	Special Protected Area Designation (Desig)	The AA is part of an area designated as a Special Protected Area according to the USGS Protected Areas Database of the U.S. **Enter 1, if true.**	0	See the ORWAP Map Viewer Report under the Location Information section for "In Special Protected Area?" [PUv]	
F63	Conservation Investment (ConsInvest)	The AA is not a mitigation wetland, but public funds or community volunteer efforts have been applied to preserve, create, restore, or enhance the condition or functions of the wetland. (e.g. CRP or WRP wetlands, community projects). **Enter 1, if true. (If unknown, leave 0).**	0	Locations of some restoration wetlands can be found in the ORWAP Map Viewer under Restoration. Another potential source is the Conservation Registry: https://oregonexplorer.info/content/conservation-registry?topic&ptopic [PUv]	
F64	Compensation Wetland (MitWet)	The AA is all or part of a compensation site used explicitly to offset impacts elsewhere. **Enter 1, if true. (If unknown, leave 0).**	0	Answer to the best of your knowledge. Sources for information include the property owner, DSL, and/or the ACOE. [PUv]	
F65	Sustained Scientific Use (SciUse)	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. **Enter 1, if true. (If unknown, leave 0)**	0	[PUv]	
F66	Visibility (Visibil)	The maximum percentage of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 300 ft of the AA is **(Select ONE):**		[WBFv,WBNv,SBMv,PUv,STR]	
		<25%.	1		
		25 - 50%.	0		
		>50%.	0		

F67	Non-consumptive Uses - Actual or Potential (RecPoten)	**Select All statements that are true** of this AA as it currently exists:		The question assumes access is allowed. [PUv]		
		Walking is physically possible in >5% of the AA during most of year (e.g., free of deep water and dense shrub thickets).	1			
		All or part of the AA (or an area within sight of the AA and within 100 ft) would be physically accessible to people in wheelchairs (e.g., paved and flat).	1			
		Maintained roads, parking areas, or foot-trails are within 30 ft of the AA, or the AA can be accessed most of the year by boat.	1			
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0			
F68	Core Area 1 (VisitNo)	The percentage of the AA almost never walked or driven by humans during an average growing season probably comprises: [Note: If more than half the wetland is visible from areas within 100 ft of the AA, include visits by people to those areas that are actually walked or driven (not simply viewed from].		Judge this based on proximity to population centers, roads, trails, accessibility of the AA to the public, wetland size, usual water depth, and physical evidence of human visitation. Exclude visits that are not likely to continue and/or that are not an annual occurrence (e.g., by construction, maintenance, or monitoring crews). [AM,WBF,WBN,SBM,PD,PUv,STR]		
		<5% and no inhabited building is within 300 ft of the AA.	0			
		<5% and inhabited building is within 300 ft of the AA.	0			
		5 to <50% and no inhabited building is within 300 ft of the AA.	0			
		5 to <50% and inhabited building is within 300 ft of the AA.	0			
		50 to 95% with or without inhabited building nearby.	1			
		>95% of the AA with or without inhabited building nearby.	0			
F69	Core Area 2 (VisitOften)	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: [The Note in the preceding question applies here as well].		See note above. [AM,WBF,WBN,SBM,PD,PUv,STR]		
		<5%.	1			
		5 to <50%.	0			
		50 to 95%.	0			
		>95% of the AA.	0			
F70	Consumptive Uses (Provisioning Services) (Hunt)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. **Select All that apply.**		Evidence of these consumptive uses may consist of direct observation, or presence of physical evidence (e.g., recently cut stumps, fishing lures, shell cases), or might be obtained from communication with the land owner or manager. [FRv,WBFv,PUv]		
		Low-impact commercial timber harvest (e.g., selective thinning).	0			
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0			
		Waterfowl hunting.	0			
		Fishing.	0			
		Trapping of furbearers.	0			
		None of the above.	1			
F71	Domestic Wells (Wells)	Wells or water bodies that currently provide drinking water are:		If unknow, assume this is true if there is an inhabited structure within the specified distance and the neighborhood is known to not be connected to a municipal drinking water system (e.g., is outside an urban growth boundary or other densely settled area). [NRv]		
		<300 ft and downslope from the AA or at same elevation.	0			
		300 to 1500 ft and downslope or at same elevation.	0			
		>1500 ft downslope, or none downslope, or no information.	1			

F72	Wetland Type of Conservation Concern (RareType)	Does the AA contain, or is it part of, any of these wetland types? **Select All that apply.**	W	Consult the ORWAP Report under the Location Information table for "Rare Wetland Types." But be aware that it may not apply to the exact AA you have delimited. [PDv, Sens]		
		Mature forested wetland (anywhere): a wetland in which mean diameter of trees (d.b.h., FACW and FAC species only) exceeds 18 inches, and/or the average age of trees exceeds 80 years, or there are >5 trees/acre with diameter >32	0	To qualify, the diameter of >18 inches must be the mean measured from at least 10 trees.		
		Bog or Fen: contains a sponge-like organic soil layer which covers most of the AA and often has extensive cover of sedges and/or broad-leaved evergreen shrubs (e.g., Ledum). Often lacks tributaries, being fed mainly by groundwater and/or direct precipitation.	0			
		Playa, Salt Flat, or Alkaline Lake: a nontidal ponded water body usually having saline (salinity >1 ppt or conductivity >1000 µS) or alkaline (conductivity >2000 µS and pH >9) conditions and large seasonal water level fluctuations (if inputs-outputs unregulated). If a playa or salt flat, vegetation cover is sparse and plants typical of saline or alkaline conditions (e.g., Distichlis, Atriplex) are common.	0	See ORWAP_SuppInfo file, worksheet P_Salt for species typically occurring in tidal or saline conditions.	Playa	
		Hot spring (anywhere): a wetland where discharging groundwater in summer is >10 degrees (F) warmer than the expected water temperature.	0			
		Native wet prairie (west of the Cascade crest): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, and dominated primarily by native graminoids often including species in column E.	0	Deschampsia caespitosa, Danthonia californica, Camassia quamash, Triteleia hyacinthina, Carex densa, C. aperta, and/or C. unilateralis		
		Vernal pool (Willamette Valley): a seasonally inundated wetland, underlain by hardpan or claypan, with hummocky micro-relief, usually without a naturally-occurring inlet or outlet, and with native plant species distinctly different from those in slightly higher areas, and often including species in column E.	0	Downingia elegans, Isoetes nuttallii, Triteleia hyacinthina, Eleocharis spp., Eryngium petiolatum, Plagiobothrys figuratus, Plagiobothrys scouleri, Grindelia nana, Veronica peregrina, Lasthenia glaberrima , Cicendia quadrangularis, Kickxia elatine, Gnaphalium palustre, and/or Callitriche spp.		
		Vernal pool (Medford area): a seasonally inundated acidic wetland, underlain by hardpan, with hummocky micro-relief, usually without a naturally-occurring inlet or outlet, and having concentric rings of similar native vegetation, often including species in column E.	0	Downingia vina, Isoetes nuttalli, Pilularia americana, Triteleia hyacinthina, Eleocharis spp., Eryngium petiolatum, Plagiobothrys brachteatus, Plagiobothrys scouleri, Grindelia nana, Veronica peregrina, Alopecurus saccatus, Lasthenia californica, Deschampsia		
		Vernal pool (Modoc basalt & Columbia Plateau): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located on shallow basalt bedrock and often having species in column E.	0	Blennosperma nanum, Camassia quamash, Epilobium densiflorum, Callitriche marginata, Cicendia quadrangularis, Eryngium vaseyi, Psilocarphus brevissimus, and/or Sedella pumila.		
		Interdunal wetland (Coastal ecoregion): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located between sand dunes where wind has scoured the sand down to the water table (deflation plain, blowout pond), and often with significant cover of the native species in column E.	0	Carex obnupta, Argentina egedii, Juncus lesueurii, J. nevadensis, J. falcatus, Sisyrinchium californicum, and/or Salix hookeriana		
		Ultramafic soil wetland (mainly southwestern Oregon): a low-elevation wetland, usually with a sponge-like organic soil layer, occurring in an area with exposed serpentine or peridotite rock, and/or in soils with very low Ca:Mg ratios.	0			
		None of above.	1			

Site: Portland Golf Club-Sediment Placement	Name: P.Scoles	Date: Nov. 16, 2021

Form S
Stresser Data
ORWAP V 3.2

					Data	Comments
S1	**Aberrant Timing of Water Inputs (AltTiming)**					No hydrology alterations since contributing watershed is small and stops at ped./ bike path immediiately to south.
	*In the "Data" column, **place an X** next to any item that is likely to have caused the **timing** of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either **more muted** (smaller or less frequent peaks spread over longer times, more temporal homogeneity of flow or water levels) **or more flashy** (larger or more frequent spikes but over shorter times).*					
	Control structure that regulates inflow to the AA (including tide gates), or flow regulation in tributaries, or water level in adjoining water body is regulated.					
	Irrigation runoff or seepage.					
	Snow storage areas that drain directly to the wetland.					
	Increased pavement and other impervious surface in the CA.					
	Straightening, ditching, dredging, and/or lining of tributary channels in the CA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points (3, 2, or 1). However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition, if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Spatial extent within the AA of timing shift.	>95% of AA.	5-95% of AA.	<5% of AA.	0	
	When most of the timing shift began.	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
	Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the AA that experiences those.					
	Input timing now vs. previously.	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
	Flashiness or muting.	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
				Sum=	0	
				Final score=	0.00	
S2	**Accelerated Inputs of Nutrients (NutrLoad)**					No increase of nutrients or stormwater within RCA.
	*In the "Data" column, **place an X** next to any item -- occurring in either the AA or its RCA -- that is likely to have accelerated the inputs of nutrients (nitrogen, phosphorus) to the AA.*					
	Stormwater or wastewater effluent (including failing septic systems), landfills.					
	Fertilizers applied to lawns, ag lands, or other areas in the RCA.					
	Livestock, dogs.					
	Artificial drainage of upslope lands.					
	Other waterborne human-related nutrient sources within the RCA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Usual load of nutrients.	Large (e.g., feedlots, extensive residential on septic) or or 303d* for nutrients.	Moderate (e.g., grazing, light residential on septic, light agriculture).	Limited (e.g., a few animals, lawns, sewered residential).	0	
	Frequency & duration of input.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
	AA proximity to main sources (actual or potential).	0 - <50 ft.	50-300 ft. or in groundwater.	In other part of contributing area.	0	
				Sum=	0	
				Final score=	0.00	
S3	**Accelerated Inputs of Contaminants and/or Salts (ContamIn).**					No increase of contaminants or stormwater within RCA.
	*In the "Data" column, **place an X** next to any item -- occurring in either the AA or its RCA -- that is likely to have accelerated the inputs of contaminants or salts to the AA.*					
	Stormwater or wastewater effluent (including failing septic systems), landfills, snow storage areas.					
	Metals & chemical wastes from mining, shooting ranges, oil/ gas extraction, other sources.					
	Irrigation of lands, especially those with saline soils.					
	Oil or chemical spills (not just chronic inputs) from nearby roads.					
	Road salt.					
	Pesticides applied to lawns, ag lands, roadsides, or other areas in the RCA, but excluding spot applications for controlling non-natives in the AA.					
	Artificial drainage of contaminated or saline soils.					
	Erosion of contaminated soils.					
	Other contaminant sources within the RCA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Usual toxicity of most toxic contaminants.	Industrial effluent or 303d* for toxics.	Wastewater treatment plant, cropland, fossil fuel extraction, pipeline, power station, managed landfill.	Low density residential or commercial.	0	
	Frequency & duration of input.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
	AA proximity to main sources (actual or potential).	0 - <50 ft.	50-300 ft. or in groundwater.	In other part of contributing area.	0	
	* See ORWAP Map Viewer for waters designated as 303d; see Oregon DEQ web site for reasons.			Sum=	0	
				Final score=	0.00	

S4	**Excessive Sediment Loading from Runoff Contributing Area (SedRCA).**					RCA historically cleared and cropped, but no longer in agricultural production.
	*In the "Data" column, **place an X** next to any item present in the RCA that is likely to have elevated the load of waterborne or windborne sediment reaching the AA from its RCA.*					
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.					
	Erosion from construction, in-channel machinery in the RCA.					
	Erosion from off-road vehicles in the RCA.					
	Erosion from livestock or foot traffic in the RCA.					
	Stormwater or wastewater effluent.					
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.					
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.					
	Other human-related disturbances within the RCA.				x	
	*If **any** items were checked above, then for each row of the table below you may assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in increasing the amount or transport of sediment into the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Erosion in RCA.	Extensive evidence, high intensity*.	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	2	
	Recentness of significant soil disturbance in the RCA.	Current & ongoing.	1-12 months ago.	>1 yr ago.	1	
	Duration of sediment inputs to the AA.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & mainly during high runoff or severe wind events.	1	
	AA proximity to actual or potential sources.	0 - <50 ft., or farther but on steep erodible slopes.	50-300 ft.	In other part of contributing area.	2	
	* **High**-intensity= plowing, grading, excavation, erosion with or without veg removal; **low**-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum=	6	
				Final score=	0.50	

S5	**Soil or Sediment Alteration *Within the Assessment Area* (SoilDisturb).**					Assessment Area historically cleared (possibly grazed), but now re-vegetated with non-native grasses and forbs.
	*In the "Data" column, **place an X** next to any item present in the AA that is likely to have compacted, eroded, or otherwise altered the AA's soil.*					
	Compaction from livestock, machinery, off-road vehicles, or mountain bikes, especially during wetter periods.					
	Leveling or other grading not to the natural contour.					
	Tillage, plowing (but excluding disking for enhancement of native plants).				x	
	Fill, riprap, other armoring, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil stockpiled or imported from another wetland.					
	Excavation.					
	Dredging in or adjacent to the AA.					
	Boat traffic in or adjacent to the AA and sufficient to cause shore erosion or stir bottom sediments.					
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.					
	*If **any** items were checked above, then for each row of the table below you may assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in altering the AA's soils. To estimate that, contrast it with the soil condition if checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Spatial extent of altered soil.	>95% of AA or >95% of its upland edge (if any).	5-95% of AA or 5-95% of its upland edge (if any).	<5% of AA and <5% of its upland edge (if any).	3	
	Recentness of significant soil alteration in AA.	Current & ongoing.	1-12 months ago.	>1 yr ago.	1	
	Duration.	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	1	
	Timing of soil alteration.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & mainly during scattered events.	1	
				Sum=	6	
				Final score=	0.50	

Oregon Rapid Wetland Assessment Protocol (ORWAP) Report

Report Generated: November 16, 2021 07:56 AM

Assessment Area: 0.7 Acres

Location Map

Location Information

Latitude	45.4699697417195	Longitude	-122.762331686491
Elevation	219 ft	Annual precipitation	40 in
Watershed (HUC12)		Fanno Creek (170900100502)	
Presettlement Vegetation Class		Douglas fir	
Rare Wetland Type(s)		None	
Hydrologic Landscape Class		Wet	
In Special Protected Area?		No	

View Salinity Maps (pdf)

Soil Information

Soil Name	Aloha silt loam
Soil Symbol	1
Hydric Rating	No
Hydric Percent	1
Percent Area	98.3%
Erosion Hazard	Slight

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (http://oregonexplorer.info).

Dom. Cond. Non-irrigated Capability Class	Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Soil Name	Cornelius and Kinton silt loams, 7 to 12 percent slopes
Soil Symbol	11C
Hydric Rating	No
Hydric Percent	4
Percent Area	1.7%
Erosion Hazard	Severe
Dom. Cond. Non-irrigated Capability Class	Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Watershed Information

HUC Best

HUC Code	HUC Name	Is HUC Best?	Greatest Criteria met	FW, s/f, lg (Acres)	FW, em, lg (Acres)	EST, em, lg (Acres)	EST, s/f, lg (Acres)
HUC8: 17090010	Tualatin	No	n/a	179.6	115.8	0	0
HUC10: 1709001005	Lower Tualatin River	No	n/a	16.1	40.5	0	0
HUC12: 170900100502	Fanno Creek	No	n/a	12.3	10	0	0

[abbreviations: FW- freshwater (wetland); em- Emergent; lg- largest; s/f- Shrub/Forested; EST- Estuarine (wetland)

HUC 12 Functional Deficit

HUC Code	HUC Name	WS	SR	NT	WC	INV	AM	FH	WB
HUC12: 170900100502	Fanno Creek								WB

[abbreviations: WS= Water Storage, SR= Sediment Retention, NT= Nutrient Retention (PR or NR), WC= Water Cooling (Thermoregulation), INV= Invertebrate Habitat, AM= Amphibian Habitat, FH= Fish Habitat (FA or FR), WB= Waterbird Habitat (WBF or WBN)]

Rare Species Scores

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0.24	0.24	Intermediate
Feeding Waterbirds	0	0	None
Nesting Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0	0	None
Invertebrate Species	0	0	None
Plant Species	0	0	None

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the "certainty" that ORBIC assigns to each of those records.

Element of Occurrence (Rare Species)

View wildlife list for Fanno Creek (170900100502)

Within Assessment Area	No EO Records
Within 1 mile	No EO Records
In HUC12 watershed	5 EO Records

Element of Occurrence Record(s) in HUC12

1 Steelhead (Upper Willamette River ESU, winter run)
[2 occurences]
Oncorhynchus mykiss pop. 33
ORBIC State Status: S2
ORBIC Global Status: G5T2Q
ODFW Strategy Species: No

2 Western pond turtle
[3 occurences]
Actinemys marmorata
ORBIC State Status: S2
ORBIC Global Status: G3G4
ODFW Strategy Species: Yes

• *HUC Best: Oregon watersheds (HUC8, HUC10, HUC12) with greatest type diversity, proportional area, or density of wetlands according to available National Wetland Inventory maps.*

"Type diversity" is the number of unique NWI codes in the watershed (e.g., PEMA, PEMC, PEMCx) and excluded types that have no vegetation component (e.g., PUBH, R3US2).

"Density" is the number of vegetated NWI polygons divided by the acreage of the watershed; many of these polygons may be contiguous with each other, forming a single wetland.

"Proportional Area" is the proportion of the watershed's total area occupied by vegetated wetlands as mapped by NWI.

• *The digital maps used to determine this do not show many wetlands or cover the entire state. Data were compiled only from watersheds that have been at least 90% mapped by NWI (see worksheets for HUC8, 10, and 12). Data were received in November 2008 from ORBIC.*

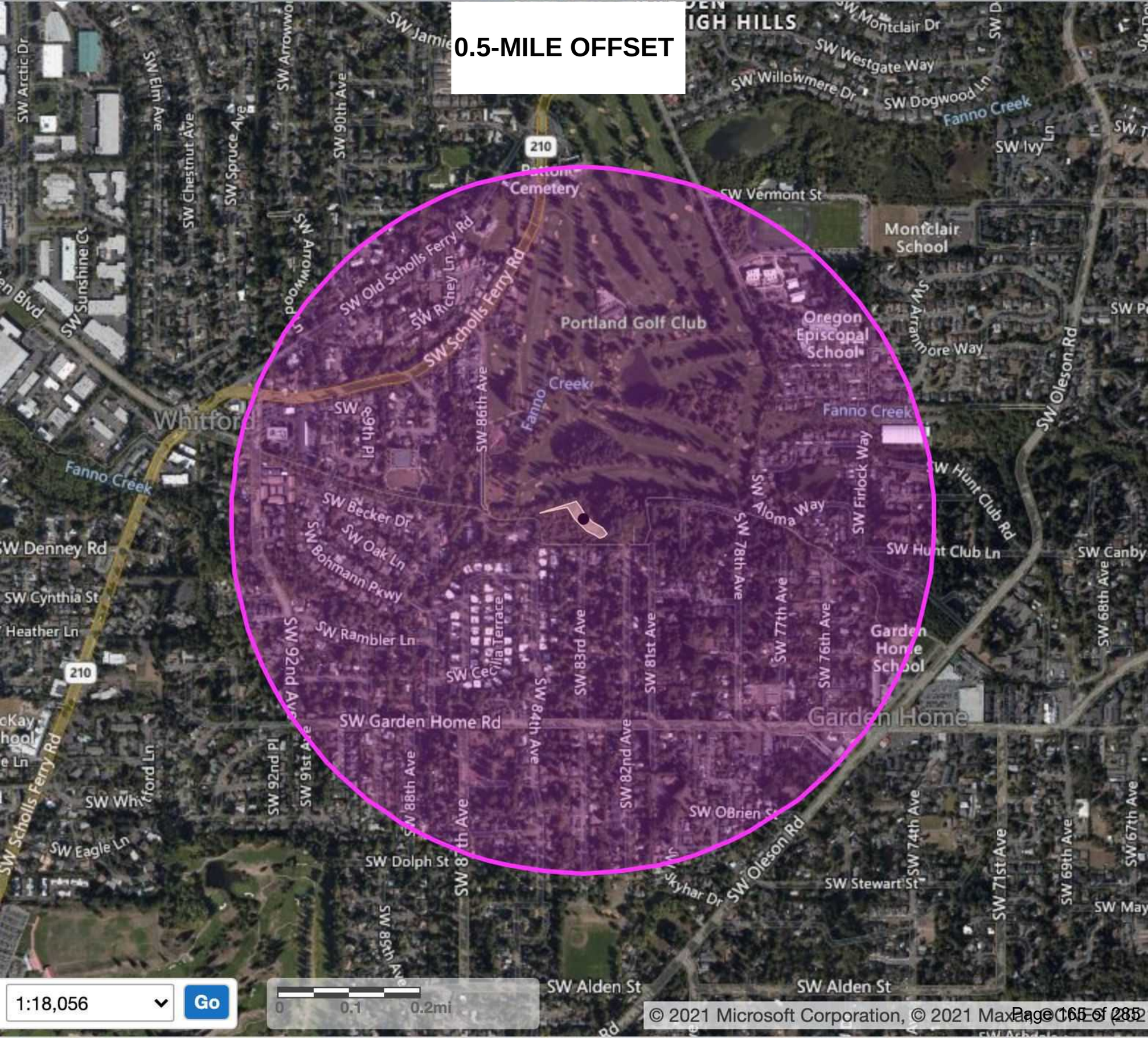
• *METHODS: The above 3 metrics can be strongly correlated with watershed size and with each other. To minimize that bias, the rankings of the residuals from a regression analysis were used, rather than simply the top-ranking watersheds, to identify the most "important" watersheds for each metric at each scale. That is, the watersheds were identified that were in the top 5% in terms of variety of mapped wetland types for watersheds of that size, the largest area of mapped wetlands as a proportion of the watershed area for watersheds of that size, and/or the greatest number of mapped wetland polygons for watersheds with that much wetland area.*

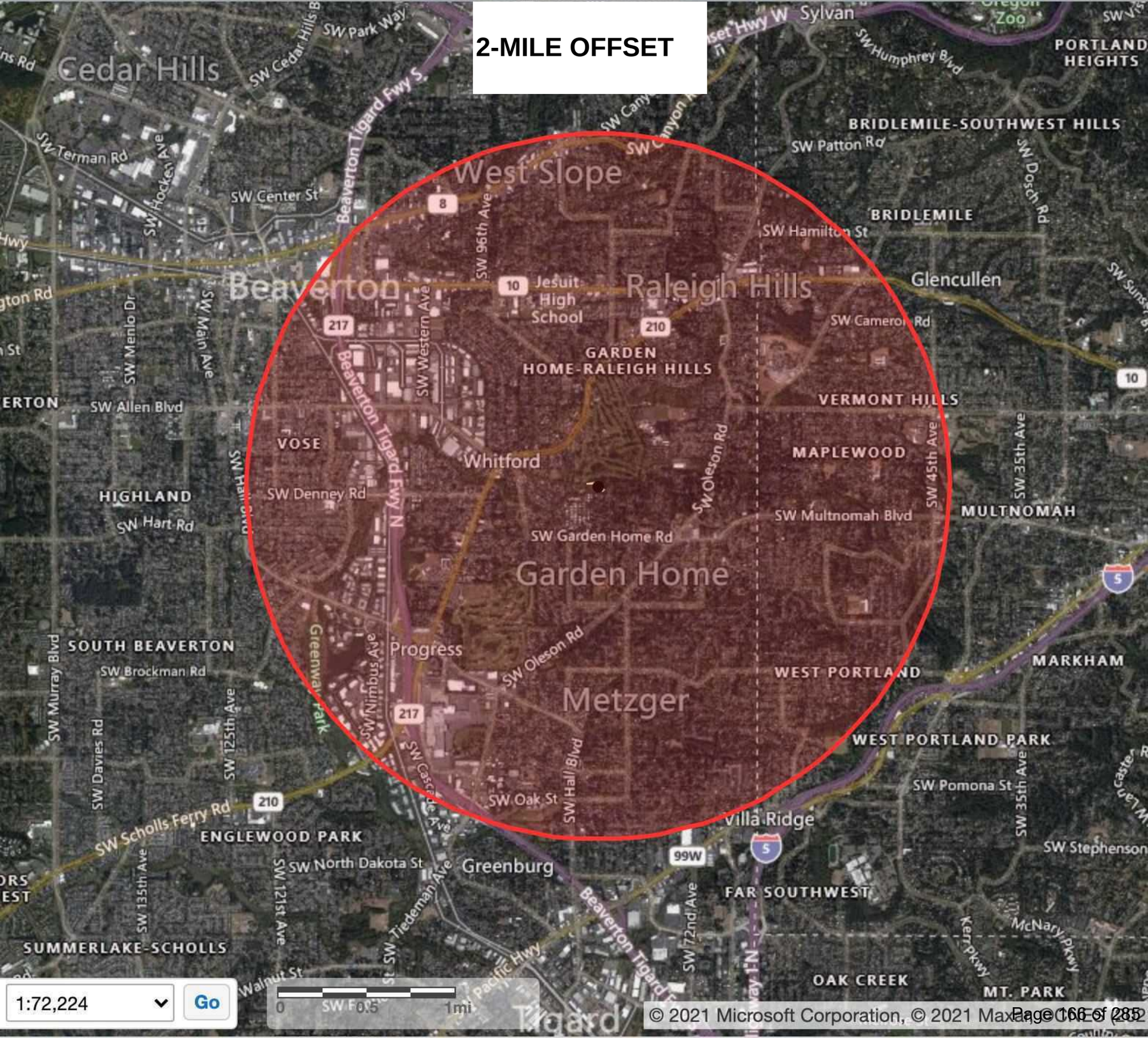
• *Global rank. ORBIC participates in an international system for ranking rare, threatened and endangered species throughout the world. The system was developed by The Nature Conservancy and is now maintained by NatureServe in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. In this book, the ranks occupy two lines. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. A "Q" at the end of this line indicates the taxon has taxonomic questions. The second line is the State Rank and begins with the letter "S". The ranks are summarized as follows: 1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; 2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; 3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences; 4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences; 5 = Demonstrably widespread, abundant, and secure; H = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered; X = Presumed extirpated or extinct; U = Unknown rank; ? = Not yet ranked, or assigned rank is uncertain.*

• *This report contains both centroid-based and polygon-based data. The Location Information and Watershed Information sections of the report contain centroid based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).*

• *The rare species results in this report are based on a subset of the ORBIC rare species dataset. The ORWAP tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see https://inr.oregonstate.edu/orbic/data-requests for details.*


300 FT. OFFSET
Fanno Creek
nno Creek Trail
Fanno Creek Trail
Fanno Creek Trail
SW 83rd Ave
SW 81st Ave
Bohmann Pkwy
1:2,257
Go
0
50
100ft
© 2021 Microsoft Corporation, © 2021 Maxar, CNES (2021


0.5-MILE OFFSET
SW Montclair Dr
SW Westgate Way
SW Willowmere Dr
SW Dogwood Ln
Fanno Creek
SW Ivy Ln
SW Arctic Dr
SW Elm Ave
SW Chestnut Ave
SW Spruce Ave
SW Arrowwood
SW 90th Ave
210
Cemetery
SW Vermont St
Montclair School
SW Old Scholls Ferry Rd
SW Richey Ln
SW Scholls Ferry Rd
Portland Golf Club
Oregon Episcopal School
SW Sunshine Ct
SW Arrowwood Dr
SW Oleson Rd
SW 86th Ave
Fanno Creek
SW 89th Pl
Whitford
Fanno Creek
SW Hunt Club Rd
SW Becker Dr
SW Oak Ln
SW Bohmann Pkwy
SW Aloma Way
SW Firlock Way
SW 78th Ave
SW Hunt Club Ln
SW Canby
SW Denney Rd
SW Cynthia St
Heather Ln
SW Rambler Ln
SW Cecilia Terrace
SW 92nd Ave
SW 83rd Ave
SW 81st Ave
SW 77th Ave
SW 76th Ave
SW 68th Ave
Garden Home School
210
SW Garden Home Rd
Garden Home
SW 84th Ave
SW 82nd Ave
SW 92nd Pl
SW 91st Ave
SW Whitford Ln
SW 88th Ave
SW Scholls Ferry Rd
SW Eagle Ln
SW Dolph St
SW 85th Ave
SW OBrien St
SW Oleson Rd
SW Stewart St
SW 74th Ave
SW 71st Ave
SW 69th Ave
SW 67th Ave
SW Alden St
SW Alden St
1:18,056
Go
0
0.1
0.2mi
© 2021 Microsoft Corporation, © 2021 Maxar, © TomTom


2-MILE OFFSET
Cedar Hills
West Slope
Beaverton
Raleigh Hills
Jesuit High School
Glencullen
BRIDLEMILE-SOUTHWEST HILLS
BRIDLEMILE
PORTLAND HEIGHTS
GARDEN HOME-RALEIGH HILLS
VERMONT HILLS
MAPLEWOOD
MULTNOMAH
VOSE
Whitford
HIGHLAND
Garden Home
SOUTH BEAVERTON
Progress
Metzger
WEST PORTLAND
MARKHAM
WEST PORTLAND PARK
Villa Ridge
ENGLEWOOD PARK
Greenburg
FAR SOUTHWEST
SUMMERLAKE-SCHOLLS
OAK CREEK
MT. PARK
Tigard
SW Terman Rd
SW Center St
SW Allen Blvd
SW Denney Rd
SW Hart Rd
SW Garden Home Rd
SW Multnomah Blvd
SW Oleson Rd
SW Patton Rd
SW Hamilton St
SW Pomona St
SW Scholls Ferry Rd
SW North Dakota St
SW Oak St
SW Stephenson
SW Park Way
Sylvan
Zoo
SW Humphrey Blvd
Beaverton Tigard Fwy S
Beaverton Tigard Fwy N
SW Western Ave
SW 96th Ave
SW Menlo Dr
SW Main Ave
SW Hocken Ave
SW Cedar Hills Blvd
SW Murray Blvd
SW Davies Rd
SW 125th Ave
SW 135th Ave
SW 121st Ave
SW Nimbus Ave
SW Hall Blvd
SW 72nd Ave
SW 45th Ave
SW 35th Ave
SW Dosch Rd
SW Sunset Blvd
SW Tiedeman Ave
Pacific Hwy
Walnut St
McNary Pkwy
Kerr Pkwy
8
10
210
217
5
99W
1:72,224
Go
0
0.5
1mi
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APPENDIX G – OREGON STREAM FUNCTIONAL ASSESSMENT METHOD (SFAM) REPORT (Best Professional Judgement Approach)

Four functional groups provide the basis for a function-based assessment for streams:

1. **Hydrologic functions:** include movement of water through the watershed and the variable transfer and storage of water along the stream channel, its floodplain, and associated alluvial aquifer.
2. **Geomorphic functions:** encompass hydraulic and sediment transport processes that generate variable forces within the channel and the variable input, transfer and storage of sediment within the channel and adjacent environs that are generally responsible for channel form at multiple scales.
3. **Biological functions:** include processes that result in maintenance and change in biodiversity, trophic structure, and habitat within the stream channel.
4. **Water quality functions:** encompass processes that govern the cycling, transfer, and regulation of energy, nutrients, chemicals and temperature in surface and groundwater, and between the stream channel and associated riparian system.

This table is completed for the removal of accumulated sediment from an irrigation pond at Portland Golf Club. It also includes temporary impacts for placement of a sandbag coffer dam, bypass pipe, and sediment check dams in Woods Creek and the irrigation pond. The post-evaluation column descriptions separately addresses post-dredging conditions, namely: (1), sediment removal from irrigation pond, and (2) installation of temporary sediment trapping features and bypass pipe for Woods Creek (only during dredging period). These are components of the same project and addressed separately in this evaluation table.

Table 2.1 Stream Function Categorization, Definition, and Ecosystem Services Provided

FUNCTIONAL GROUP	SPECIFIC FUNCTIONS	DEFINITION AND SERVICES PROVIDED	PRE- FUNCTION RATING	POST-FUNCTION RATING
Hydrologic functions	Surface water storage (SWS)	Temporary storage of surface water in relatively static state, generally during high flow, as in floodplain inundation, backwater channels, wetland depressions. Providing regulating discharge, replenishes soil moisture, provides pathways for fish and invertebrate movement, low velocity habitat and refuge, and contact time for biogeochemical processes.	Medium. The irrigation pond water levels are controlled by two gate valves situated along the north and southwest edges. During winter months, water levels are maintained at a lower elevation to provide stormwater desynchronization functions. During extreme rainfall periods, water backfloods Woods Creek and may overtop creek banks (near Wetland B). Due to control gate closures, flooding from Fanno Creek is infrequent (greater than 10 year frequency).	1. Medium. Portland Golf Club would continue to manage pond levels in a similar manner. Since the volume of removed sediments gets replaced with water, no appreciable increase in stormwater storage would occur. Backflooding of Woods Creek would also not change. 2. Temporary coffer dam, bypass pipe, and check dams would not change surface water storage, since these features will be removed before autumn rains.
	Sub/surface transfer (SST)	Transfer of water between surface and subsurface environments, often through hyporheic zone. Provides aquifer recharge, base-flow, exchange of nutrients/chemicals through hyporheic, moderates flow, and maintains soil moisture.	Low. Soil conditions surrounding the irrigation pond are mostly silt loam to silty clay loam textures. Clay layers may be present below 5 feet below ground surface. During irrigation season, pond water is removed, so shallow ground water moves toward the pond. During rainy season, groundwater likely flows toward Fanno Creek. Subsurface water transmissivity likely slow due to lack of sand or gravel layers underlying golf course.	1. Low. Portland Golf Club would continue 2. to withdraw irrigation water in a similar manner. No anticipated change to irrigation pumping, so no significant change to groundwater baseflows into pond. That is, sediment removal would neither increase or decrease exchange between surface water and ground water. Temporary coffer dam, bypass pipe, and check dams do not facilitate or interfere with surface to groundwater exchange.

Hydrologic functions (cont.)	**Flow variation (FV)**	Daily, seasonal and inter-annual variation in flow. Provides variability in stream energy driving channel dynamics, provides environmental cues for life history transitions, redistributes sediment, provides habitat variability (temporal), provides sorting of sediment and differential deposition.	Low. The irrigation pond water levels are controlled by two gate valves situated along the north and southwest edges. During winter months, water levels are maintained at a lower elevation to provide stormwater desynchronization functions. During extreme rainfall periods, water backfloods Woods Creek and may overtop creek banks (near Wetland B).	1. Low. Portland Golf Club would continue to manage pond levels in a similar manner. Since the volume of removed sediments gets replaced with water, no appreciable increase in stormwater storage would occur. Backflooding of Woods Creek would also not change. 2. Temporary coffer dam, bypass pipe, and check dams would not change surface water storage, since these features will be removed before autumn rains.

Geomorphic functions	**Sediment continuity (SC)**	The balance between transport and deposition of sediment such that there is no net erosion or deposition (aggradation or degradation) within the channel. Maintains channel character and associated habitat diversity, provides sediment source and storage for riparian and aquatic habitat succession, maintains channel equilibrium.	Low. Irrigation pond edges defined by a retaining wall in all directions; hence no erosion within pond. Pond bottom functions as sediment trap for Woods Creek.	1. Low. Sediment removal from irrigation pond would not accelerate erosion; however, increased sediment capacity is achieved. 2. Temporary coffer dam, bypass pipe, and check dams would provide short-term sediment trapping during dredging period. Any accumulated sediment would be removed with temporary features.
	Substrate mobility (SM)	Regular movement of channel bed substrate. Provides sorting of sediments, mobilizes/flushes fine sediment, creates and maintains hydraulic diversity, creates and maintains habitat.	Low. Irrigation pond effective at trapping sand and silt textures; however, clay particles may export with overflows to Fanno Creek. Pond accumulates sediments but does not sort, flush or remain static.	1. Low. Sediment removal from irrigation pond would not change sand and silt trapping function. No change to export of clay particles. 2. Temporary coffer dam, bypass pipe, and check dams would not interfere or alter substrate mobility of the irrigation pond or Woods Creek.

Biological Functions	**Maintain Biodiversity (MB)**	Maintain the variety of species, life forms of a species, community compositions, and genetics. Biodiversity provides species and community resilience in the face of disturbance and disease, full spectrum trophic resources, balance of resource use (through interspecies competition).	Low. The pond substrate is mostly unvegetated, hence low biodiversity. Additionally, the accumulated sediment in the irrigation pond generally limits biodiversity due to shallow water depth. Existing wildlife use consists of warmwater fish, water fowl, song birds, nocturnal mammals and occasional nutria or beaver. Pond is surrounded by mowed turf on three sides, so adjacent upland provides little ancillary habitat.	1. Low. Surrounding upland would be maintained in a similar condition, but water depth in irrigation pond would increase. It is plausible that deeper water would attract slightly more waterfowl and warmwater fish, but such improvement may be insignificant. Temporary coffer dam and check dams would temporarily displace or 2. discourage wildlife use during dredging period. Warmwater fish would utilize bypass pipe and avoid pond during dredge period.
	Create and maintain habitat (aquatic/ riparian) (CMH)	Create and maintain the suite of physical, chemical, thermal and nutritional resources necessary to sustain organisms. Habitat sustains native organisms. Habitat includes in-channel habitat, as defined largely by depth, velocity, and substrate, and riparian habitat, as defined largely by vegetative structure.	Low. The pond habitat is primarily unvegetated, submerged sediment. The pond has a narrow fringe bounded by a retaining wall on the upper side. Typical emergent plants include smartweed, rush, and cattail. Water movement within pond (except during irrigation pumping) slowly flows to Fanno Creek. Suitable habitat for warmwater fish, songbirds, waterfowl, and insects.	1. Low. Removal of accumulated sediment would deepen water depths in pond; thus, potential warmwater fish habitat would likely increase proportionally. While pond fringe plants would be removed by dredging, such species would naturally revegetate within 2 to 4 years. As such, no significant increase or decrease anticipated for in-pond habitat and associated 2. vegetation. Temporary coffer dam, bypass pipe, and check dams would not change habitat within pond and Woods Creek.
	Sustain trophic structure (STS)	Production of food resources necessary to sustain all trophic levels including primary producers, consumers, prey species and predators. Trophic structure provides basic nutritional resources for aquatic resources, regulates the diversity of species and communities.	Low. The irrigation pond has limited production of food resources due to shallow depth to accumulated sediment and nearly unvegetated condition. Since water is removed daily from pond during irrigation season, invertebrate food sources are low. Limited use by warmwater fish also restricts feeding opportunities for waterbirds and other predators.	1. Low. Removal of accumulated sediment would deepen water depths in pond; thus, potential warmwater fish habitat would likely increase proportionally. Mostly 2. unvegetated condition of substrate not likely to change, so no significant increase or decrease anticipated for trophic structure. Temporary coffer dam, bypass pipe, and check dams would not change food production resources.

Water Quality functions	**Nutrient cycling (NC)**	Transfer and storage of nutrients from environment to organisms and back to environment. Provides basic resources for primary production, regulates excess nutrients, provides sink and source for nutrients.	Medium. The accumulated sediment in the irrigation pond generally sequesters nutrients, since pond substrate is mostly unvegetated. Some dissolved nutrients are exported as irrigation water in spring, summer and early fall months. Tees, fairways, greens and landscaping benefit from nutrients in irrigation water. New sediment incrementally buries older sediment, which further sequesters nutrients.	1. Medium. Removal of accumulated sediment (via dredging) would export nutrients and sequester them at the sediment bag placement area. Nutrient sequestration will continue as new sediment incremental accumulates. Dissolved nutrients would continue being exported with irrigation water and utilized by turf grasses. No net change in nutrient cycling is anticipated. 2. Temporary coffer dam, bypass pipe, and check dams would not change irrigation pond capacity to sequester nutrient. Further, such features would not increase nutrient delivery to Fanno Creek; however, dissolved nutrients in Woods Creek would temporarily bypass the irrigation pond for 6 to 8 weeks. After project completion, no net change in nutrient cycling is anticipated.
	Chemical regulation (CR)	Moderation of chemicals in the water. Limits the concentration of beneficial and detrimental chemicals in the water.	Low. Chemical composition of irrigation pond water not known. The primary water source is the urbanizing watershed of Woods Creeks. Typical water constituents may include soil and grease from roads and driveways. No onsite impervious surfaces shed runoff into irrigation pond. Other chemical sources could be fertilizers and limited herbicides infrequently applied to turf area. Turf land does not drain directly to irrigation pond. Instead, such applications are absorbed by turf grasses and landscaping. Excess chemicals infiltrate into soil, where root system further utilize and/or degrade chemicals.	1. Low. Removal of accumulated sediment (via dredging) would cycle chemicals to the sediment bags, then drainage water would be pumped back to the irrigation pond. It is unlikely this temporary circulation pattern would either increase or decrease chemicals in the irrigation water. 2. Temporary coffer dam, bypass pipe, and check dams would not change chemical constituents in irrigation pond and Woods Creek. These temporary features are constructed of inert materials and installed for 6 to 10 weeks. After dredging is complete, these features are removed. No net change in chemical regulation is anticipated.

Water Quality functions	**Thermal regulation (TR)**	Moderation of water temperature. Limits the transfer and storage of thermal energy to and from streamflow and hyporheic zone.	Low. The irrigation pond has limited capacity for thermal regulation due to shallow depth to accumulated sediment. Few trees along south side of pond provide afternoon shade for a narrow edge of pond. Overall, the transfer and storage of thermal energy is minimal due to shallow water.	1. Medium. Removal of accumulated sediment would deepen water depths in pond; thus, thermal storage and transfer would likely increase (not quantified). Inlet and outlet features would not be affected by sediment removal. 2. Temporary coffer dam, bypass pipe, and check dams would not change thermal regulation in irrigation pond and Woods Creek.

APPENDIX F – OREGON RAPID WETLAND ASSESSMENT PROTOCOL (ORWAP) FUNCTIONAL ASSESSMENT REPORT

Oregon Rapid Wetland Assessment (ORWAP) V.3.2.*	Cover Page: Basic Description of Assessment
Site Name:	Portland Golf Club-Sediment Placement
Investigator Name:	P.Scoles
Date of Field Assessment:	Nov. 16, 2021
County:	Washington
Nearest Town:	Tigard
Latitude (decimal degrees):	45.47
Longitude (decimal degrees):	-122.7623
TRS, quarter/quarter section and tax lot(s):	T,01S, R. 01W, Sec. 24 (BC)
Approximate size of the Assessment Area (AA, in acres):	0.72
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100%
If delineated, DSL file number (WD #) if known:	Pending
Cowardin Systems & Classes (indicate all present, based on field visit and/or aerial imagery): Systems: Palustrine =P, Riverine =R, Lacustrine =L, Estuarine =E Classes: Emergent =EM, Scrub-Shrub =SS, Forested =FO, Aquatic Bed (incl. SAV) =AB, Open Water =OW, Unconsolidated Bottom =UB, Unconsolidated Shore =US	PEME
Predominant HGM Class: Estuarine=E, Lacustrine=L, Riverine=R, S= Slope, F= Flats, D= Depressional	Slope
Soil Unit Mapped in Most of the AA:	Aloha silt loam (mapping unit 1)
If tidal, the tidal phase during most of visit:	N/A
What percent (approximate) of the **wetland** were you able to visit?	100
What percent (approximate) of the **AA** were you able to visit?	100
Have you attended an ORWAP training session? If so, indicate approximate month & year.	Aug, 2010
How many wetlands have you assessed previously using ORWAP (approximate)?	16
Comments about the site or this ORWAP assessment (attach extra page if desired):	Subject PEM wetland formerly cleared, now dominated by non-native and invasive grasses. Adjacent ped/bike path is upper limit of contributing watershed. Lower end of wetland impounded by former RR berm. Golf course situated to north, older residential to south.

ORWAP V.3.2 Site Name:	Portland Golf Club-Sediment Placement
Investigator Name:	P.Scoles
Date of Field Assessment:	Nov. 16, 2021

Scores will appear below after data are entered in worksheets OF, F, T, and S. See Manual for definitions and descriptions of how scores were computed and ratings assigned.

Normalized Scores & Ratings for this Assessment Area (AA):

Specific Functions or Values:	Function Score	Function Rating	Rating Break Proximity	Values Score	Values Rating	Rating Break Proximity	Function Score (raw)	Values Score (raw)
Water Storage & Delay (WS)	4.74	Moderate	LM	0.00	Lower		4.74	0.00
Sediment Retention & Stabilization (SR)	4.85	Moderate		5.44	Moderate	MH	5.08	4.14
Phosphorus Retention (PR)	4.05	Moderate		2.10	Lower		4.28	1.74
Nitrate Removal & Retention (NR)	4.51	Moderate	LM	1.69	Lower		5.56	1.74
Anadromous Fish Habitat (FA)	5.68	Moderate		10.00	Higher		4.99	10.00
Resident Fish Habitat (FR)	0.00	Lower		0.00	Lower		0.00	0.00
Amphibian & Reptile Habitat (AM)	5.95	Moderate		6.67	Moderate	MH	5.40	6.67
Waterbird Nesting Habitat (WBN)	6.70	Moderate	MH	2.56	Moderate		5.56	2.56
Waterbird Feeding Habitat (WBF)	7.65	Higher		3.33	Moderate		6.90	3.33
Aquatic Invertebrate Habitat (INV)	2.18	Lower		2.33	Lower		4.25	2.83
Songbird, Raptor, Mammal Habitat (SBM)	2.33	Lower		3.33	Lower		4.34	3.33
Water Cooling (WC)	2.67	Moderate	LM	9.33	Higher		2.33	8.90
Native Plant Diversity (PD)	0.00	Lower		0.00	Lower		0.00	0.00
Pollinator Habitat (POL)	4.51	Moderate		3.92	Moderate		3.94	3.17
Organic Nutrient Export (OE)	5.94	Moderate					5.26	
Carbon Sequestration (CS)	3.51	Lower	LM				3.58	
Public Use & Recognition (PU)				3.50	Lower	LM		4.10

Other Attributes:	Score	Rating	Rating Break Proximity		
Wetland Sensitivity (SEN)	0.82	Lower			3.53
Wetland Ecological Condition (EC)	1.59	Lower			3.33
Wetland Stressors (STR)	5.07	Moderate	MH		4.67

GROUPS	Selected Function	Function Rating	Rating Break Proximity	Values Rating	Rating Break Proximity
Hydrologic Function (WS)	Water Storage & Delay (WS)	Moderate	LM	Lower	
Water Quality Support (SR, PR, or NR)	Sediment Retention & Stabilization (SR)	Moderate		Moderate	MH
Fish Habitat (FA or FR)	Anadromous Fish Habitat (FA)	Moderate		Higher	
Aquatic Habitat (AM, WBF, or WBN)	Waterbird Feeding Habitat (WBF)	Higher		Moderate	
Ecosystem Support (WC, INV, PD, POL, SBM, or OE)	Water Cooling (WC)	Moderate	LM	Higher	

NOTE: A score of 0 does not always mean the function or value is absent from the wetland. It usually means that this wetland has equal or less capacity than the lowest-scoring one, for that function or value, from among the 200 calibration wetlands that were assessed previously by Oregon Department of State Lands.

Date: Nov. 16, 2021	Name: P. Scoles	Site: Portland Golf Club-Sediment Placement	
Form OF Office Data ORWAP V. 3.2	Conduct an assessment only after reading the accompanying Manual and explanations in column E below. Answering many of the following questions requires viewing aerial imagery and maps, covering an area up to within 2 miles of the AA. **For each affirmative answer, change the 0 in the "Data" column to a "1".** Answer all items except where directed to skip to others. Questions whose cells in "Data" column have a **"W" MUST be answered for the ENTIRE wetland and bordering waters.**	For a list of functions to which each question pertains, see bracketed codes in column E. Codes for functions and their benefits are: WS= Water Storage, WC= Water Cooling, SR= Sediment Retention, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Aquatic Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibians & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PD= Native Plant Diversity, PU= Public Use & Recognition, EC= Ecological Condition, Sens= Sensitivity, STR= Stressors.	For guidance and detailed descriptions of how Excel calculates the numbers in the Scores worksheet, see the Technical Supplement and Appendix C of the Manual. For a documented rationale for each indicator, open each of the worksheet tabs at the bottom (one for each function or value) and see column H.

#	Indicators	Condition Choices	Data	Explanations, Definitions (Column E)	Cell Name	Comments
OF1	Distance to Extensive Perennial Cover (DistPerCov)	The distance from the AA edge to the edge of the closest patch or **corridor** of **perennial cover** (see definition in column E) larger than 100 acres is:		**Corridor** - is simply an elongated patch of perennial cover that is not narrower than 150 ft at any point. **Perennial cover** - is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground is disturbed less than annually, such as hayfields, lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. [AM, WBN, PD, PDv, POL, SBM, Sens, STR]		
		<100 ft.	0			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to <0.5 mile.	0			
		0.5 mile to 2 miles.	0			
		> 2 miles.	1			
OF2	Distance to Tidal Waters (DistTidal)	The distance from the AA edge to the closest body of **tidal water** is:		**Tidal water** - If unclear whether a water body is tidal, check the ORWAP Map Viewer's Headtide layer (expand Hydrology), or check with local sources. Assume Columbia River is tidal east to Bonneville Dam and the Willamette River south to the Oregon City Falls. [WBF]		
		<1 mile.	0			
		1-5 miles.	0			
		>5 miles.	1			
OF3	Distance to Ponded Water (DistPond)	The distance from the AA edge to the closest (but separate) body of nontidal fresh water (wetland, pond, or lake) that is ponded all or most of the year is:		Use field observations, aerial imagery, and/or the ORWAP Map Viewer's Persistent Nontidal layer (expand Wetlands/National Wetlands Inventory). [AM,WBF,WBN,SBM,PD,Sens]		
		<100 ft.	0			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to < 0.5 mile.	1			
		0.5 mile to 2 miles.	0			
		>2 miles.	0			
OF4	Distance to Lake (DistLake)	The distance from the AA edge to the closest (but separate) body of nontidal fresh water (wetland, pond, or lake) that is ponded during most of the year and is larger than 20 acres (about 1000 ft on a side) is:		Use field observations, aerial imagery, and/or the ORWAP Map Viewer's Persistent Nontidal layer (expand Wetlands/National Wetlands Inventory). [WBF,WBN]		
		<1 mile.	0			
		1-5 miles.	0			
		>5 miles.	1			
OF5	Distance to Herbaceous Open Land (DistOpenL)	The distance from the AA edge to the closest patch of **herbaceous openland** larger than 10 acres and in **flat terrain** is:		**Herbaceous openland** - includes both perennial and non-perennial cover. For example, it can include pasture, herbaceous wetland, meadow, prairie, ryegrass fields, row crops, herbaceous rangeland, golf courses, grassed airports, and hayfields. Do not include open water of lakes, ponds, or rivers; or unvegetated surfaces; or areas with woody vegetation. In dry parts of the state, croplands in flat areas are often irrigated and are distinctly greener in aerial images. **Flat terrain** - means slope of less than 5%. [WBF,WBN,POL]		
		<100 ft.	1			
		100 to <300 ft.	0			
		300 to <1000 ft.	0			
		1000 ft. to < 0.5 mile.	0			
		0.5 mile to 2 miles.	0			
		>2 miles.	0			

OF6	Distance to Nearest Busy Road (DistRd)	The distance from the AA center to the nearest road with an average daytime traffic rate of at least 1 vehicle/ minute is:		Estimate this traffic rate threshold using your judgment and considering the road width, local population, distance to densely settled areas, alternate routes, and other factors.		
		<100 ft.	0	[AM,SBM,PD,PUv,STR]		
		100 to <300 ft.	0			
		300 to < 0.5 mile.	1			
		0.5 to <1 miles.	0			
		1 to 2 miles.	0			
		>2 miles.	0			
OF7	Size of Largest Nearby Patch of Perennial Cover (SizePerenn)	Including the AA's vegetated area, the largest patch or corridor that is **perennial cover** and is contiguous with vegetation in the AA (i.e., not separated by roads or channels that create gaps wider than 150 ft), occupies:		**Contiguous** -Abutting, with no major physical separation that prohibits free exchange or flow of surface water (i.e., not separated by roads or channels that create gaps wider than 150 ft)		
		<.01 acre.	0	**Perennial cover** - See OF1.		
		.01 to < 1 acre.	0			
		1 to <10 acres.	1	Disqualify any patch or corridor of perennial cover where it becomes separated from the AA by a gap of >150 ft, if the gap is comprised of unvegetated land or if the corridor narrows to less than 150 ft.		
		10 to <100 acres.	0			
		100 to <1000 acres.	0			
		1000 to 10,000 acres.	0	[AM,SBM,PD,POL,Sens,STR]		
		>10,000 acres.	0			
OF8	Wetland Type Local Uniqueness (UniqPatch)	**Select EACH** of the vegetation types below that comprise more than 10% of the AA AND less than 10% of a 0.5 mile radius around the AA. (See Column E).		This is a 2-part question: (1) if no vegetation class comprises more than 10% of the AA, answer "none of the above."		
		Herbaceous vegetation (perennial grasses, sedges, forbs; not under a woody canopy; not crops).	0			
		Unshaded shrubland (woody plants shorter than 20 ft).	0	(2) If a vegetation class does comprise more than 10%, determine if that vegetation class also comprises less than 10% of a 0.5 mile circle (~50 acres).		
		Trees (woody plants taller than 20 ft).	0	[INVv,AMv,WBFv,WBNv,SBMv,PDv,POLv,Sens]		
		None of above.	1			
OF9	Perennial Cover Percentage (PerCovPct)	Within a 2-mile radius of the AA center, the percentage of land that has **perennial cover** is:		**Perennial cover** - is vegetation that includes wooded areas, native prairies, sagebrush, vegetated wetlands, as well as relatively unmanaged commercial lands in which the ground is disturbed less than annually, such as hayfields, lightly grazed pastures, timber harvest areas, and rangeland. It does not include water, row crops (e.g., vegetable, orchards, Christmas tree farms), lawns, residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads. [FA,AM,SBM,POL,Sens,STR]		
		<5% of the land.	0			
		5 to <20% of the land.	0			
		20 to <60% of the land.	1			
		60 to 90% of the land.	0			
		>90% of the land.	0		PerennAll	
OF10	Forest Percentage (ForestPct)	Within a 2-mile radius of the AA center, the cumulative amount of forest (regardless of **forest patch** sizes, and including any in the AA) is:		**Forested patch -** is a land cover patch that currently has >70% cover of woody plants taller than 20 ft. May be in a plantation.		
		<5% of the circle.	0	[FA,SBM,STR]		
		5 to <20%.	1			
		20 to <50%.	0			
		50 to 80%.	0			
		>80%.	0			
OF11	Herbaceous Open Land Percentage (OpenLpct)	Within a 2-mile radius of the AA center, the amount of **herbaceous openland** in **flat terrain** is:		**Herbaceous openland** - can include both perennial and non-perennial cover. For example, it can include pasture, herbaceous wetland, meadow, prairie, ryegrass fields, row crops, herbaceous rangeland, golf courses, grassed airports, and hayfields. Do not include open water of lakes, ponds, or rivers; or unvegetated surfaces; or areas with woody vegetation. **Flat terrain** - means slope of less than 5%. [WBF,WBN,POL]		
		<5% of the land.	0			
		5 to <20%.	1			
		20 to <50%.	0			
		50 to 80%.	0			
		>80%.	0			

OF12	Landscape Wetland Connectivity (ConnScapeW)	Within a 2-mile radius of the AA center:		**Corridor** - is simply an elongated patch of perennial cover that is not narrower than 150 ft at any point.		
		There are NO other wetlands.	0			
		There are other wetlands (or a wetland), but NONE are connected to the AA by a **corridor** of **perennial** vegetation. The corridor must be at least 150 ft wide along its entire length and not interrupted by roads with **regular traffic**.	0	**Regular traffic** - is at least 1 vehicle per hour during the daytime throughout most of the growing season. Assess this based on local knowledge, type of road, and proximity to developed areas.		
		There are other wetlands (or a wetland), and ALL are connected to the AA by the type of corridor described.	1			
		There are other wetlands (or a wetland), and ONE or MORE (but not all) are connected to the AA by the type of corridor described.	0	**Perennial** - see OF9 for definition. [WBN,SBM,Sens,STR]		
OF13	Local Wetland Connectivity (ConnLocalW)	Within a 0.5 mile radius of the AA center:		**Regular traffic** - is at least 1 vehicle per hour during the daytime throughout most of the growing season. Assess this based on local knowledge, type of road, and proximity to developed areas.		
		There are NO other wetlands.	0			
		There are other wetlands (or a wetland), but NONE are connected to the AA by a **corridor** of **perennial** vegetation. The corridor must be at least 150 ft wide along its entire length and not interrupted by roads with **regular traffic**.	0	**Perennial** - see OF9 for definition.		
		There are other wetlands (or a wetland), and ALL are connected to the AA by the type of corridor described.	1	IF possible, field verify		
		There are other wetlands (or a wetland), and ONE or MORE (but not all) are connected to the AA by the type of corridor described.	0	[AM,WBN,SBM,PD,Sens,STR]		
OF14	Wetland Number & Diversity Uniqueness (HUCbest)	According to the ORWAP Report, this AA is located in one of the HUCs that are listed as having a large diversity, area, or number of wetlands relative to the area of the HUC. **Select All of the following that are true:**		In the ORWAP Report, under the Watershed Information section and the HUC Best table, look at the columns "Is HUC Best?" and "Greatest Criteria Met."		
		Yes, for the HUC8 watershed	0	[AM,WBF,WBN,SBM,Sens]		
		Yes, for the HUC10 watershed	0			
		Yes, for the HUC12 watershed	0			
		None of above.	1			
		Data are inadequate (NWI mapping not completed in HUC).	0			
OF15	Landscape Functional Deficit (GISscore)	In the ORWAP Report, find the HUC 12 Functional Deficit table. **Select All functions below that have a notation for that HUC.**		In the ORWAP Report, under the Watershed Information section, look at the Functional Deficit table. Enter 1 for each of the listed functions that are noted.		
		Water storage (WS)	0			
		Sediment retention (SR)	0	These are HUCs in which a relatively small number, or proportional area, of the wetlands are likely to be performing the named function, thus adding value to those that are.		
		Nutrient transformation (NT)	0			
		Thermoregulation (WC)	0	See ORWAP's Technical Supplement for explanation of how the FuncDeficit was calculated.		
		Aquatic invertebrate habitat (INV)	0			
		Amphibian habitat (AM)	0	[WSv,WCv,SRv,PRv,INVv,FAv,AMv,WBNv]		
		Fish habitat (FH)	0			
		Waterbird habitat (WB)	1			
		None of above.	0			
		No data.	0			
OF16	Conservation Designations of the AA or Local Area (ConDesig)	On the ORWAP Map Viewer, use the layers indicated below to answer. **Select All of the following that are true**:		In the ORWAP Map Viewer, use the applicable layers.		
		(a)The AA is within or connected to a stream or other water body and this stream or water body has been designated as ESH within 0.5 miles of the AA, according to the **Essential Salmonid Habitat (ESH)** layer.	1	Include areas not shown as ESH, if ODFW has confirmed they qualify as ESH. [WCv, FA, FAv]		
		(b)The AA is within or contiguous to a designated **Oregon's Greatest Wetlands,** according to the map layer of that name.	0	Oregon's Greatest Wetlands identifies the most biologically and ecologically significant wetlands in the State of Oregon. [PU]		
		(c)The AA is within an **Important Bird Area (IBA)**, as officially designated, according to the map layer of that name.	0	[WBFv, WBNv]		
		None of above.	0			

OF17	Non-anadromous Fish Species of Conservation Concern (RareFR)	According to the ORWAP Report, the score for occurrences of rare non-anadromous fish species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include Miller Lake lamprey, Goose Lake lamprey, Pit sculpin, Lahontan cutthroat trout, Inland Columbia Basin redband trout, Steelhead (Snake River Basin ESU), Alvord chub, Goose Lake tui chub, Borax Lake chub, Lahontan redside, Oregon chub, Goose Lake sucker, Tahoe sucker, Warner sucker, Shortnose sucker, Lost River sucker. Note that for some of these species, only specific geographic populations are designated. [FRv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or ≥ 0.90 for this group's sum score), or there is a recent (within 5 years) onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.33 for both the maximum score this group's sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF18	Amphibian or Reptile of Conservation Concern (AmphRare)	According to the ORWAP Report, the score for occurrences of rare amphibian or reptile species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Black salamander, California slender salamander, Cope's giant salamander, Rocky Mountain tailed frog, Woodhouse's toad, Foothill yellow-legged frog, Northern leopard frog, Oregon spotted frog, Columbia spotted frog. [AMv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or >0.90 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	1			
		Low (≤ 0.21 for maximum score AND <0.15 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	0			
OF19	Feeding (Non-breeding) Waterbird Species of Conservation Concern (RareWBF)	According to the ORWAP Report, the score for occurrences of rare **non-breeding** (feeding) waterbird species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. **Non-breeding** - mainly refers to waterbird feeding during migration and winter. California brown pelican, Aleutian cackling goose, Dusky Canada goose [WBFv] This question may need to revised after the field visit.		
		High (≥ 0.33 for maximum score, or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Low (< 0.33 for maximum score and for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF20	Nesting Waterbird Species of Conservation Concern (RareWBN)	According to the ORWAP Report, the score for occurrences of rare nesting waterbird species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Horned grebe, Red-necked grebe, Western grebe, Clark's grebe, American white pelican, Least bittern, Snowy egret, Trumpeter swan, White-faced ibis, Harlequin duck, Bufflehead, Yellow rail, Western snowy plover, Upland sandpiper, Franklin's gull, Marbled murrelet. [WBNv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or ≥1.00 for this group's sum score), or there is a recent breeding-season observation of any of these species onsite by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.09 for maximum score and for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species during breeding season by a qualified observer under conditions similar to what now occur.	1			
OF21	Songbird, Raptor, Mammal Species of Conservation Concern (RareSBM)	According to the ORWAP Report, the score for occurrences of rare songbird, raptor, or mammal species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. Species include: Bald eagle, American peregrine falcon, Arctic peregrine falcon, Greater sage-grouse, Columbian sharp-tailed grouse, Yellow-billed cuckoo, Northern spotted owl, Short-eared owl, Black swift, Lewis's woodpecker, Purple martin, Northern waterthrush, Bobolink, Tricolored blackbird, Fringed myotis, Spotted bat, Townsend's big-eared bat, Pallid bat, Northern sea lion, Fisher, Sea otter, Canada lynx, Columbian white-tailed deer. [SBMv] This question may need to revised after the field visit.		
		High (≥ 0.60 for maximum score, or >1.13 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.09 for maximum score AND <0.13 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF22	Invertebrate Species of Conservation Concern (RareInvert)	According to the ORWAP Report, the score for occurrences of rare invertebrate species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See Supp_Info file for a list of species. See the Supp_Info file's RareAnimals worksheet for list of species addressed by this question. [INVv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or for this group's sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Low (< 0.75 for maximum score AND for this group's sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			

OF23	Plant Species of Conservation Concern (RarePspp)	According to the ORWAP Report, the score for occurrences of rare wetland-indicator plant species in the vicinity of this AA is:		Use ORWAP Report's Rare Species Scores max and sum scores. See the Supp_Info's RareWetPlants worksheet for list of species addressed by this question. [PDv,POLv] This question may need to revised after the field visit.		
		High (≥ 0.75 for maximum score, or > 4.00 for sum score), or there is a recent onsite observation of any of these species by a qualified observer under conditions similar to what now occur.	0			
		Intermediate (i.e., not as described above or below).	0			
		Low (≤ 0.12 for maximum score AND < 0.20 for sum score, but not 0 for both).	0			
		Zero for both this group's maximum and its sum score, and no recent onsite observation of these species by a qualified observer under conditions similar to what now occur.	1			
OF24	River Proximity (RiverProx)	There is a nontidal river within 1 mile and it is adjacent to, OR downslope from, the AA (connected or not). **Enter 1, if true. If not, SKIP to OF27.**	0	**River** - as used here is a channel wider than 50 ft between its banks. In the ORWAP Map Viewer, use the National Hydrography Dataset - Flowline layer (expand Hydrology).[WSv]	NearRiver	
OF25	Floodable Property (FloodProp)	**Select ONE** of the below:		**Row crops** - do not include pasture or other perennial cover. In the ORWAP Map Viewer, use the Floodplain layers. Also, the Seasonal Nontidal Wetland layer (expand Wetlands/National Wetlands Inventory) may indicate some floodplain areas. [WSv] Supplement with field observations at multiple seasons, if possible.		
		Floodplain boundaries within 1 mile downslope or downriver from the AA have not been mapped. **Enter 1 and SKIP TO OF27.**	0			
		Floodplain boundaries within 1 mile downslope from the AA have been mapped BUT there is neither infrastructure nor **row crops** vulnerable to river flooding located within the floodplain and within that distance. **Enter 1 and SKIP TO OF27.**	0			
		Floodplain boundaries have been mapped AND infrastructure or **row crops** are present within 1 mile downslope or downriver and those are not protected from 100-year floods, but actual damage has not been documented.	0			
		Damage to infrastructure or row crops from river flooding has been documented within that distance.	0			
OF26	Type of Flood Damage (DamageType)	The greatest financial damage in the floodplain is (or would be) to:		**Row crops** - do not include pasture or other perennial cover. On the ORWAP Map Viewer, use the Floodplain layers [WSv]		
		Buildings, roads, bridges.	0			
		Row crops (during some years).	0			
OF27	Hydrologic Landscape (Arid)	According to the ORWAP Report, the wetland is in a hydrologic landscape unit classified as:		In the ORWAP Report, under the Location Information table, find the Hydrologic Landscape Class. [AM, AMv, WBNv, SBMv, OE, Sens]		
		Arid.	0			
		Semi-arid.	0			
		Dry.	0			
		Moist.	0			
		Wet.	1			
		Very Wet.	0			
OF28	Input Water - Recognized Quality Issues (WQin)	According to ORWAP Map Viewer's Water Quality Streams layer and Water Quality Lakes layers, ALL of the following are true: **(a)** within 1 mile upstream from the AA edge, a water body or stream reach is labeled as being 303d, Water Quality Limited (categories 3B-5); Potential Concer; or TMDL Approved AND **(b)** the problem concerns one or more of the parameters listed below. **Select All that apply**.		Use the ORWAP Map Viewer's Water Quality Streams layer and the Water Quality Lakes layer (expand Water Quality and Quanity) and the Distance tool. Use the Identy tool to determine the reason for the listings. If the AA receives both inflow and outflow from river flooding, consider the polluted water to be both "upstream" and "downstream". [SRv,PRv,INV,FA,FR,AM,WBF,WBN,STR] This may need to be verified in the field.		
		Total suspended solids (TSS), sedimentation, or turbidity.	0			
		Phosphorus, chlorophyll-a, or algae.	0			
		Nitrates, ammonia, chlorophyll-a, or algae.	0			
		Petrochemicals, heavy metals (iron, manganese, lead, zinc, etc.), other toxins.	0			
		Temperature or dissolved oxygen.	0			
		None of above, or no data. **If true, enter 1 and SKIP to OF30.**	1		NoDataWQup	
OF29	Duration of Connection Beween Problem Area & the AA (ConnecUp)	The upstream problem area mentioned above (OF28) has a surface water connection to the AA:		In the ORWAP Map Viewer, use the National Hydography Dataset (expand Hydrology) and the Persistent, Seasonal, or Saturated nontidal layers (expand Wetlands/National Wetlands Inventory) to determine duration of surface water connection. [SRv,PRv,INV,FA,FR,AM,WBF,WBN,STR] This may need to be determined or verified in the field.		
		For 9 or more continuous months annually.	0			
		Intermittently (at least once annually, but for less than 9 months continually).	0			
		Never (or less than annually).	0			
OF30	Downslope Water Quality Issues (ContamDown)	According to ORWAP Map Viewer's Water Quality Streams layer and Water Quality Lakes layer, ALL of the following are true: (**a**) within 1 mile downhill or downstream from the AA's edge, a water body is labeled as being 303d, Water Quality Limited (categories 3B-5); Potential Concern; or TMDL Approved AND **(b)** the problem concerns one or more of the parameters listed below. **Select All that apply**.		Use the ORWAP Map Viewer's Water Quality Streams layer and the Water Quality Lakes layer (expand Water Quality and Quanity) and the Distance tool. Use the Identy tool to determine the reason for the listings. [WCv,SRv,PRv,FA]		
		Total suspended solids (TSS), sedimentation, or turbidity.	0			
		Phosphorus, chlorophyll-a, or algae.	0			
		Nitrates, ammonia, chlorophyll-a, or algae.	0			
		Petrochemicals, heavy metals (iron, manganese, lead, zinc, etc.), other toxins.	0			
		Temperature or dissolved oxygen.	0			
		None of above, or no data. **Enter 1 and SKIP to OF32.**	1		NoDataWQdo	
OF31	Duration of Connection Beween AA & Water Quality Problem Area (ConnDown)	The connection between the downstream problem area mentioned above (OF30) and the AA:		In the ORWAP Map Viewer, use the National Hydography Dataset (expand Hydrology) and the Persistent, Seasonal, or Saturated nontidal layers (expand Wetlands/National Wetlands Inventory) to determine duration of surface water connection. [WCv,SRv,PRv,FA]		
		Is a stream or water body that connects these areas for 9 or more continuous months annually.	0			
		Is a stream or water body that connects these areas intermittently (at least once annually, but for less than 9 months continually).	0			

		Is a probable groundwater connection, or connection via direct runoff only (no channel connection).	0	This may need to be determined or verified in the field.		
		Never exists (a topographic ridge probably prevents all the AA's runoff and groundwater from reaching the problem area).	0			
OF32	Drinking Water Source (DEQ) (DWsource)	According to ORWAP Map Viewer's Surface Water Drinking Water Source Areas layer and the Ground Water Drinking Water Source Areas layer, the AA is within:		In the ORWAP Map Viewer, use the water source layers (expand Water Quality and Quantity). [NRv]		
		The source area for a surface-water drinking water (DW) source.	0			
		The source area for a groundwater drinking water source.	0			
		Neither of above.	1			
OF33	Groundwater Risk Designations (GWrisk)	According to ORWAP Map Viewer's Groundwater Management Areas layer and the Sole Source Aquifer layer, the AA is: **Select All that apply**		In the ORWAP Map Viewer, use the DEQ Groundwater Management Areas layer and the Sole source Aquifer layer (expand Water Quality and Quantity). [NRv]		
		Within a designated Groundwater Management Area (ODEQ).	0			
		Within a designated Sole Source Aquifer area (EPA): the North Florence Dunal Aquifer.	0			
		Neither of above.	1			
OF34	Relative Elevation in Watershed (Elev)	In the ORWAP Map Viewer, based on the Hydrologic Boundaries 4th Level (HUC 8) layer (expand Hydrology), determine if the AA is: (See Column E)		1) Consider which end of the HUC is the bottom. Where streams join, the "V" that they form on the map points towards the bottom of the HUC. 2) If the AA is closer to the HUC's outlet than to its upper end, and is closer to the river or large stream that exits at the bottom of the HUC than it is to the boundary (margin) of the HUC, then check "lower 1/3" If not near that river, check "middle 1/3". 3) If the AA is not in a 100-yr floodplain, is closer to the HUC upper end than to its outlet, and is closer to the boundary (margin) of the HUC than to the river or large stream that exits at the bottom of the HUC, then check "upper 1/3" 4) For all other conditions, check "middle 1/3". [WSv, PRv, FA, ER, WCv, OF, Seps, SRv]		
		In the upper one-third of its watershed.	0			
		In the middle one-third of its watershed.	0			
		In the lower one-third of its watershed.	1		LowerShed	
OF35	Runoff Contributing Area (RCA) - Wetland as % of (WetPctRCA)	Delimit the wetland's Runoff Contributing Area (RCA) using a topographic base map. The area of the AA's wetland is:	W	See the ORWAP Manual for specific protocol for delimiting the RCA (Section 4.1 Step 5). The RCA includes only the areas that potentially drain directly to the AA's wetland rather than to channels that flow or flood into that wetland. Exact precision in drawing the boundary is not required. [WS, WSv, SR, SRv, PR, PRv, WCv]		
		<1% of its RCA.	0			
		1 to <10% of its RCA.	0			
		10 to 100% of its RCA.	1			
		Larger than the area of its RCA. **Enter 1 and SKIP TO OF39.**	0		NoRCA	

OF36	Unvegetated % in the RCA (ImpervRCA)	The proportion of the RCA comprised of buildings, roads, parking lots, exposed bedrock, and other surface that is usually unvegetated at the time of peak annual runoff is about:	W	In the ORWAP Map Viewer, use an Aerial layer to determine the proportion of the RCA comprised of buildings, roads, parking lots, exposed bedrock, and other surfaces that are usually unvegetated at the time of peak annual runoff. [WSv,WCv,SRv,PRv,INV,FA,Sens,STR]		
		<10%.	1			
		10 to 25%.	0			
		>25%.	0			
OF37	Transport From Upslope (TransRCA)	A relatively large proportion of the precipitation that falls farther upslope in the RCA reaches this wetland quickly as indicated by the following: **(a)** RCA slopes are steep, and/or **(b)** upslope wetlands historically present have been filled or drained extensively, and/or **(c)** land cover is mostly non-forest, and/or **(d)** most RCA soils are shallow. This statement is:	W	Refer to aerial imagery and/or consult local sources. See the ORWAP Manual for instructions. [WSv,SRv,PRv,STR]		
		Mostly true.	0			
		Somewhat true.	0			
		Mostly untrue.	1			
OF38	Upslope Soil Erodibility Risk (ErodeUp)	Use the ORWAP Report or the Map Viewer to determine if the erosion hazard rating of the soil within 200 ft away and upslope of the AA is:		If the soil unit is the same as the AA, the Erosion Hazard can be obtained from the ORWAP Report's Soil Information section. If the soil unit is different than the AA, use ORWAP Map Viewer's Oregon Soil layer and see the ORWAP Manual for instructions on how to determine the erosion hazard rating. [SRv,PRv,STR]		
		Slight.	0			
		Moderate.	0			
		Severe.	0			
		Very severe.	0			
		Could not determine.	0			
OF39	Streamflow Contributing Area (SCA) - Wetland as % of (WetPctSCA)	Delimit (or visualize, for large river basins) the wetland's Streamflow Contributing Area (SCA) using a topographic base map. The area of the AA's wetland is:	W	See the ORWP Manual for specific protocol for delimiting the SCA (section 4.1, Step 6). The SCA is all upland areas that drain into streams, rivers, and lakes that feed the AA's wetland either directly or during semi-annual floods. In addition, for wetlands intercepted by a mapped stream, the SCA can be delineated automatically and its area reported at this USGS web site: https://streamstats.usgs.gov/ss/. Enter the coordinates, select Oregon, select Delineate, zoom to level 15 or finer, and click on a stream.		
		<1% of its SCA, or wetland is in the floodplain of a major river.	0			
		1 to <10% of its SCA.	0			
		10 to 100% of its SCA.	0			
		Larger than the area of its SCA. **Enter 1 and SKIP TO OF41.**	0		NoSCA1	
		Wetland lacks tributaries and receives no overbank water. **Enter 1 and SKIP to OF41.**	1		NoSCA	
OF40	Unvegetated % in the SCA (ImpervSCA)	The proportion of the SCA comprised of buildings, roads, parking lots, exposed bedrock, and other surface that is usually unvegetated at the time of peak annual runoff is about :	W	See the ORWAP Manual for instructions. [WCv,SRv,PRv,FA,STR]		
		<10%.	0			
		10 to 25%.	0			
		>25%.	0			
OF41	Upland Edge Shape Complexity (EdgeShape)	Most of the edge between the AA's wetland and upland is **(select one)**:	W	See ORWAP Manual for instructions and illustrations. [NR, SBM, Sens]		
		Linear: a significant proportion of the wetland's upland edge is straight, as in wetlands bounded partly or wholly by dikes or roads, or the AA is entirely surrounded by water or other wetlands.	0			
		Intermediate: Wetland's shape is (a) ovoid, or (b) mildly ragged edge, and/or (c) contains a lesser amount of artificially straight edge.	1			
		Convoluted: Wetland perimeter is many times longer than maximum width of the wetland, with many alcoves and indentations ("fingers").	0			
OF42	Zoning (Zoning)	According to ORWAP Map Viewer's Zoning layer, the dominant zoned land use designation for currently undeveloped parcels upslope from the AA and within 300 ft. of its upland edge is:		See the ORWAP Manual for instructions on how to determine the zoning designation. If information is not provided, check local zoning maps. [WSv,WCv,SRv,PRv,INVv,FAv,FRv,AMv,WBFv,WBNv,SBMv,PDv,POLv,PUv]		
		Development (Commercial, Industrial, Urban Residential, etc.), or no undeveloped parcels exist upslope from the AA.	1			
		Agriculture or Rural Residential.	0			
		Forest or Open Space, or entirely public lands.	0			
		Not zoned, or no information.	0			

OF43	Growing Degree Days (GDD)	According to ORWAP Map Viewer's Growing Degree Days layer, the long term normal Growing Degree Days category at the approximate location of the AA is:		See the ORWAP Manual for instructions on how to determine the growing degree days category. [NR, FR, AM, WBN, SBM, WCv, OE, CS, Sens]		
		<256.	0			
		256 - 1020.	0			
		1021-1785.	0			
		1786 - 2550.	0			
		2551 - 3315.	1			
		3316 - 4079.	0			
		> 4079.	0			

Date: Nov. 16, 2021	Name: P.Scoles	Site: Portland Golf Club-Sediment Placement	
Form F Field Data (nontidal Wetlands) ORWAP V 3.2	Conduct an assessment only after reading the accompanying Manual and explanations in column E below. **For each affirmative answer, change the 0 in the "Data" column to a "1".** Answer all items except where directed to skip to others. Questions whose cells in "Data" column have a **"W" MUST be answered for the ENTIRE wetland and bordering waters.**	For a list of functions to which each question pertains, see bracketed codes in column E. Codes for functions and their benefits are: WS= Water Storage, WC= Water Cooling, SR= Sediment Retention, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Export, INV= Invertebrates, FA= Anadromous Fish, FR= Resident Fish, AM= Amphibians, WBF= Feeding Waterbirds, WBN= Nesting Waterbirds, SBM= Songbirds, Mammals, & Raptors, POL= Pollinators, PH= Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sens= Sensitivity, STR= Stressors.	For guidance and detailed descriptions of how Excel calculates the numbers in the Scores worksheet, see the Technical Supplement and Appendix C of the accompanying Manual. For a documented rationale for each indicator, open each of the worksheet tabs at the bottom (one for each function or value) and see column H.

#	Indicators	Condition Choices	Data	Explanations, Definitions (Column E)	Cell Name	Comments
F1	Tidal Wetland (Tidal)	This is a tidal wetland (either freshwater or saltwater). **If yes, GO TO worksheet " T ".** Do not enter any data here. **If nontidal, continue with F2.**		**Tidal wetland -** a wetland that receives tidal water at least once during a normal year, regardless of salinity, and dominated by emergent or woody vegetation. Tidal flooding occurs on a 6-hour cycle DURING THE TIME it is flooded by tide, which may be as infreuent as once per year. If NWI map shows the wetland with a code beginning with E (for estuarine), assume the wetland to be tidal. However, some wetlands lacking that code are also tidal.		
F2	Ponded Condition (Lentic)	At least once every 2 years, some part of the AA contains a cumulative total of >900 sq.ft. of surface water that is ponded. The water persists for >6 days and may be hidden beneath emergent vegetation or scattered in small pools. **Enter 1, if true.**	1	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). [AM,WBF,WBN]	Lentic	
Reminder: For all questions, the AA should include all persistent waters in ponds smaller than 20 acres that are **adjacent** to the AA. The AA should also include part of the water area of adjacent lakes or rivers larger than 20 acres -- specifically, the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone.				**Adjacent** - is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.		
F3	Water Regime (Hydropd)	The water regime (hydroperiod) of the most permanent (usually deepest) part of the AA is: **Select only ONE.** [To meet any of the definitions other than Ephemeral, there must be >100 sq ft of surface water for the duration described, otherwise mark the type listed above it.]		In the NRCS county soil survey, the Water Features table provides information about periods of flooding, ponding, and highwater table depths. Descriptions of the soil units may include information on saturation persistence. Also consider the hydroperiod label on NWI wetland polygons. [WS, FA, FR, WBN, WBF, WC]		
		Ephemeral. Surface water in the wettest part of the AA is present for fewer than 7 consecutive days during an average growing season. Includes some of the areas mapped as Saturated Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F25.**	0		NeverWater	
		Temporary. Surface water present for 1-4 weeks consecutively during an average growing season, OR if persists for longer, it is almost entirely in scattered pools, each smaller than 1 sq.m. Dries up completely during part of most average years. Includes some of the areas mapped as Saturated Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F25.**	0		TempWet	
		Seasonal. Surface water present for 5-17 weeks (1-4 months) consecutively during an average growing season, but dries up completely during part of most average years. Includes some of the areas mapped as Seasonal Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F5.**	1		ShallowType	
		Semi-Persistent. Surface water present for more than 17 weeks (4 months) consecutively during an average growing season, but dries up completely during part of most average years. Includes some of the areas mapped as Seasonal Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and SKIP to F5.**	0		DeepType	
		Permanent. Does not dry up completely during most average years. Includes some of the areas mapped as Persistent Nontidal in the ORWAP Map Viewer (which is not comprehensive). **Enter 1 and continue.**	0	**Permanent** - usually has significant groundwater input, higher conductivity, less annual water level fluctuation. No woody vegetation in most persistently flooded parts. Often with extensive open water and subsurface aquatic plants.	PermType	

F4	Flooded Persistently - % of AA (PermW)	Identify the parts of the AA that still contain surface water even during the **driest times of a normal year** . At that time, the percentage of the AA that still contains surface water is:		**driest times of a normal year -** i.e., when the AA's surface water is at its lowest annual level. Sites fed by unregulated streams that descend on north-facing slopes, tend to remain wet longer into the summer. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [WS,PR,NR,CS,INV,FR,AM,WBF,WBN]		
		1 to <25% of the AA.	1			
		25 to <50% of the AA.	0			
		50 to 95% of the AA.	0			
		>95% of the AA.	0		AllPermWater	
F5	Depth Class (Predominant) (DepthDom)	When water is present in the AA, the depth most of the time in most of inundated area is: [Note: NOT necessarily the maximum spatial or annual depth]		This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the AA is brief, the answer will be based on the depth of the most persistently inundated part of the AA. Include surface water in channels and ditches as well as ponded areas. In the ORWAP Manual, se the diagram in Appendix B. [WC,SR,PR,CS,OE,INV,FA,FR,WBF,WBN,PD,Sens]		
		>0 to <0.5 ft.	1			
		0.5 to < 1 ft deep.	0			
		1 to <3 ft deep.	0			
		3 to 6 ft deep.	0			
		>6 ft deep.	0			
F6	Depth Class Distribution (DepthEven)	Within the area described above, and during most of the time when surface water is present, the water area has: **Select only one.**		Estimate these proportions by considering the gradient and microtopography of the site. In the ORWAP Manual, see the diagram in Appendix B. [INV,FR,WBF,WBN,PD]		
		One depth class covering >90% of the AA's inundated area (use the classes in the question above).	0			
		One depth class covering 51-90% of the AA's inundated area (use the classes in the question above).	0			
		Neither of above. There are 3 or more depth classes and none occupy >50%.	1			
F7	Emergent Plants -- Area (EmArea)	Consider just the area that has surface water for >1 week during the growing season. Herbaceous plants (not moss, not woody) whose foliage extends above a water surface in this area (i.e., emergents) cumulatively occupy an annual maximum of:	W	If multiple small patches are separated by less than 150 ft, they may be combined when evaluating this question. [SR,PR,OE,INV,FR,WBF,WBN,SBM,PD]		
		<0.01 acre (< 400 sq.ft). **Enter 1 and SKIP TO F10,** unless only part of a wetland is being assessed.	0		NoEm	
		0.01 to < 0.10 acres (3,920 sq. ft).	1			
		0.10 to <0.50 acres (21,340 sq. ft).	0			
		0.50 to <5 acres.	0			
		5 to 50 acres.	0			
		>50 acres.	0			
F8	% Emergent Plants (EmPct)	Emergent plants occupy an annual maximum of:		[WC,SR,PR,NR,CS,OE,INV,PD,FA,FR,AM,WBF,WBN,SBM]		
		<5% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		5 to <30% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		30 to <60% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		60 to 95% of the parts of the AA that are inundated for >7 days at some time of the year.	0			
		>95% of the parts of the AA that are inundated for >7 days at some time of the year.	1			
F9	Cattail or Tall Bulrush Cover (Cttail)	The percentage of the emergent vegetation cover in the AA that is cattail (*Typha* spp.) or tall bulrush is:		[WBN, SBM]		
		<1% of the emergent vegetation, or cattail and bulrush are absent.	1			
		1 to <25% of the emergent vegetation.	0			
		25 to 75% of the emergent vegetation.	0			
		>75%, of the emergent vegetation.	0			

F10	Water Shading by AA's Woody Vegetation - Driest (WoodyDryShade)	During an average growing season, when water levels are lowest (but surface water still occupies >400 sq ft or >1% of the AA), the percentage of the remaining surface water within the AA that is shaded by trees and/or shrubs located within the AA is:		[WC,FA,WBN,SBM]		
		<5% of the water, and fewer than 10 woody plants taller than 3 ft shade it, or all surface water is flowing.	1			
		<5% of the water, but more than 10 woody plants taller than 3 ft shade it.	0			
		5 to <25% of the water.	0			
		25 to <50% of the water.	0			
		50 to 95% of the water.	0			
		>95% of the water.	0			
F11	Open Water - Extent	During most of the growing season, the largest patch of **open water** that is in or adjacent to the AA is >1 acre and mostly deeper than 1 ft. **Enter 1, if true.**	0	**Open Water** - is surface water of any depth that contains no emergent herbaceous or woody vegetation (may contain floating-leaved or completely submersed plants). It may be partially	OpenW	
F12	All **Ponded** Water as Percentage - Wettest (PondWpctWet)	When water levels are highest, during a normal year, the surface water that is **ponded** continually for >6 days occupies:		**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle).		
		<1% or none of the AA. Surface water is completely or nearly absent then, or is entirely flowing. **Enter 1 and SKIP TO F22.**	0		NoPond	
		1 to <5% of the AA.	1	[WS,WC,CS,OE,INV,AM,WBF,WBN]		
		5 to <30% of the AA.	0			
		30 to <70% of the AA.	0			
		70 to 95% of the AA.	0			
		>95% of the AA.	0			
F13	Ponded Open Water Area - Wettest (OWareaWet)	When water levels are highest, during a normal year, the AA's **ponded open water** occupies a cumulative area of:	W	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle).		
		<0.10 acre (< 4356 sq. ft) of the AA and adjacent ponded waters. **Enter 1 and SKIP TO F16.**	1		NoPondOW	
		0.10 to <0.50 acres (21,340 sq. ft) of the AA and adjacent ponded waters.	0	**Open water -** is surface water of any depth that contains no emergent herbaceous or wood vegetation (may contain floating-leaved or completely submersed species). It may be partially shaded by a tree canopy.		
		0.50 to <1 acres of the AA and adjacent ponded waters.	0			
		1 to <5 acres of the AA and adjacent ponded waters.	0			
		5 to <50 acres of the AA and adjacent ponded waters.	0			
		50 to <640 acres (1 sq. mi) of the AA and adjacent ponded waters.	0	[WS,WBF]		
		640 to <1000 acres of the AA and adjacent ponded waters.	0			
		1000 to <2500 acres of the AA and adjacent ponded waters.	0			
		>2500 acres (>4 sq.mi) of the AA and adjacent ponded waters.	0			
F14	Ponded Open Water **Distribution** - Wettest (WaterMixWet)	When water levels are highest, during a normal year, the distribution (in aerial view) of ponded open water patches larger than 0.01 acre (400 sq. ft) within the AA is (must meet both a and b criteria):		[NR,AM,WBF,WBN,PD,SBM]		
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) **AND (b)** There are many small patches of open water scattered widely within vegetation or many small vegetation clump "islands" scattered widely within open water. Typical (for example) of some extensive bulrush and cattail marshes.	0			
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) **AND (b)** There are only **a** few (or no) small patches of open water scattered widely within vegetation or a few small vegetation clump "islands" scattered widely within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) **AND (b)** There are several small patches of open water scattered within vegetation or several small vegetation clump "islands" scattered within open	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) **AND (b)** Open water is mostly in a single area (e.g., center of the wetland) and vegetation is in the rest (e.g., periphery), with almost no intermixing. (Typical of many ponds excavated for livestock watering, stormwater treatment, mineral extraction as well as many wetlands that are inundated only temporarily each year)	0			
F15	Width of Vegetated Zone - Wettest (WidthWet)	When water levels are highest, during a normal year, the width of the **vegetated wetland** that separates the largest patch of open water within or bordering the AA from the closest adjacent uplands, is predominantly: [Note: This is not asking for the maximum width.]		**Vegetated wetland** - in this case does not include underwater or floating-leaved plants, i.e., aquatic bed. In farmed wetlands that have different crops from year to year, consider vegetation condition as it probably existed during most of the past 5 years.		
		<5 ft, or no vegetation between upland and open water.	0			
		5 to <30 ft.	0	If open water exists as many patches, use the distance between the majority of those patches and uplands.		
		30 to <50 ft.	0			
		50 to <100 ft.	0	[WC,SR,PR,NR,CS,OE,AM,WBF,WBN,SBM,PD,Sens,EC]		
		100 to 300 ft.	0			
		> 300 ft.	0			

F16	All Ponded Water as a Percentage (Driest) (PondWpctDry)	When water levels are lowest during a normal year, but surface water still occupies >1,076 sq feet (100 sq meter) OR >1% of the AA (whichever is more), the water that is **ponded** (either visible or concealed by vegetation) in the AA		**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). [WC,FA,FR,AM,WBN,Sens]		
		<1% or none. Surface water is completely or nearly absent then, or is entirely flowing. **Enter 1 and SKIP TO F22.**	1		NoPond2	
		1 to <5% of the AA.	0			
		5 to <30% of the AA.	0			
		30 to <70% of the AA.	0			
		70 to 95% of the AA.	0			
		>95% of the AA.	0			
F17	Ponded Open Water **Area** (Driest) (OWareaDry)	When water levels are lowest during a normal year, the AA's **ponded open water** occupies a cumulative area, including adjacent ponded waters, of:	W	**Ponded** - Most surface water is not visibly flowing. Flow, if any, is not sufficient to suspend fine sediment. These include pools in floodplains and may be either large (e.g., an off-channel pond) or small (size of a puddle). **Open water -** is surface water of any depth that contains no emergent herbaceous or wood vegetation (may contain floating-leaved or completely submersed species). It may be partially shaded by a tree canopy. [WBN,PUv]		
		<0.10 acre (< 4356 sq. ft). **Enter 1 and SKIP TO F24.**	0		NoPondOW2	
		0.10 to <0.50 acres (21,340 sq. ft).	0			
		0.50 to <1 acres.	0			
		1- 4 acres.	0			
		5 to <50 acres.	0			
		50 to <640 acres (1 sq. mi).	0			
		640 to <1000 acres.	0			
		1000 to 2500 acres.	0			
		>2500 acres (>4 sq.mi).	0			
F18	Ponded Open Water Distribution - (Driest) (WaterMixDry)	When water levels are lowest, during a normal year, the distribution of ponded open water patches larger than 0.01 acre (400 sq. ft) within the AA is:		[NR,INV,AM,WBN]		
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) AND **(b)** There are many small patches of open water scattered widely within vegetation or many small vegetation clump "islands" scattered widely within open water. Typical (for example) of some extensive bulrush and cattail marshes.	0			
		(a) Vegetation and **open water** EACH comprise 30-70% of the AA (including its bordering waters if any) AND **(b)** There are only a few (or no) small patches of open water scattered widely within vegetation or a few small vegetation clump "islands" scattered widely within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) AND **(b)** There are several small patches of open water scattered within vegetation or several small vegetation clump "islands" scattered within open water.	0			
		(a) Vegetation or **open water** comprise >70% of the AA (and its bordering waters) AND **(b)** Open water is mostly in a single area (e.g., center of the wetland) and vegetation is in the rest (e.g., periphery), with almost no intermixing. Typical of many ponds excavated for livestock watering, stormwater treatment, mineral extraction as well as many wetlands that are inundated only temporarily each year.	0			
F19	Floating Algae & Duckweed (Algae)	At some time of the year, most of the AA's otherwise-unshaded water surface is covered by floating mats of algae, or small (<1 inch) floating plants such as duckweed, *Azolla*, *Wolffia*, or *Riccia*. **Enter 1, if true.**	0	This includes most nontidal wetlands labeled as Aquatic Bed (AB) on NWI maps. If wetland can be visited only during winter, it may not be possible to answer this question with much certainty unless local sources are contacted or indicators (e.g., dried remains of algae) are		
F20	Floating-leaved & Submerged Aquatic Vegetation (SAV)	**SAV** (submerged & floating-leaved aquatic vegetation, excluding the species listed above) occupies an annual maximum of:		**SAV** - are herbaceous plants that characteristically grow at or below the water surface, i.e., whose leaves are primarily and characteristically under or on the water surface during most of the part of the growing season when surface water is present. Some species are rooted in the sediment whereas others are not. If pond lily (*Nuphar*) is the predominant species, consider its maximum extent only during the period when surface water is present beneath the leaves. [PR,OE,INV,FR,AM,WBF,WBN]		
		none, or <5% of the water area.	0		NoSAV	
		5 to <25% of the water area.	0			
		25 to <50% of the water area.	0			
		50 to 95% of the water area.	0			
		>95% of the water area.	0			
		many SAV plants present, but impossible to select from the above categories.	0			
F21	Width of Vegetated Zone (Driest) (WidthDry)	When water levels are lowest, during a normal year, but surface water still occupies >400 sq feet or >1% of the AA (which ever is more), the width of the v**egetated wetland** that separates the largest patch of open water within or bordering the AA from the closest adjacent uplands, is predominantly:		Measure the width perpendicular to the open water part. **Vegetated wetland -** in this case does not include underwater or floating-leaved plants, i.e., aquatic bed. In farmed wetlands that have different crops from year to year, consider vegetation condition as it probably existed during most of the past 5 years. Note: For most sites larger than 1 acre and with persistent water, measure the width using aerial imagery rather than estimating in the field. [WBN]		
		<5 ft, or no vegetation between upland and open water.	0			
		5 to <30 ft.	0			
		30 to <50 ft.	0			
		50 to <100 ft.	0			
		100 to 300 ft.	0			
		> 300 ft.	0			

F22	Beaver (Beaver)	Use of the AA by beaver during the past 5 years is: **Select most applicable ONE.**		**Valley width** - is delimited by an abrupt increase in slope on both sides of the channel.		
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, or lodges.	0	[AM,WBN,SBM,PD,Sens]		
		Very likely based on known occurrence in this part of the region and proximity to ALL of the following **(a)** a persistent freshwater wetland, pond, or lake, or a perennial low-gradient (<5%) channel, and **(b)** average valley width is > 150 ft and **(c)** >20% cumulative cover of aspen, cottonwood, alder, and willow in vegetated areas within 150 ft of the AA's edge. Or there is evidence of beaver just outside the AA.	0			
		Somewhat likely based on known occurrence in this part of the region and proximity to ALL of the following **(a)** a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and **(b)** average valley width is >50 ft, and **(c)** >20% cumulative cover of hardwood trees and shrubs in vegetated areas within 150 ft of the AA's	0			
		Unlikely because site characteristics above are deficient, and/or this is an area where beaver are routinely removed. But beaver occur within 2 miles.	0			
		None. Beaver are absent from this part of the region.	0			
F23	Isolated Island (Island)	During June, the wetland contains (or is part of) an island that is isolated from the shore by water depths >3 ft. The island may be solid, or it may be a floating vegetation mat suitable for nesting waterbirds. The island must be larger than 400 sq.ft and without inhabited buildings. **Enter 1, if true.**	0	[WBF,WBN]		
F24	Ice-free (IceDura)	During most years, most of the AA's surface water (if any) does **not** freeze, or freezes for fewer than 4 continuous weeks. **Enter 1, if true.**	1	[PR,FR,WBF]		

F25	Water Fluctuation Range - Maximum (Fluctu)	The **maximum vertical fluctuation** in surface water within the AA, during a normal year is:		**maximum vertical fluctuation** - is the difference between the highest annual and lowest annual water level during an average year. Use field indicators to assess this indicator. [WS,SR,PR,NR,CS,OE,INV,AM,WBN,PD]		
		<0.5 ft or stable.	1			
		0.5 to < 1 ft.	0			
		1 to <3 ft.	0			
		3 to 6 ft.	0			
		>6 ft.	0			
F26	% Only Saturated or Seasonally Flooded (SeasPct)	Identify the parts (if any) of the AA that never contain surface water (only saturated soil) or where the water (either ponded or flowing) usually remains on the land surface for less than the entire growing season. The percentage of the AA containing such areas is:		If you can identify plants, use their wetland indicator status to infer the possible extent of seasonal-only inundation within a wetland. Vegetation may be patterned in concentric or parallel zones, as one moves outward & away from the deepest part of the wetland or channel. Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) may be evident when not fully inundated. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualizing where that would intercept the land along the river. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. Although useful only as a general guide, the NRCS county soil survey descriptions of the soil units and water feature table usually includes information on flooding frequency and saturation persistence. [SR,NR,CS,OE,INV,FA,WBF,WBN,POI, SBM,PD,Sens,EC]		
		<5% of the AA, or none (i.e., all water persists for >4 months).	0		NoSeasonal	
		5 to <25% of the AA.	0			
		25 to <50% of the AA.	0			
		50 to 75% of the AA.	0			
		>75% of the AA.	1			
F27	Salinity, Alkalinity, Conductance (Salin)	The AA's surface water is mostly:		Saline or brackish conditions are commonly indicated by a prevalence of particular plant species. Consult the ORWAP SuppInfo file's P_Salt worksheetfor a list of these. **Brackish or saline** - conductance of >5000 µS/cm, or >3200 ppm TDS **Slightly brackish** - conductance of 500- 5000 µS/cm, or 320 - 3200 ppm TDS **Fresh** - conductance of < 500 µS/cm, or <320 ppm TDS [PR,CS,AM]		
		Brackish or saline. Plants that indicate saline conditions dominate the vegetation. Salt crust may be obvious around the perimeter and on flats.	0			
		Slightly brackish. Plants that indicate saline conditions are common. Salt crust may or may not be present along	0			
		Fresh. [Note: *Assume this to be the condition unless wetland is known to be a playa or there is other contradicting evidence].*	1		FreshW	
		Unknown.	0			
F28	Fish & Waterborne Pests (FishAcc)	**Select All that apply**:		[INV,FA,FR,AM,WBF]		
		A regularly-used boat dock is present within or contiguous to the AA.	0			
		A regularly-used boat dock is not within the AA, but there is one within 300 ft. of the AA and there is a persistent surface connection between the dock and the AA.	0			
		Fish (native or stocked) are known to be present in the AA, or can access it during at least one day annually.	0			
		None of the above, and could not estimate fish presence/absence.	1			
F29	Non-native Aquatic Animals (PestAnim)	The following are known or likely to have reproducing populations in this AA, its wetland, or in water bodies within 300 ft that connect to the AA at least seasonally. **Select All that apply:**		Assume non-native fish to be present if wetland is associated with a nearby reservoir, fish pond, or perennial stream flowing through an agricultural or residential area. Assume bullfrog, nutria, and/or carp to be present if (a) the AA contains persistent water or is flooded seasonally by an adjoining body of permanent water, and (b) not a forested wetland, and (c) in western Oregon, elevation is lower than about 3000 ft. In the ORWAP_SuppInfo file, see Inverts_Exo worksheet for more complete list of non-native invertebratesf or Oregon, and WetVerts worksheet for more complete list of fish that are not native to Oregon. You may also consult: http://nas.er.usgs.gov/queries/default.aspx http://www.dfw.state.or.us/conservationstrategy/invasive_species.asp [FA,FR,AM,EC]		
		Non-native amphibians (e.g., bullfrog) or reptiles (e.g., red-ear slider).	0			
		Carp.	0			
		Non-native fish that prey on tadpoles or turtles (e.g., bass, walleye, crappie, brook trout).	0			
		Non-native invertebrates (e.g., New Zealand mudsnail, mitten crab, rusty crayfish).	0			
		Nutria.	0			
		None of above.	1			

F30	Shorebird Feeding Habitats (Shorebd)	The extent of mudflats, very shallow waters, or shortgrass meadows, within the AA, that meet the definition of **shorebird habitat** for at least 3 months during the period of late summer through the following May is:		**Shorebird habitat** - areas must have **(a)** grasses shorter than 6", or a mudflat, during any part of this period, **AND (b)** soils that either are saturated or covered with <2 inches of water during any part of this period, **AND (c)** no detectable surrounding slope (e.g., not the bottom of an incised dry channel), **AND (d)** not shaded by shrubs or trees. See photograph in Appendix A of manual. This addresses needs of most migratory sandpipers, plovers, curlews, and godwits. [WBF]		
		None, or <100 sq. ft.	1			
		100 to <1000 sq. ft. within AA.	0			
		1000 to 10,000 sq. ft. within AA.	0			
		>10,000 sq. ft. within AA.	0			
F31	Outflow Duration (OutDura)	The most persistent surface water connection (outlet channel, pipe, ditch, or overbank water exchange) between the AA and the closest stream or lake located downslope is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of its wetland, OR the surface connection between the AA's wetland and a mapped stream or lake located within 300 ft downslope	W	The emphasis is on the connection to a mapped stream network. A larger difference in elevation between the wetland-upland boundary and the bottom of the wetland outlet (if any) indicates shorter outflow duration. Do not rely only on topographic maps or NWI maps to show this; inspect while in field if possible, and ask landowner. The durations given are only approximate and are for a "normal" year. The connection need not occur during the growing season. Assume that depressions with effective nearby ditches or tile drains will connect for shorter periods. [WS,WCv,SR,PR,NR,CS,OE,FA,FR,Sens]		
		Persistent (>9 months/year).	0			
		Seasonal (14 days to 9 months/year, not necessarily consecutive).	1			
		Temporary (<14 days, not necessarily consecutive).	0			
		None -- no surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. **Enter 1 and SKIP TO F33.**	0		NoOutlet	
F32	Outflow Confinement (Constric)	During **major runoff events**, in the places described above where surface water exits the AA, it:	W	**Major runoff events -** would include biennial high water caused by storms and/or rapid snowmelt. **Impeded** - means causing a delay or reduction in water velocity or volume. [WS,SR,PR,NR,CS,OE,Sens,STR]		
		Is **impeded** as it mostly passes through a pipe, culvert, tidegate, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography).	1			
		Leaves mainly through natural surface exits, not largely through artificial or temporary features which **impede** or accelerate outflow.	0			
		Is exported more quickly than usual as it mostly passes through ditches or pipes intended to accelerate drainage. They may be within the AA or connected to its outlet or within 30 ft of the AA's edge.	0			
F33	Tributary or Overbank Inflow (Inflow)	At least once annually, surface water from upstream or another water body moves into the AA. It may enter directly, or as unconfined overflow from a contiguous river or lake. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. **Enter 1, if true. If false, SKIP to F36.**	0	[SRv,PRv, PD]	Inflow	
F34	Input Channel Gradient (SlopeInChan)	The gradient of the tributary with the largest inflow, averaged over the 150 ft. before it enters the AA (but excluding any portion of the distance where water travels through a pipe) is:		[SRv, PRv]		
		<1%.	0			
		1 to <3%.	0			
		3 to 6%.	0			
		>6%.	0			
F35	Throughflow Complexity (ThruFlo)	**[Skip this question if the AA lacks both an inlet and outlet.]** During peak annual flow, water entering the AA in channels encounters which of the following conditions as it travels through the AA: **Select the ONE encountered most.**		This mainly refers to surface water that moves between the inlet and outlet. Some judgment is required in assessing straight vs. indirect flow path. See ORWAP Manual Appendix B diagram. [WS,SR,PR,NR,OE,INV,FA,FR,WBF,WBN,PD]		
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel within unvegetated (often incised) channels and has minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0			
		Bumps into **h**erbaceous vegetation but mostly remains in fairly straight channels.	0			
		Bumps into herbaceous vegetation and mostly spreads throughout, or follows a fairly indirect path (in widely meandering, multi-branched, or braided channels).	0			
		Bumps into **t**ree trunks and/or shrub stems but mostly remains in fairly **s**traight channels.	0			
		Bumps into tree trunks and/or shrub stems and follows a fairly indirect path (meandering, multi-branched, or braided) from entrance to exit.	0			

F36	Internal Gradient (Gradient)	The gradient from the lowest to highest point of land within the AA (**or** from outlet to inlet) is:		Wetlands with no outlet, and wetlands where most surface water is impounded on site, should be considered flat (<2%). For other wetlands, estimate gradient as the elevation difference between the inlet and outlet (if any) divided by the distance between them, or the difference between the highest and lowest points in the wetland divided by the distance between them. [WS,SR,PR,NR,CS,OE,AM,WBF,WBN]		
		<2% (internal flow is absent or barely detectable; basically flat).	0			
		2 to <6%.	1			
		6 to 10%.	0		TooSteep1	
		>10%.	0		TooSteep2	
F37	Groundwater Strength of Evidence (Groundw)	**Select first one that applies:**		[WS,WC,NR,CS,OE,INV,FA,FR,PD]		
		In the AA or its wetland: **(a)** Springs are observed, OR **(b)** Water is markedly cooler in summer and warmer in winter (e.g., later ice formation) than in other local wetlands, OR **(c)** Measurements from shallow wells indicate groundwater is discharging to the wetland, OR **(d)** Water visibly seeps into pits dug within the AA during the driest time of the year and located >30 ft from the closest surface water.	0			
		The AA's wetland: **(a)** Is very close to the base of a natural slope steeper than 15% and longer than 300 ft or is located at a geologic fault, OR **(b)** Has no persistently flowing tributary AND one or more is true: (b1) Is on a natural slope of >5%, OR (b2) Has rust deposits ("iron floc"), colored precipitates, or dispersible natural oil sheen, OR	0			
		The AA is not in an **Arid or Semi-arid hydrologic unit**, but has persistent ponded water, no tributary, and is not fed by wastewater, concentrated stormwater, or irrigation water, or by an adjacent river or lake.	0	**Arid or Semi-arid hydrologic unit** - See the ORWAP Report's Hydrologic Landscape Class (under Location Information).		
		None of above is true, OR AA contains a hot spring. Some groundwater may nonetheless discharge to or flow through the wetland.	1			
F38	Unshaded Herbaceous Vegetation (Extent) (HerbExpos)	The annual maximum areal cover of herbaceous vegetation (excluding SAV, ferns, and mosses, but including forbs & graminoids) that is not beneath a woody canopy reaches:		Do not include submersed and floating-leaved aquatics (SAV) in the category of "herbaceous vegetation", or when defining the "vegetated part" of the site. For sites larger than 10 acres, this should be determined from aerial imagery rather than estimated in the field. [WBF,WBN]		
		<5% of the vegetated part of the AA. **Enter 1 and SKIP to F42.**	0		NoHerb	
		5 to <25% of the vegetated part of the AA.	0			
		25 to <50% of the vegetated part of the AA.	0			
		50-95% of the vegetated part of the AA.	0			
		>95% of the vegetated part of the AA.	1			
F39	Forb Cover (Forb)	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of **forbs** reaches an annual maximum of:		**Forbs -** are flowering non-woody vascular plants (excludes grasses, sedges, ferns, mosses). [POL]		
		<5% of the herbaceous part of the AA.	0			
		5 to <25% of the herbaceous part of the AA.	1			
		25 to <50% of the herbaceous part of the AA.	0			
		50 to 95% of the herbaceous part of the AA.	0			
		>95% of the herbaceous part of the AA.	0			
F40	Species Dominance - Herbaceous (HerbDom)	Determine which two native herbaceous (forb, fern, and graminoid) species comprise the greatest portion of the herbaceous cover that is unshaded by a woody canopy. **Then select one:**		[INV,WBF,SBM,PD,POL,Sens,EC]		
		Those species together comprise more than half of the areal cover of native herbaceous plants at any time during the year, i.e., one dominant species or two co-dominants. **Also mark this if <20% of the vegetated cover is native**	1			
		Those species together comprise less than half of the areal cover of native herbaceous plants at any time during the	0			

F41	Invasive or Non-native - % of Vegetative Cover (Invas)	Vegetative cover (annual maximum) is:		In the ORWAP_SuppInfo, see P_Invas worksheet for list of invasives and P_Exo for non-native species list. Examples of woody invasives are Himalayan blackberry, English ivy, scotch broom, and gorse. For known distributions of invasive plants in your area see: http://inr.oregonstate.edu/orbic/invasive-species and http://www.weedmapper.org/maps.html but do not limit your answer based only on that information. Consider most crops to be non-native. [WBF,PD,POL,Sens,EC]		
		Overwhelmingly (>80% cover) non-native species AND >10% of the herbaceous cover is invasive species. (See ORWAP SuppInfo file for species designations).	1		InvasDom	
		Overwhelmingly (>80% cover) non-native species AND <10% of the herbaceous cover is invasive species; OR 50-80% of cover is non-native species regardless of invasiveness.	0			
		Mostly (50-80%) native species.	0			
		Overwhelmingly (>80%) native species.	0			
F42	Mowing, Grazing, Fire (VegCut)	There is evidence that grazing by domestic or wild animals -- or mowing (multiple times per year), plowing, herbicides, harvesting, or fire -- has **repeatedly** reduced the AA's vegetation cover (plants that normally grows taller than 4") to less than 4 inches, or has created an obvious browse line, over the following extent:		**Repeatedly** - means the condition occurred in at least half of the last 10 years. [SR,AM,WBN,SBM,PD,EC]		
		0% (No evidence of such activities).	1		NoMowGraze	
		Trace to 5% of the normally vegetated AA (grazing, mowing, or fire have occurred but vegetation height effects are mostly unnoticeable).	0			
		5 to <50% of the normally vegetated AA.	0			
		50 to 95% of the normally vegetated AA.	0			
		>95% of the normally vegetated AA.	0			
F43	Historically Lacking Trees (HistVeg)	According to the ORWAP Report, the presettlement vegetation class in the vicinity of the AA was prairie, sagebrush, or other open lands not dominated by trees. In addition, the AA is not within the biennial floodplain of a river where trees and shrubs typically dominate when conditions are unaltered. **Enter 1, if true.**	0	In the ORWAP Report's Location Information table. This question is used as a classification variable mainly to set appropriate expectations for the extent of forest cover.	HistOpenland	
F44	Moss Wetland (Moss)	The AA's ground cover is primarily a deep layer of moss, and/or soils are mainly peat or organic muck. Also, the soil remains water-saturated to within 3 inches of the surface during most of a normal year. Surface water within the AA often is absent or confined to small scattered pools or ditches. **Enter 1, if true.**	0	Includes most bogs and fens. May be a floating island. [NR,CS,OE,WBF,WBN,Sens]		
F45	Woody Extent (WoodyPct)	Within the vegetated part of the AA, woody vegetation (trees, shrubs, **robust vines**) taller than 3 ft occupies:		**Robust vines** - include Himalayan blackberry and others that are generally erect and taller than 1 ft.		
		<5% of the vegetated AA, and fewer than 10 trees are present. **Enter 1 and SKIP to F51.**	1		NoWoody	
		<5% of the vegetated AA, but more than 10 trees are present.	0	**Vegetated part** - should not include floating-leaved or submersed aquatics.		
		5 to <25% of the vegetated AA.	0			
		25 to <50% of the vegetated AA.	0	For sites larger than 1 acre, this should be determined from aerial imagery rather than estimated only in the field. [NR,WC,CS,SBM,PD,Sens]		
		50 to 95% of the vegetated AA.	0			
		>95% of the **vegetated part** of the AA.	0			
F46	Woody Diameter Classes (TreeDiams)	**Select All the types** that comprise >5% of the woody canopy cover in the AA or >5% of its **wooded upland edge** if any:		**Wooded upland edge**- includes woody plants located within one tree-height of the wetland-upland boundary.		
		Deciduous 1-4" diameter (DBH) and >3 ft tall.	0			
		Evergreen 1-4" diameter and >3 ft tall.	0	**DBH** is the diameter of the tree measured at 4.5 ft above the ground.		
		Deciduous 4-9" diameter.	0			
		Evergreen 4-9" diameter.	0	[CS,SBM,POL,Sens]		
		Deciduous 9-21" diameter.	0			
		Evergreen 9-21" diameter.	0			
		Deciduous >21" diameter.	0			
		Evergreen >21" diameter.	0			

F47	Snags (Snags)	The number of large **snags** (diameter >12 inches) in the AA plus 100 ft uphill of its edge is:		**Snags -** are standing trees at least 20 ft tall that are mainly without bark or foliage.		
		Few or none.	0	[SBM,POL]		
		Several.	0			
F48	Abovewater Wood (WoodOver)	The number of horizontal wood pieces thicker than 4 inches that are partly submerged during most of the spring or early summer, thus potentially serving as basking sites for turtles, birds, or frogs and cover for fish is:		Only the wood that is at or above the water surface is assessed because of the impracticality of assessing underwater wood accurately when using a rapid assessment method.		
		None.	0	[FA,FR,AM]		
		Few.	0			
		Several (e.g., >3 per 300 ft of channel or shoreline).	0			
F49	Downed Wood (WoodDown)	The number of downed wood pieces longer than 6 ft and with diameter >4 inches that are not submerged during most of the growing season, is:		Exclude temporary "burn piles."		
		Few or none.	0	[INV,AM,SBM,POL]		
		Several.	0			
F50	Exposed Shrub Canopy (ShrExpos)	Within the **vegetated part** of the AA, shrubs shorter than 20 ft that are not overtopped by trees occupy: Select first statement that is true.		**Vegetated part** - should not include floating-leaved or submersed aquatics.		
		<5% of the vegetated AA and <0.01 acre (400 sq ft).	0	[SBM,PD]		
		5 to <25% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		25 to <50% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		50 to 95% of the vegetated AA or the water edge (whichever is greater in early summer).	0			
		>95% of the vegetated part of the AA or the water edge (whichever is greater in early summer).	0			
F51	N Fixers (Nfix)	The percentage of the vegetated area in the AA or along its water edge (whichever has more) that contains nitrogen-fixing plants (e.g., alder, baltic rush, scotch broom, lupine, clover, alfalfa, other legumes) is:		For a more complete list, see ORWAP_SuppInfo, worksheet NFIX (includes native and non-native species). Do not include algae.		
		<1% or none.	1	[OE,INV,Sens]		
		1 to <25%.	0			
		25 to <50%.	0			
		50 to 75%.	0			
		>75%.	0			
Note for the next four questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter and outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.						
F52	Upland Perennial Cover - % of Perimeter (PerimPctPer)	The percentage of the AA's edge (perimeter) that is comprised of a band of upland **perennial cover** wider than 10 ft and taller than 6 inches, during most of the growing season is:		**Perennial cover** - vegetation that includes wooded areas, native prairies, sagebrush, as well as relatively unmanaged commercial lands in which the ground is disturbed less frequently than annually such as perennial ryegrass fields, hayfields, lightly grazed pastures, timber harvest areas, and rangeland.		
		<5%.	0			
		5 to <25%.	0			
		25 to <50%.	1	It does not include water, row crops (vegetable, orchards, Christmas tree farms), residential areas, golf courses, recreational fields, pavement, bare soil, rock, bare sand, or gravel or dirt roads.		
		50 to <75%.	0			
		75 to 95%.	0	[WCv,SRv,PRv,INV,FA,AM,WBF,WBN,SBM,PD,POL,POLv,Sens,STR]		
		>95%.	0			

F53	Upland Perennial Cover - Width (Buffer) (BuffWidth)	Along the greatest extent of the AA's **upland edge**, the width of **perennial cover** taller than 6 inches that extends upslope from the AA until mostly shorter or non-perennial cover is reached is: [NOTE: the width is not necessarily the maximum width. Base on vegetation that occurs most of the growing season.]		**Upland edge** - is the land within 3 ft of the wetland's perimeter that is not wetland. [WCv,SRv,PRv,INV,FA,AM,WBN,SBM,PD,POL,Sens,STR]		
		< 5 ft, or none.	0		NoUpPerCov	
		5 to <30 ft.	0			
		30 to <50 ft.	0			
		50 to <100 ft.	1			
		100 to 300 ft.	0			
		> 300 ft.	0		AllUpPerren	
F54	Upland Trees as % of All Perennial Cover (UpTreePctPer)	Within 100 f.t landward from the AA's edge (perimeter), the percentage of the upland perennial cover that is woody plants taller than 20 ft is:		Base this on the cumulative canopy width of the trees. [WSv,FA,WBF,WBN,SBM]		
		<5%, or there is no upland perennial cover along the upland edge.	0			
		5 to <25% of perennial cover.	1			
		25 to <50% of perennial cover.	0			
		50 to <75% of perennial cover.	0			
		75 to 95% of perennial cover.	0			
		>95% of perennial cover.	0			
F55	Weeds - % of Upland Edge (UpWeed)	Along the AA's edge (perimeter), the cover of invasive woody or herbaceous plants occupies: [If vegetation is so senesced that apparently-dominant edge species cannot be identified even to genus, answer "none"]		See ORWAP_SuppInfo file, worksheet P_Invas. Some of the most common invaders along upland edges of Oregon wetlands are Himalayan blackberry, knotweed, sweetbrier rose, Russian olive, English ivy, nightshade, pepperweed, medusahead, white clover, ryegrass, quackgrass, false brome, bentgrass, dandelion, oxeye daisy, pennyroyal, bull and creeping thistles, tansy ragwort, poison hemlock, and teasel. If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an invasive species, assume the unidentified plant to also be invasive. [PD,STR]		
		<5%, or none.	0			
		5 to <25%.	0			
		25 to <50%.	1			
		50 to <75%.	0			
		75 to 95%.	0			
		>95%.	0			
F56	Bare Ground & Accumulated Plant Litter (Gcover)	Consider the parts of the AA that go dry during a normal year. Viewed from 6 inches above the soil surface, the condition in most of that area just before the year's longest inundation period begins is:		**Bare ground-** includes unvegetated soil, rock, sand, or mud between stems if any. Bare ground under a tree or shrub canopy should be counted. Wetlands that are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [WS,WC,SR,PR,NR,CS,OE,INV,AM,SBM,POL,Sens,EC]		
		Little or no (<5%) **bare ground** is visible between erect stems or under canopy and there is little or no dead detached plant tisuse (thatch) remaining on top of the ground surface and ground surface is extensively blanketed by moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1			
		Some (5-20%) bare ground or remaining thatch is visible. Herbaceous plants have moderate stem densities and do not closely hug the ground.	0			
		Much (20-50%) bare ground or thatch is visible. Low stem density and/or tall plants with little living ground cover during early growing season.	0			
		Mostly (>50%) bare ground or thatch.	0			
		Not applicable. All of the AA is inundated throughout most years.	0			
F57	Ground Irregularity (Girreg)	In parts of the AA that lack persistent water, the number of small pits, raised mounds, hummocks, boulders, upturned trees, animal burrows, islands, natural levees, wide soil cracks, and microdepressions is:		**Microtopography** - refers mainly to vertical relief of <3 ft and is represented only by inorganic features, except where plants have created depressions or mounds of soil. Consider the microtopography to be "few or none" if one could walk easily through most of the AA once any slash and logs are removed. Consider it to be "several" if one has to constantly look down and check balance. [WS,SR,PR,NR,INV,AM,SBM,PD,POL,EC]		
		Few or none, or the entire AA is always water-covered. Minimal **microtopography**; <1% of the AA, e.g., many flat sites having a single hydroperiod.	1			
		Intermediate.	0			
		Several (extensive micro-topography).	0			
F58	Soil Composition (SoilTex)	Based on digging into the substrate and examining the surface layer of the soil (2 inch depth) that was mapped as being predominant, its composition (excluding **duff** and living roots) is mostly:		Do not base the texture on soil maps unless the AA is inaccessible. See ORWAP Manual's protocol (Step 2 of section 5.3 and the soil chart in Appendix B). Judge which soil type is predominant only in the part of the AA that is not inundated at the time of your visit. **Duff** - is loose organic surface material, e.g., dead plant leaves and stems). Organic soils are much less common in floodplains. [WS,PR,NR,CS,OE,PD,Sens]		
		Loamy: includes silt, silt loam, loam, sandy loam.	1			
		Clayey: includes clay, clay loam, silty clay, silty clay loam, sandy clay, sandy clay loam.	0			
		Organic: includes muck, mucky peat, peat, and mucky mineral soils (blackish or grayish). Exclude live roots unless they are moss.	0			
		Coarse: includes sand, loamy sand, gravel, cobble, stones, boulders, fluvents, fluvaquents, riverwash.	0			
F59	Cliffs or Banks (Cliff)	Within 300 ft of the AA, there are elevated terrestrial features such as cliffs, bluffs, talus slopes, or unarmored stream banks that extend at least 6 ft nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. **Enter 1, if true.**	0	[SBM,POL]		

F60	Restored or Created Wetland (NewWet)	The AA is (or is within, or contains) a "new" wetland resulting from human actions (e.g., excavation, impoundment) or other factors affecting what was upland (non-hydric) soil. Or, some part of the AA was originally a wetland, was artificially drained for many years, and has since had its water regime partly or wholly restored or rehabilitated (e.g., by ditch plugs, berms, tile breakage, non-maintenance).		Include wetlands whose area was likely expanded by road berms which impeded runoff, but do not include wetlands created by beaver dams except for the part where flooding affected uplands (not just existing wetlands and streams). Determine this using historical aerial photography, old maps, soil maps, consultation with landowners, and/or permit files as available. See ORWAP Map Viewer's Hydric Soil layer (expend Soils). Also, locations of some restoration wetlands can be found in the ORWAP Map Viewer under Restoration. Another potential source is the Conservation Registry: https://oregonexplorer.info/content/conservation-registry?topic&ptopic.		
		Yes, and constructed or restored mostly within last 3 years.	0			
		Yes, and constructed or restored mostly 3-7 years ago.	0			
		Yes, and constructed or restored mostly >7 years ago.	0			
		Yes, but time of origin or restoration unknown.	0			
		No.	1		NotNewWet	
		Unknown if wetland is constructed, restored, or natural.	0			
F61	Ownership (Ownership)	Most of the AA is:		An initial indication of ownership can be found on the ORWAP Map Viewer under the Land Ownership layer (expand Land Classification). However, it is advisable to ask local sources or use local maps with higher precision. [PUv]		
		Publicly owned (municipal, county, state, federal).	0			
		Owned by non-profit conservation organization or easement holder who allows public access to this AA.	0			
		Other private ownership, including tribal. **Enter 1 and SKIP to F63.**	1		PrivateOwn	
F62	Special Protected Area Designation (Desig)	The AA is part of an area designated as a Special Protected Area according to the USGS Protected Areas Database of the U.S. **Enter 1, if true.**	0	See the ORWAP Map Viewer Report under the Location Information section for "In Special Protected Area? [PUv]		
F63	Conservation Investment (ConsInvest)	The AA is not a mitigation wetland, but public funds or community volunteer efforts have been applied to preserve, create, restore, or enhance the condition or functions of the wetland. (e.g. CRP or WRP wetlands, community projects). **Enter 1, if true. (If unknown, leave 0).**	0	Locations of some restoration wetlands can be found in the ORWAP Map Viewer under Restoration. Another potential source is the Conservation Registry: https://oregonexplorer.info/content/conservation-registry?topic&ptopic [PUv]		
F64	Compensation Wetland (MitWet)	The AA is all or part of a compensation site used explicitly to offset impacts elsewhere. **Enter 1, if true. (If unknown, leave 0).**	0	Answer to the best of your knowledge. Sources for information include the property owner, DSL, and/or the ACOE. [PUv]		
F65	Sustained Scientific Use (SciUse)	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. **Enter 1, if true. (If unknown, leave 0)**	0	[PUv]		
F66	Visibility (Visibil)	The maximum percentage of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 300 ft of the AA is **(Select ONE):**		[WBFv,WBNv,SBMv,PUv,STR]		
		<25%.	1			
		25 - 50%.	0			
		>50%.	0			

F67	Non-consumptive Uses - Actual or Potential (RecPoten)	**Select All statements that are true** of this AA as it currently exists:		The question assumes access is allowed. [PUv]		
		Walking is physically possible in >5% of the AA during most of year (e.g., free of deep water and dense shrub thickets).	1			
		All or part of the AA (or an area within sight of the AA and within 100 ft) would be physically accessible to people in wheelchairs (e.g., paved and flat).	1			
		Maintained roads, parking areas, or foot-trails are within 30 ft of the AA, or the AA can be accessed most of the year by boat.	1			
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0			
F68	Core Area 1 (VisitNo)	The percentage of the AA almost never walked or driven by humans during an average growing season probably comprises: [Note: If more than half the wetland is visible from areas within 100 ft of the AA, include visits by people to those areas that are actually walked or driven (not simply viewed from].		Judge this based on proximity to population centers, roads, trails, accessibility of the AA to the public, wetland size, usual water depth, and physical evidence of human visitation. Exclude visits that are not likely to continue and/or that are not an annual occurrence (e.g., by construction, maintenance, or monitoring crews). [AM,WBF,WBN,SBM,PD,PUv,STR]		
		<5% and no inhabited building is within 300 ft of the AA.	0			
		<5% and inhabited building is within 300 ft of the AA.	0			
		5 to <50% and no inhabited building is within 300 ft of the AA.	0			
		5 to <50% and inhabited building is within 300 ft of the AA.	0			
		50 to 95% with or without inhabited building nearby.	1			
		>95% of the AA with or without inhabited building nearby.	0			
F69	Core Area 2 (VisitOften)	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: [The Note in the preceding question applies here as well].		See note above. [AM,WBF,WBN,SBM,PD,PUv,STR]		
		<5%.	1			
		5 to <50%.	0			
		50 to 95%.	0			
		>95% of the AA.	0			
F70	Consumptive Uses (Provisioning Services) (Hunt)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. **Select All that apply.**		Evidence of these consumptive uses may consist of direct observation, or presence of physical evidence (e.g., recently cut stumps, fishing lures, shell cases), or might be obtained from communication with the land owner or manager. [FRv,WBFv,PUv]		
		Low-impact commercial timber harvest (e.g., selective thinning).	0			
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0			
		Waterfowl hunting.	0			
		Fishing.	0			
		Trapping of furbearers.	0			
		None of the above.	1			
F71	Domestic Wells (Wells)	Wells or water bodies that currently provide drinking water are:		If unknow, assume this is true if there is an inhabited structure within the specified distance and the neighborhood is known to not be connected to a municipal drinking water system (e.g., is outside an urban growth boundary or other densely settled area). [NRv]		
		<300 ft and downslope from the AA or at same elevation.	0			
		300 to 1500 ft and downslope or at same elevation.	0			
		>1500 ft downslope, or none downslope, or no information.	1			

F72	Wetland Type of Conservation Concern (RareType)	Does the AA contain, or is it part of, any of these wetland types? **Select All that apply.**	W	Consult the ORWAP Report under the Location Information table for "Rare Wetland Types." But be aware that it may not apply to the exact AA you have delimited. [PDv, Sens]		
		Mature forested wetland (anywhere): a wetland in which mean diameter of trees (d.b.h., FACW and FAC species only) exceeds 18 inches, and/or the average age of trees exceeds 80 years, or there are >5 trees/acre with diameter >32	0	To qualify, the diameter of >18 inches must be the mean measured from at least 10 trees.		
		Bog or Fen: contains a sponge-like organic soil layer which covers most of the AA and often has extensive cover of sedges and/or broad-leaved evergreen shrubs (e.g., Ledum). Often lacks tributaries, being fed mainly by groundwater and/or direct precipitation.	0			
		Playa, Salt Flat, or Alkaline Lake: a nontidal ponded water body usually having saline (salinity >1 ppt or conductivity >1000 µS) or alkaline (conductivity >2000 µS and pH >9) conditions and large seasonal water level fluctuations (if inputs-outputs unregulated). If a playa or salt flat, vegetation cover is sparse and plants typical of saline or alkaline conditions (e.g., Distichlis, Atriplex) are common.	0	See ORWAP_SuppInfo file, worksheet P_Salt for species typically occurring in tidal or saline conditions.	Playa	
		Hot spring (anywhere): a wetland where discharging groundwater in summer is >10 degrees (F) warmer than the expected water temperature.	0			
		Native wet prairie (west of the Cascade crest): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, and dominated primarily by native graminoids often including species in column E.	0	Deschampsia caespitosa, Danthonia californica, Camassia quamash, Triteleia hyacinthina, Carex densa, C. aperta, and/or C. unilateralis		
		Vernal pool (Willamette Valley): a seasonally inundated wetland, underlain by hardpan or claypan, with hummocky micro-relief, usually without a naturally-occurring inlet or outlet, and with native plant species distinctly different from those in slightly higher areas, and often including species in column E.	0	Downingia elegans, Isoetes nuttallii, Triteleia hyacinthina, Eleocharis spp., Eryngium petiolatum, Plagiobothrys figuratus, Plagiobothrys scouleri, Grindelia nana, Veronica peregrina, Lasthenia glaberrima , Cicendia quadrangularis, Kickxia elatine, Gnaphalium palustre, and/or Callitriche spp.		
		Vernal pool (Medford area): a seasonally inundated acidic wetland, underlain by hardpan, with hummocky micro-relief, usually without a naturally-occurring inlet or outlet, and having concentric rings of similar native vegetation, often including species in column E.	0	Downingia vina, Isoetes nuttalli, Pilularia americana, Triteleia hyacinthina, Eleocharis spp., Eryngium petiolatum, Plagiobothrys brachteatus, Plagiobothrys scouleri, Grindelia nana, Veronica peregrina, Alopecurus saccatus, Lasthenia californica, Deschampsia		
		Vernal pool (Modoc basalt & Columbia Plateau): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located on shallow basalt bedrock and often having species in column E.	0	Blennosperma nanum, Camassia quamash, Epilobium densiflorum, Callitriche marginata, Cicendia quadrangularis, Eryngium vaseyi, Psilocarphus brevissimus, and/or Sedella pumila.		
		Interdunal wetland (Coastal ecoregion): a seasonally inundated wetland, usually without a naturally-occurring inlet or outlet, located between sand dunes where wind has scoured the sand down to the water table (deflation plain, blowout pond), and often with significant cover of the native species in column E.	0	Carex obnupta, Argentina egedii, Juncus lesueurii, J. nevadensis, J. falcatus, Sisyrinchium californicum, and/or Salix hookeriana		
		Ultramafic soil wetland (mainly southwestern Oregon): a low-elevation wetland, usually with a sponge-like organic soil layer, occurring in an area with exposed serpentine or peridotite rock, and/or in soils with very low Ca:Mg ratios.	0			
		None of above.	1			

Site: Portland Golf Club-Sediment Placement	Name: P.Scoles	Date: Nov. 16, 2021

Form S
Stresser Data
ORWAP V 3.2

					Data	Comments
S1	**Aberrant Timing of Water Inputs (AltTiming)**					No hydrology alterations since contributing watershed is small and stops at ped./ bike path immediiately to south.
	*In the "Data" column, **place an X** next to any item that is likely to have caused the **timing** of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either **more muted** (smaller or less frequent peaks spread over longer times, more temporal homogeneity of flow or water levels) **or more flashy** (larger or more frequent spikes but over shorter times).*					
	Control structure that regulates inflow to the AA (including tide gates), or flow regulation in tributaries, or water level in adjoining water body is regulated.					
	Irrigation runoff or seepage.					
	Snow storage areas that drain directly to the wetland.					
	Increased pavement and other impervious surface in the CA.					
	Straightening, ditching, dredging, and/or lining of tributary channels in the CA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points (3, 2, or 1). However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition, if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Spatial extent within the AA of timing shift.	>95% of AA.	5-95% of AA.	<5% of AA.	0	
	When most of the timing shift began.	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
	Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the AA that experiences those.					
	Input timing now vs. previously.	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
	Flashiness or muting.	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
				Sum=	0	
				Final score=	0.00	
S2	**Accelerated Inputs of Nutrients (NutrLoad)**					No increase of nutrients or stormwater within RCA.
	*In the "Data" column, **place an X** next to any item -- occurring in either the AA or its RCA -- that is likely to have accelerated the inputs of nutrients (nitrogen, phosphorus) to the AA.*					
	Stormwater or wastewater effluent (including failing septic systems), landfills.					
	Fertilizers applied to lawns, ag lands, or other areas in the RCA.					
	Livestock, dogs.					
	Artificial drainage of upslope lands.					
	Other waterborne human-related nutrient sources within the RCA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Usual load of nutrients.	Large (e.g., feedlots, extensive residential on septic) or or 303d* for nutrients.	Moderate (e.g., grazing, light residential on septic, light agriculture).	Limited (e.g., a few animals, lawns, sewered residential).	0	
	Frequency & duration of input.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
	AA proximity to main sources (actual or potential).	0 - <50 ft.	50-300 ft. or in groundwater.	In other part of contributing area.	0	
				Sum=	0	
				Final score=	0.00	
S3	**Accelerated Inputs of Contaminants and/or Salts (ContamIn).**					No increase of contaminants or stormwater within RCA.
	*In the "Data" column, **place an X** next to any item -- occurring in either the AA or its RCA -- that is likely to have accelerated the inputs of contaminants or salts to the AA.*					
	Stormwater or wastewater effluent (including failing septic systems), landfills, snow storage areas.					
	Metals & chemical wastes from mining, shooting ranges, oil/ gas extraction, other sources.					
	Irrigation of lands, especially those with saline soils.					
	Oil or chemical spills (not just chronic inputs) from nearby roads.					
	Road salt.					
	Pesticides applied to lawns, ag lands, roadsides, or other areas in the RCA, but excluding spot applications for controlling non-natives in the AA.					
	Artificial drainage of contaminated or saline soils.					
	Erosion of contaminated soils.					
	Other contaminant sources within the RCA.					
	*If **any** items were checked above, then for each row of the table below, you may assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Usual toxicity of most toxic contaminants.	Industrial effluent or 303d* for toxics.	Wastewater treatment plant, cropland, fossil fuel extraction, pipeline, power station, managed landfill.	Low density residential or commercial.	0	
	Frequency & duration of input.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
	AA proximity to main sources (actual or potential).	0 - <50 ft.	50-300 ft. or in groundwater.	In other part of contributing area.	0	
	* See ORWAP Map Viewer for waters designated as 303d; see Oregon DEQ web site for reasons.			Sum=	0	
				Final score=	0.00	

S4	**Excessive Sediment Loading from Runoff Contributing Area (SedRCA).**					RCA historically cleared and cropped, but no longer in agricultural production.
	*In the "Data" column, **place an X** next to any item present in the RCA that is likely to have elevated the load of waterborne or windborne sediment reaching the AA from its RCA.*					
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.					
	Erosion from construction, in-channel machinery in the RCA.					
	Erosion from off-road vehicles in the RCA.					
	Erosion from livestock or foot traffic in the RCA.					
	Stormwater or wastewater effluent.					
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.					
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.					
	Other human-related disturbances within the RCA.				x	
	*If **any** items were checked above, then for each row of the table below you may assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in increasing the amount or transport of sediment into the AA. To estimate that, contrast it with the condition if checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Erosion in RCA.	Extensive evidence, high intensity*.	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	2	
	Recentness of significant soil disturbance in the RCA.	Current & ongoing.	1-12 months ago.	>1 yr ago.	1	
	Duration of sediment inputs to the AA.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & mainly during high runoff or severe wind events.	1	
	AA proximity to actual or potential sources.	0 - <50 ft., or farther but on steep erodible slopes.	50-300 ft.	In other part of contributing area.	2	
	* **High**-intensity= plowing, grading, excavation, erosion with or without veg removal; **low**-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum=	6	
				Final score=	0.50	

S5	**Soil or Sediment Alteration *Within the Assessment Area* (SoilDisturb).**					Assessment Area historically cleared (possibly grazed), but now re-vegetated with non-native grasses and forbs.
	*In the "Data" column, **place an X** next to any item present in the AA that is likely to have compacted, eroded, or otherwise altered the AA's soil.*					
	Compaction from livestock, machinery, off-road vehicles, or mountain bikes, especially during wetter periods.					
	Leveling or other grading not to the natural contour.					
	Tillage, plowing (but excluding disking for enhancement of native plants).				x	
	Fill, riprap, other armoring, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil stockpiled or imported from another wetland.					
	Excavation.					
	Dredging in or adjacent to the AA.					
	Boat traffic in or adjacent to the AA and sufficient to cause shore erosion or stir bottom sediments.					
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.					
	*If **any** items were checked above, then for each row of the table below you may assign points (3, 2, or 1) in the last column that describe the combined maximum effect of those items in altering the AA's soils. To estimate that, contrast it with the soil condition if checked items never occurred or were no longer present.*					
		Severe (3 pts)	Medium (2 pts)	Mild (1 pt)		
	Spatial extent of altered soil.	>95% of AA or >95% of its upland edge (if any).	5-95% of AA or 5-95% of its upland edge (if any).	<5% of AA and <5% of its upland edge (if any).	3	
	Recentness of significant soil alteration in AA.	Current & ongoing.	1-12 months ago.	>1 yr ago.	1	
	Duration.	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	1	
	Timing of soil alteration.	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & mainly during scattered events.	1	
				Sum=	6	
				Final score=	0.50	

Oregon Rapid Wetland Assessment Protocol (ORWAP) Report

Report Generated: November 16, 2021 07:56 AM

Assessment Area: 0.7 Acres

Location Map

Location Information

Latitude	45.4699697417195	Longitude	-122.762331686491
Elevation	219 ft	Annual precipitation	40 in
Watershed (HUC12)		Fanno Creek (170900100502)	
Presettlement Vegetation Class		Douglas fir	
Rare Wetland Type(s)		None	
Hydrologic Landscape Class		Wet	
In Special Protected Area?		No	

View Salinity Maps (pdf)

Soil Information

Soil Name	Aloha silt loam
Soil Symbol	1
Hydric Rating	No
Hydric Percent	1
Percent Area	98.3%
Erosion Hazard	Slight

This report was generated using the ORWAP Map Viewer, a tool of the Oregon Explorer (http://oregonexplorer.info).

Dom. Cond. Non-irrigated Capability Class	Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Soil Name	Cornelius and Kinton silt loams, 7 to 12 percent slopes
Soil Symbol	11C
Hydric Rating	No
Hydric Percent	4
Percent Area	1.7%
Erosion Hazard	Severe
Dom. Cond. Non-irrigated Capability Class	Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Watershed Information

HUC Best

HUC Code	HUC Name	Is HUC Best?	Greatest Criteria met	FW, s/f, lg (Acres)	FW, em, lg (Acres)	EST, em, lg (Acres)	EST, s/f, lg (Acres)
HUC8: 17090010	Tualatin	No	n/a	179.6	115.8	0	0
HUC10: 1709001005	Lower Tualatin River	No	n/a	16.1	40.5	0	0
HUC12: 170900100502	Fanno Creek	No	n/a	12.3	10	0	0

[abbreviations: FW- freshwater (wetland); em- Emergent; lg- largest; s/f- Shrub/Forested; EST- Estuarine (wetland)

HUC 12 Functional Deficit

HUC Code	HUC Name	WS	SR	NT	WC	INV	AM	FH	WB
HUC12: 170900100502	Fanno Creek								WB

[abbreviations: WS= Water Storage, SR= Sediment Retention, NT= Nutrient Retention (PR or NR), WC= Water Cooling (Thermoregulation), INV= Invertebrate Habitat, AM= Amphibian Habitat, FH= Fish Habitat (FA or FR), WB= Waterbird Habitat (WBF or WBN)]

Rare Species Scores

Rare Species Type	Maximum score	Sum Score	Rating
Non-anadromous Fish Species	0	0	None
Amphibian & Reptile Species	0.24	0.24	Intermediate
Feeding Waterbirds	0	0	None
Nesting Waterbirds	0	0	None
Songbirds, Raptors, and Mammals	0	0	None
Invertebrate Species	0	0	None
Plant Species	0	0	None

Scores have taken into account several factors for each rare species record contained in the official database of the Oregon Biodiversity Information Center (ORBIC): (a) the regional rarity of the species, (b) their proximity to the point of interest, and (c) the "certainty" that ORBIC assigns to each of those records.

Element of Occurrence (Rare Species)

View wildlife list for Fanno Creek (170900100502)

Within Assessment Area	No EO Records
Within 1 mile	No EO Records
In HUC12 watershed	5 EO Records

Element of Occurrence Record(s) in HUC12

1 Steelhead (Upper Willamette River ESU, winter run)
[2 occurences]
Oncorhynchus mykiss pop. 33
ORBIC State Status: S2
ORBIC Global Status: G5T2Q
ODFW Strategy Species: No

2 Western pond turtle
[3 occurences]
Actinemys marmorata
ORBIC State Status: S2
ORBIC Global Status: G3G4
ODFW Strategy Species: Yes

• *HUC Best: Oregon watersheds (HUC8, HUC10, HUC12) with greatest type diversity, proportional area, or density of wetlands according to available National Wetland Inventory maps.*

"Type diversity" is the number of unique NWI codes in the watershed (e.g., PEMA, PEMC, PEMCx) and excluded types that have no vegetation component (e.g., PUBH, R3US2).

"Density" is the number of vegetated NWI polygons divided by the acreage of the watershed; many of these polygons may be contiguous with each other, forming a single wetland.

"Proportional Area" is the proportion of the watershed's total area occupied by vegetated wetlands as mapped by NWI.

• *The digital maps used to determine this do not show many wetlands or cover the entire state. Data were compiled only from watersheds that have been at least 90% mapped by NWI (see worksheets for HUC8, 10, and 12). Data were received in November 2008 from ORBIC.*

• *METHODS: The above 3 metrics can be strongly correlated with watershed size and with each other. To minimize that bias, the rankings of the residuals from a regression analysis were used, rather than simply the top-ranking watersheds, to identify the most "important" watersheds for each metric at each scale. That is, the watersheds were identified that were in the top 5% in terms of variety of mapped wetland types for watersheds of that size, the largest area of mapped wetlands as a proportion of the watershed area for watersheds of that size, and/or the greatest number of mapped wetland polygons for watersheds with that much wetland area.*

• *Global rank. ORBIC participates in an international system for ranking rare, threatened and endangered species throughout the world. The system was developed by The Nature Conservancy and is now maintained by NatureServe in cooperation with Heritage Programs or Conservation Data Centers (CDCs) in all 50 states, in 4 Canadian provinces, and in 13 Latin American countries. The ranking is a 1-5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. In this book, the ranks occupy two lines. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. A "Q" at the end of this line indicates the taxon has taxonomic questions. The second line is the State Rank and begins with the letter "S". The ranks are summarized as follows: 1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences; 2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences; 3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences; 4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences; 5 = Demonstrably widespread, abundant, and secure; H = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered; X = Presumed extirpated or extinct; U = Unknown rank; ? = Not yet ranked, or assigned rank is uncertain.*

• *This report contains both centroid-based and polygon-based data. The Location Information and Watershed Information sections of the report contain centroid based data (determined by the center point of the polygon), while the remaining sections are polygon-based (determined from the entire polygon).*

• *The rare species results in this report are based on a subset of the ORBIC rare species dataset. The ORWAP tool only reports on rare species that meet the following criteria: wetland habitat species that are tracked by ORBIC, excluding historical or extirpated sites or those with low mapping accuracy. More information about specific sites and additional species can be obtained from ORBIC through data requests, see https://inr.oregonstate.edu/orbic/data-requests for details.*


300 FT. OFFSET
Fanno Creek Trail
Fanno Creek Trail
Fanno Creek Trail
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SW 81st Ave
Bohmann Pkwy
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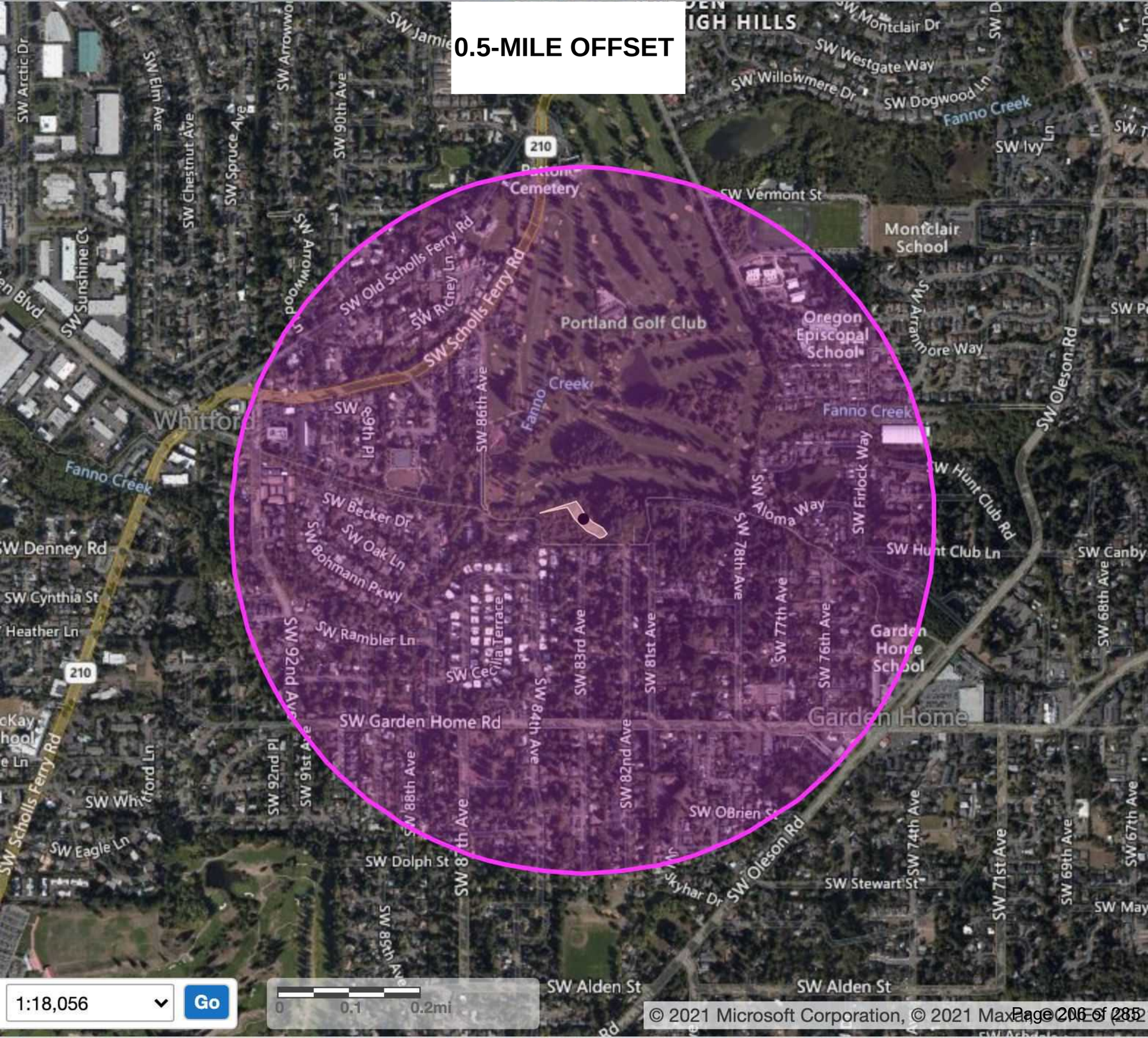
© 2021 Microsoft Corporation, © 2021 Maxar, CNES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SW Ivy Ln
SW Arctic Dr
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SW Spruce Ave
SW Arrowwood
SW 90th Ave
210
Cemetery
SW Vermont St
Montclair School
SW Old Scholls Ferry Rd
SW Richey Ln
SW Scholls Ferry Rd
Portland Golf Club
Oregon Episcopal School
SW Sunshine Ct
SW Arrowwood Dr
SW Oleson Rd
SW 86th Ave
Fanno Creek
Whitford
SW 89th Pl
Fanno Creek
SW Hunt Club Rd
SW Becker Dr
SW Oak Ln
SW Bohmann Pkwy
SW Aloma Way
SW Firlock Way
SW 78th Ave
SW Hunt Club Ln
SW Canby
SW Denney Rd
SW Cynthia St
SW 68th Ave
Heather Ln
SW Rambler Ln
SW Cecilia Terrace
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SW 81st Ave
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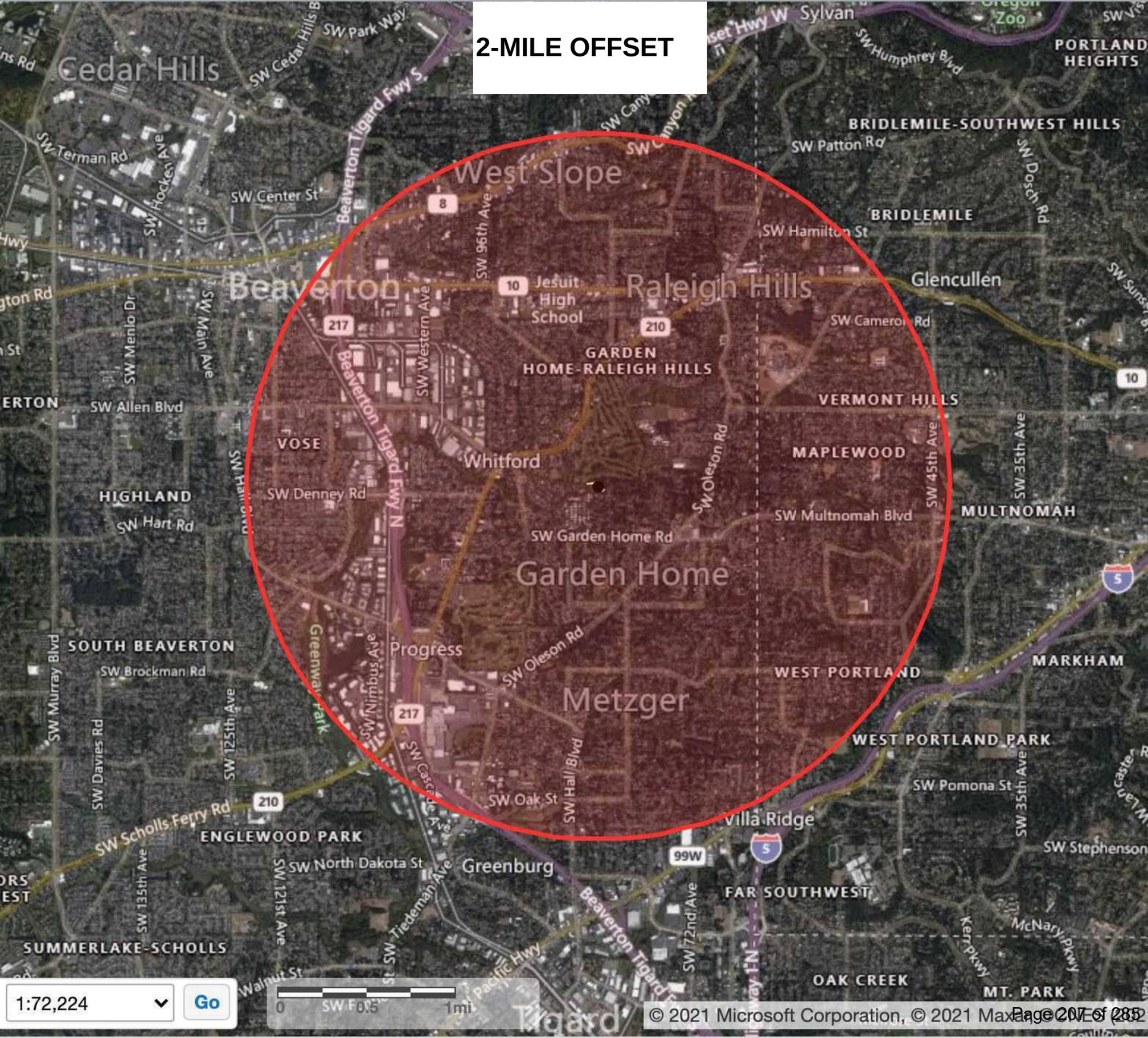
© 2021 Microsoft Corporation, © 2021 Maxar, ©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Cedar Hills
West Slope
Beaverton
Raleigh Hills
Jesuit High School
GARDEN HOME-RALEIGH HILLS
Whitford
Garden Home
Metzger
Progress
Greenburg
Villa Ridge
Glencullen
BRIDLEMILE
BRIDLEMILE-SOUTHWEST HILLS
VERMONT HILLS
MAPLEWOOD
MULTNOMAH
MARKHAM
WEST PORTLAND
WEST PORTLAND PARK
FAR SOUTHWEST
VOSE
HIGHLAND
SOUTH BEAVERTON
ENGLEWOOD PARK
SUMMERLAKE-SCHOLLS
OAK CREEK
MT. PARK
PORTLAND HEIGHTS
SW Terman Rd
SW Center St
SW Hocken Ave
Beaverton Tigard Fwy S
SW Park Way
SW Cedar Hills Blvd
SW Patton Rd
SW Hamilton St
SW Dosch Rd
SW 96th Ave
SW Western Ave
SW Menlo Dr
SW Main Ave
SW Allen Blvd
SW Cameron Rd
SW Oleson Rd
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SW 35th Ave
SW Multnomah Blvd
SW Garden Home Rd
SW Denney Rd
SW Hart Rd
SW Brockman Rd
SW Murray Blvd
SW Davies Rd
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SW Nimbus Ave
Greenway Park
SW Hall Blvd
SW Oak St
SW Pomona St
SW Stephenson
SW Scholls Ferry Rd
SW North Dakota St
SW 121st Ave
SW 135th Ave
SW Tiedeman Ave
SW 72nd Ave
Beaverton Tigard Fwy N
Pacific Hwy
Walnut St
Kerr Pkwy
McNary Pkwy
Sylvan
SW Humphrey Blvd
Oregon Zoo
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APPENDIX G – OREGON STREAM FUNCTIONAL ASSESSMENT METHOD (SFAM) REPORT (Best Professional Judgement Approach)

Four functional groups provide the basis for a function-based assessment for streams:

1. **Hydrologic functions:** include movement of water through the watershed and the variable transfer and storage of water along the stream channel, its floodplain, and associated alluvial aquifer.
2. **Geomorphic functions:** encompass hydraulic and sediment transport processes that generate variable forces within the channel and the variable input, transfer and storage of sediment within the channel and adjacent environs that are generally responsible for channel form at multiple scales.
3. **Biological functions:** include processes that result in maintenance and change in biodiversity, trophic structure, and habitat within the stream channel.
4. **Water quality functions:** encompass processes that govern the cycling, transfer, and regulation of energy, nutrients, chemicals and temperature in surface and groundwater, and between the stream channel and associated riparian system.

This table is completed for the removal of accumulated sediment from an irrigation pond at Portland Golf Club. It also includes temporary impacts for placement of a sandbag coffer dam, bypass pipe, and sediment check dams in Woods Creek and the irrigation pond. The post-evaluation column descriptions separately addresses post-dredging conditions, namely: (1), sediment removal from irrigation pond, and (2) installation of temporary sediment trapping features and bypass pipe for Woods Creek (only during dredging period). These are components of the same project and addressed separately in this evaluation table.

Table 2.1 Stream Function Categorization, Definition, and Ecosystem Services Provided

FUNCTIONAL GROUP	SPECIFIC FUNCTIONS	DEFINITION AND SERVICES PROVIDED	PRE- FUNCTION RATING	POST-FUNCTION RATING
Hydrologic functions	Surface water storage (SWS)	Temporary storage of surface water in relatively static state, generally during high flow, as in floodplain inundation, backwater channels, wetland depressions. Providing regulating discharge, replenishes soil moisture, provides pathways for fish and invertebrate movement, low velocity habitat and refuge, and contact time for biogeochemical processes.	Medium. The irrigation pond water levels are controlled by two gate valves situated along the north and southwest edges. During winter months, water levels are maintained at a lower elevation to provide stormwater desynchronization functions. During extreme rainfall periods, water backfloods Woods Creek and may overtop creek banks (near Wetland B). Due to control gate closures, flooding from Fanno Creek is infrequent (greater than 10 year frequency).	1. Medium. Portland Golf Club would continue to manage pond levels in a similar manner. Since the volume of removed sediments gets replaced with water, no appreciable increase in stormwater storage would occur. Backflooding of Woods Creek would also not change. 2. Temporary coffer dam, bypass pipe, and check dams would not change surface water storage, since these features will be removed before autumn rains.
	Sub/surface transfer (SST)	Transfer of water between surface and subsurface environments, often through hyporheic zone. Provides aquifer recharge, base-flow, exchange of nutrients/chemicals through hyporheic, moderates flow, and maintains soil moisture.	Low. Soil conditions surrounding the irrigation pond are mostly silt loam to silty clay loam textures. Clay layers may be present below 5 feet below ground surface. During irrigation season, pond water is removed, so shallow ground water moves toward the pond. During rainy season, groundwater likely flows toward Fanno Creek. Subsurface water transmissivity likely slow due to lack of sand or gravel layers underlying golf course.	1. Low. Portland Golf Club would continue 2. to withdraw irrigation water in a similar manner. No anticipated change to irrigation pumping, so no significant change to groundwater baseflows into pond. That is, sediment removal would neither increase or decrease exchange between surface water and ground water. Temporary coffer dam, bypass pipe, and check dams do not facilitate or interfere with surface to groundwater exchange.

Hydrologic functions (cont.)	**Flow variation (FV)**	Daily, seasonal and inter-annual variation in flow. Provides variability in stream energy driving channel dynamics, provides environmental cues for life history transitions, redistributes sediment, provides habitat variability (temporal), provides sorting of sediment and differential deposition.	Low. The irrigation pond water levels are controlled by two gate valves situated along the north and southwest edges. During winter months, water levels are maintained at a lower elevation to provide stormwater desynchronization functions. During extreme rainfall periods, water backfloods Woods Creek and may overtop creek banks (near Wetland B).	1. Low. Portland Golf Club would continue to manage pond levels in a similar manner. Since the volume of removed sediments gets replaced with water, no appreciable increase in stormwater storage would occur. Backflooding of Woods Creek would also not change. 2. Temporary coffer dam, bypass pipe, and check dams would not change surface water storage, since these features will be removed before autumn rains.

Geomorphic functions	**Sediment continuity (SC)**	The balance between transport and deposition of sediment such that there is no net erosion or deposition (aggradation or degradation) within the channel. Maintains channel character and associated habitat diversity, provides sediment source and storage for riparian and aquatic habitat succession, maintains channel equilibrium.	Low. Irrigation pond edges defined by a retaining wall in all directions; hence no erosion within pond. Pond bottom functions as sediment trap for Woods Creek.	1. Low. Sediment removal from irrigation pond would not accelerate erosion; however, increased sediment capacity is achieved. 2. Temporary coffer dam, bypass pipe, and check dams would provide short-term sediment trapping during dredging period. Any accumulated sediment would be removed with temporary features.
	Substrate mobility (SM)	Regular movement of channel bed substrate. Provides sorting of sediments, mobilizes/flushes fine sediment, creates and maintains hydraulic diversity, creates and maintains habitat.	Low. Irrigation pond effective at trapping sand and silt textures; however, clay particles may export with overflows to Fanno Creek. Pond accumulates sediments but does not sort, flush or remain static.	1. Low. Sediment removal from irrigation pond would not change sand and silt trapping function. No change to export of clay particles. 2. Temporary coffer dam, bypass pipe, and check dams would not interfere or alter substrate mobility of the irrigation pond or Woods Creek.

Biological Functions	**Maintain Biodiversity (MB)**	Maintain the variety of species, life forms of a species, community compositions, and genetics. Biodiversity provides species and community resilience in the face of disturbance and disease, full spectrum trophic resources, balance of resource use (through interspecies competition).	Low. The pond substrate is mostly unvegetated, hence low biodiversity. Additionally, the accumulated sediment in the irrigation pond generally limits biodiversity due to shallow water depth. Existing wildlife use consists of warmwater fish, water fowl, song birds, nocturnal mammals and occasional nutria or beaver. Pond is surrounded by mowed turf on three sides, so adjacent upland provides little ancillary habitat.	1. Low. Surrounding upland would be maintained in a similar condition, but water depth in irrigation pond would increase. It is plausible that deeper water would attract slightly more waterfowl and warmwater fish, but such improvement may be insignificant. Temporary coffer dam and check dams would temporarily displace or 2. discourage wildlife use during dredging period. Warmwater fish would utilize bypass pipe and avoid pond during dredge period.
	Create and maintain habitat (aquatic/ riparian) (CMH)	Create and maintain the suite of physical, chemical, thermal and nutritional resources necessary to sustain organisms. Habitat sustains native organisms. Habitat includes in-channel habitat, as defined largely by depth, velocity, and substrate, and riparian habitat, as defined largely by vegetative structure.	Low. The pond habitat is primarily unvegetated, submerged sediment. The pond has a narrow fringe bounded by a retaining wall on the upper side. Typical emergent plants include smartweed, rush, and cattail. Water movement within pond (except during irrigation pumping) slowly flows to Fanno Creek. Suitable habitat for warmwater fish, songbirds, waterfowl, and insects.	1. Low. Removal of accumulated sediment would deepen water depths in pond; thus, potential warmwater fish habitat would likely increase proportionally. While pond fringe plants would be removed by dredging, such species would naturally revegetate within 2 to 4 years. As such, no significant increase or decrease anticipated for in-pond habitat and associated 2. vegetation. Temporary coffer dam, bypass pipe, and check dams would not change habitat within pond and Woods Creek.
	Sustain trophic structure (STS)	Production of food resources necessary to sustain all trophic levels including primary producers, consumers, prey species and predators. Trophic structure provides basic nutritional resources for aquatic resources, regulates the diversity of species and communities.	Low. The irrigation pond has limited production of food resources due to shallow depth to accumulated sediment and nearly unvegetated condition. Since water is removed daily from pond during irrigation season, invertebrate food sources are low. Limited use by warmwater fish also restricts feeding opportunities for waterbirds and other predators.	1. Low. Removal of accumulated sediment would deepen water depths in pond; thus, potential warmwater fish habitat would likely increase proportionally. Mostly 2. unvegetated condition of substrate not likely to change, so no significant increase or decrease anticipated for trophic structure. Temporary coffer dam, bypass pipe, and check dams would not change food production resources.

Water Quality functions	**Nutrient cycling (NC)**	Transfer and storage of nutrients from environment to organisms and back to environment. Provides basic resources for primary production, regulates excess nutrients, provides sink and source for nutrients.	Medium. The accumulated sediment in the irrigation pond generally sequesters nutrients, since pond substrate is mostly unvegetated. Some dissolved nutrients are exported as irrigation water in spring, summer and early fall months. Tees, fairways, greens and landscaping benefit from nutrients in irrigation water. New sediment incrementally buries older sediment, which further sequesters nutrients.	1. Medium. Removal of accumulated sediment (via dredging) would export nutrients and sequester them at the sediment bag placement area. Nutrient sequestration will continue as new sediment incremental accumulates. Dissolved nutrients would continue being exported with irrigation water and utilized by turf grasses. No net change in nutrient cycling is anticipated. 2. Temporary coffer dam, bypass pipe, and check dams would not change irrigation pond capacity to sequester nutrient. Further, such features would not increase nutrient delivery to Fanno Creek; however, dissolved nutrients in Woods Creek would temporarily bypass the irrigation pond for 6 to 8 weeks. After project completion, no net change in nutrient cycling is anticipated.
	Chemical regulation (CR)	Moderation of chemicals in the water. Limits the concentration of beneficial and detrimental chemicals in the water.	Low. Chemical composition of irrigation pond water not known. The primary water source is the urbanizing watershed of Woods Creeks. Typical water constituents may include soil and grease from roads and driveways. No onsite impervious surfaces shed runoff into irrigation pond. Other chemical sources could be fertilizers and limited herbicides infrequently applied to turf area. Turf land does not drain directly to irrigation pond. Instead, such applications are absorbed by turf grasses and landscaping. Excess chemicals infiltrate into soil, where root system further utilize and/or degrade chemicals.	1. Low. Removal of accumulated sediment (via dredging) would cycle chemicals to the sediment bags, then drainage water would be pumped back to the irrigation pond. It is unlikely this temporary circulation pattern would either increase or decrease chemicals in the irrigation water. 2. Temporary coffer dam, bypass pipe, and check dams would not change chemical constituents in irrigation pond and Woods Creek. These temporary features are constructed of inert materials and installed for 6 to 10 weeks. After dredging is complete, these features are removed. No net change in chemical regulation is anticipated.

Water Quality functions	**Thermal regulation (TR)**	Moderation of water temperature. Limits the transfer and storage of thermal energy to and from streamflow and hyporheic zone.	Low. The irrigation pond has limited capacity for thermal regulation due to shallow depth to accumulated sediment. Few trees along south side of pond provide afternoon shade for a narrow edge of pond. Overall, the transfer and storage of thermal energy is minimal due to shallow water.	1. Medium. Removal of accumulated sediment would deepen water depths in pond; thus, thermal storage and transfer would likely increase (not quantified). Inlet and outlet features would not be affected by sediment removal. 2. Temporary coffer dam, bypass pipe, and check dams would not change thermal regulation in irrigation pond and Woods Creek.

APPENDIX B – RESTORATION PLAN FOR TEMPORARY WETLAND IMPACTS

Temporary Wetland Impacts Restoration Plan for Portland Golf Club Sediment Bag Placement Area

Introduction

Portland Golf Club (PGC) will be dredging their irrigation pond (aka Junor Lake) to remove creek-delivered sediment that has accumulated for many decades. The dredge process will fill approximately 90 sediment bags (amounting to 5300 cubic yards). The bags are filled with a slurry of sediment and water, then the water seeps from the bag, while the sediment stays inside. The seepage water is then pumped back to the pond where it helps sustain water levels for the floating dredge barge. The only space available to place this large number of sediment bags is an upland area west of Wetland A, a palustrine emergent marsh. The wetland is sustained by rainfall and stormwater runoff from the nearby residential neighborhood.

Due to space limitations, the staging area for equipment and supplies is situated southeast of Wetland A, so a temporary access route is needed along the south edge of the wetland (Exhibit B). The temporary wetland impact will be limited to 0.05-acre (1875 sq. ft.). The dredging project will have additional temporary impacts to Wetland A for a seepage water recovery sump, overflow check dams, and coffer dams to bypass Woods Creek around the irrigation pond. When the dredge activity is complete, then these temporary features will be removed and ground surface restored. The following paragraphs and tables itemize the temporary impacts and proposed restoration activities, as well as non-native vegetation maintenance and short-term recovery monitoring.

Temporary Wetland and Non-Wetland Waters Impacts and Mitigation

The PGC dredging and sediment bag placement project will have temporary impacts to wetlands (vegetated terrestrial features) and non-wetland waters (pond bottom and creek channel). The temporary impacts to Junor Lake (where sediment is removed, Exhibit A) are considered self-mitigating, since the resultant pond is deeper and greater capacity for sediment sequestration. The temporary impacts to Woods Creek and a bypass pipe are mitigated simply by hand removal of sand bags and plastic sheeting installed for temporary coffer dam and two check dams. No further restoration necessary, since creek channel bottom is already unvegetated.

Table 1. Summary of Temporary Non-Wetland Waters Impacts by Type and Activity.

Non-Wetland Waters	Activity	Area and Volume (CY)	Restoration Mitigation
Junor Lake (irrig. pond)	Sediment removal	1.77 ac. / 5300 CY	Self-Mitigating
Junor Lake (irrig. pond)	Woods Ck. Bypass pipe	660 sf. / 37 CY	Plastic bypass pipe and sand bags
Woods Creek	Coffer dam	180 sf. / 6.5 CY	Remove sand bags and plastic sheeting
Woods Creek	Check dams	240 sf. / 6 CY	Remove sand bags and plastic sheeting

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Page 2 – Portland Golf Club Temporary Impacts Restoration Plan

Temporary impacts to wetland areas involves brush trimming, placement of geofabric and crushed gravel, temporary sump excavation and two check dam placements. Installation will be surgical and will not disturb adjacent wetland areas (no secondary impacts). Mitigation for temporary wetland impacts will be removal of installed features, then grass seeding and shrub planting.

Table 2. Summary of Temporary Wetland Impacts by Type and Activity.

Wetlands	Activity	Area and Volume (CY)	Restoration Mitigation
Wetland A (south edge)	Access route	1875 sf. / 150 CY	Remove gravel and geofabric, then seeding and plantings.
Wetland A (north edge)	Seepage water recovery sump	375 sf. / 44 CY	Remove temporary sump structure, gravel, backfill with salvaged soil, then seeding and plantings.
Wetland A (ditch outlet)	Check dams	100 sf. / 5 CY	Remove sand bags and plastic sheeting, the seeding/plantings.

Restoration Goals

Restoration activity will begin with removal of features permitted for temporary impacts, as itemized in Tables 1 and 2. The majority of these activities involves either hand-removal of sand bags and plastic sheeting or backhoe removal of crushed gravel and geofabric. The plastic sheeting will be hauled away as refuse, while sand bags re-purposed for golf course maintenance. Similarly, salvaged crushed gravel will be temporarily stockpiled on upland, then loaded into dump trucks for re-use in other golf course features and pathways. Geofabric will likely be hauled away as refuse, unless it can be re-purposed for other golf course activity.

The goals of restoration mitigation are:
- Re-establish original slopes, typically 5H:1V or flatter.
- Minimize soil erosion after removal of temporary features.
- Re-establishment of ground cover via broadcast seeding
- Shrub planting to replace previous invasive blackberry brambles
- Reduce growth of non-native species within restoration area
- Provide future nesting and feeding habitat for wildlife.

Restoration Seeding and Planting

Table 3 outlines the anticipated plant species, seed quantity, container quantity for each restoration area. Seed will be sourced from a Willamette or Tualatin Valley cultivator specializing in native seed generation. Container stock will be sourced from an Oregon or Washington nursery utilizing source materials growing in the Pacific Northwest climate. Such plants will be 1 gallon size or larger. Once the temporary features have been removed from the restoration areas, the ground surface will be scarified with rakes or similar tools intended to reverse compaction and create a rough surface for hand broadcast seed.

The container stock materials will be installed first, with each hole dug slightly bigger than the container. A small amount of slow-release, natural fertilizer will be added to each hole prior to plant installation. Any container stock with bound roots will scarified and loosened to promote new root growth. Surplus soil will be placed around the planted stock to form a small circular berm. Such berm can be used to hold water from rain events and/or hand watering (no automated

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irrigation available). A 1-inch mulch layer will be added atop the soil surface within a 1-foot radius of the planted stem. After container stock is planted, then the seed mixture will be hand broadcast.

Table 3. Summary of Restoration Seeding/Planting Amounts by Restoration Area.

Wetlands	Seed or Stock	Species	Amount
Wetland A (access route along south edge)	Seeding, 1875 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	1 lbs. 0.25 lbs. 0.5 lbs. 0.25 lbs.
Wetland A (access route along south edge)	Shrubs, 1875 sf. 1 gal. container	*Rosa pisocarpa* *Cornus alba* *Salix scouleriana*	10 stems 10 stems 25 stems
Wetland A (sump near north edge)	Seeding, 375 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	0.25 lbs. 0.1 lbs. 0.25 lbs. 0.1 lbs.
Wetland A (sump near north edge)	Shrubs, 375 sf. 1 gal. container	*Cornus alba* *Salix scouleriana*	2 stems 10 stems
Wetland A (check dams in outlet ditch)	Seeding, 100 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	0.1 lbs. 0.05 lbs. 0.1 lbs. 0.05 lbs.
Wetland A (check dams in outlet ditch)	Shrubs, 100 sf. 1 gal. container	*Cornus alba*	3 stems

Restoration Success Rate and Monitoring

The container stock survival rate, 2 years after planting, will be at least 75% of the amounts specified in Table 3. Dead plantings will be replaced in sufficient quantities to obtain the 75% survival rate. PGC may elect to install excess plantings at the onset in anticipation of replacement plantings. The seeding success rate will be 80% or greater ground cover and roughly 40% of native grass cover. Supplemental hand broadcast seeding will be employed to increase cover as needed.

Monitoring will occur in the fall of each year for 2 years, or until plant survival goals are met. A spring-time inspection will be conducted to identify dead plants and stresses on plants, in addition to adjusting weed control measures (described in next section). Planting of replacement container stock will be limited to winter-early spring months, or late fall-early winter, since no drip irrigation will be employed for plant survival. An annual monitoring report will be submitted to Oregon Dept. of State Lands no later than December 31 for the two years after planting.

Restoration Mitigation Maintenance

Any non-native shrub or tree growing in the restoration area will be spot-sprayed with an appropriate herbicide, preferably in spring months. A follow-up spot spray will occur in early summer, as needed. Given existing adjacent shade and lack of nutria, chew guards on wood plantings appear unnecessary.

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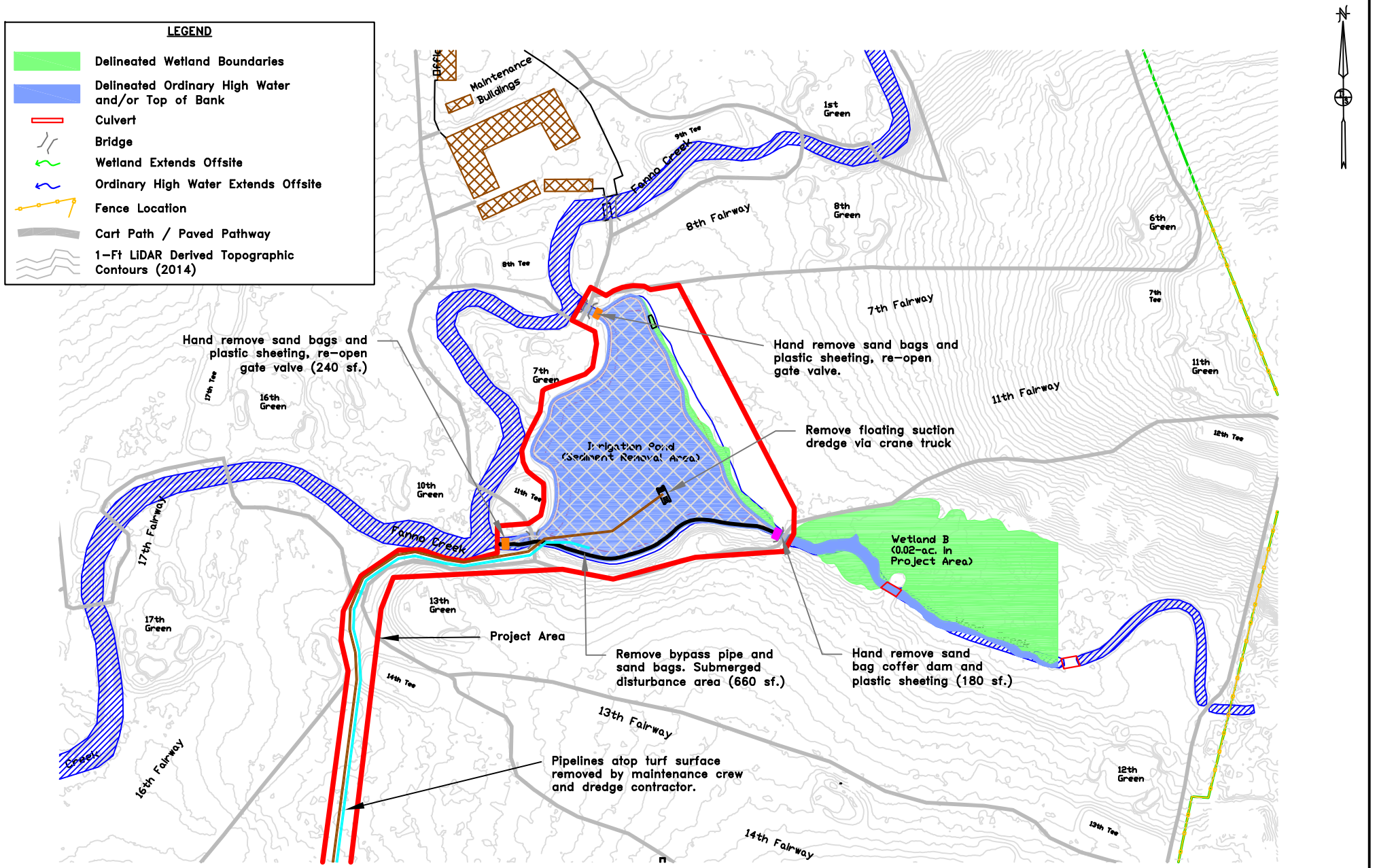

SOURCE: National Oceanic and Atmospheric Administration (NOAA) LiDAR Contours, 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
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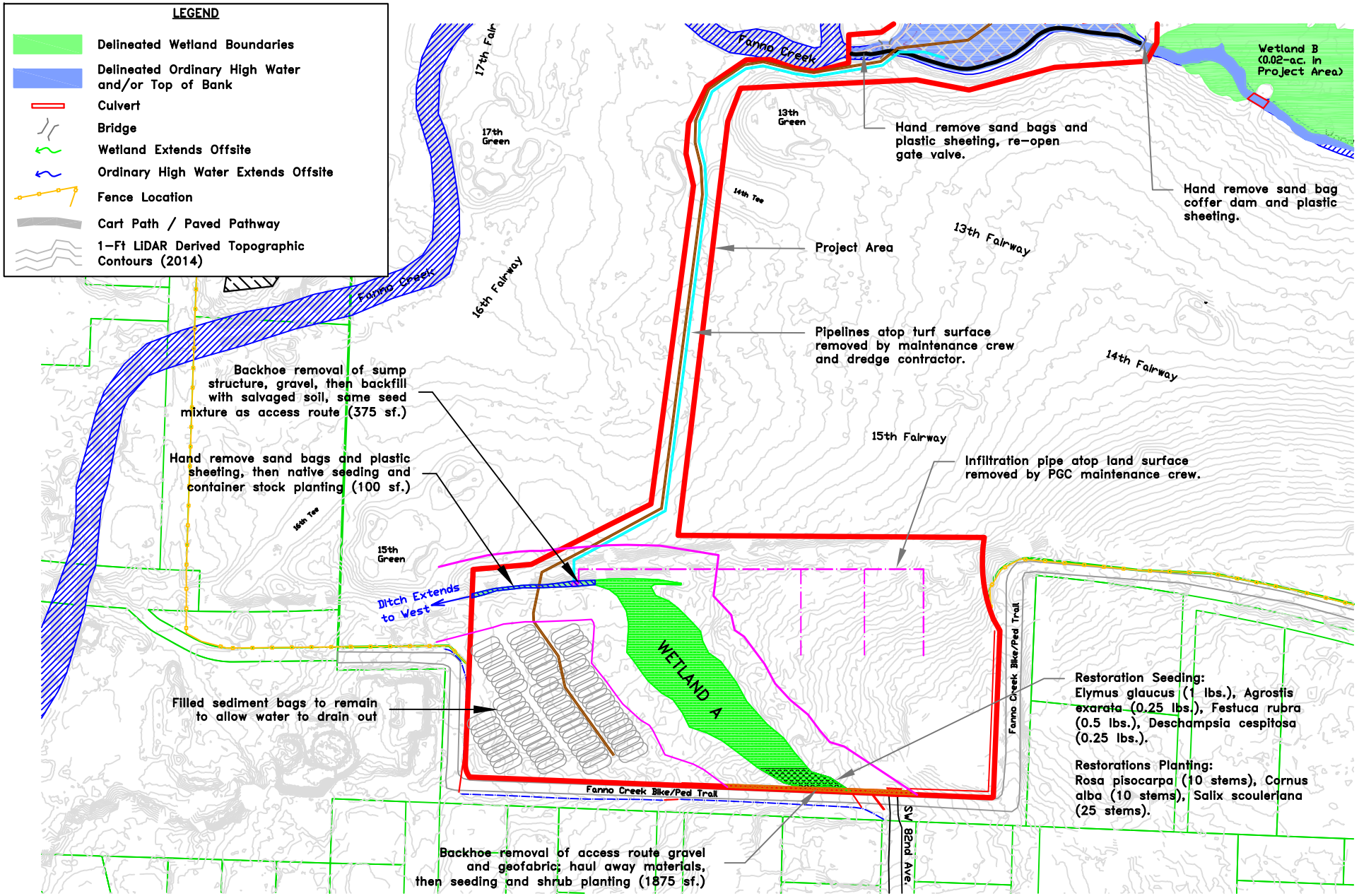
1 inch = 450 feet

TEMPORARY IMPACTS RESTORATION MITIGATION FOR PORTLAND GOLF CLUB POND SEDIMENT REMOVAL AND BAG PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024

NON-WETLAND WATERS MITIGATION ACTIVITY

EXHIBIT A



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225 0 225 450 900
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Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024

WETLAND MITIGATION ACTIVITY

EXHIBIT B

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Due to space limitations, the staging area for equipment and supplies is situated southeast of Wetland A, so a temporary access route is needed along the south edge of the wetland (Exhibit B). The temporary wetland impact will be limited to 0.05-acre (1875 sq. ft.). The dredging project will have additional temporary impacts to Wetland A for a seepage water recovery sump, overflow check dams, and coffer dams to bypass Woods Creek around the irrigation pond. When the dredge activity is complete, then these temporary features will be removed and ground surface restored. The following paragraphs and tables itemize the temporary impacts and proposed restoration activities, as well as non-native vegetation maintenance and short-term recovery monitoring.

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Woods Creek	Coffer dam	180 sf. / 6.5 CY	Remove sand bags and plastic sheeting
Woods Creek	Check dams	240 sf. / 6 CY	Remove sand bags and plastic sheeting

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Page 2 – Portland Golf Club Temporary Impacts Restoration Plan

Temporary impacts to wetland areas involves brush trimming, placement of geofabric and crushed gravel, temporary sump excavation and two check dam placements. Installation will be surgical and will not disturb adjacent wetland areas (no secondary impacts). Mitigation for temporary wetland impacts will be removal of installed features, then grass seeding and shrub planting.

Table 2. Summary of Temporary Wetland Impacts by Type and Activity.

Wetlands	Activity	Area and Volume (CY)	Restoration Mitigation
Wetland A (south edge)	Access route	1875 sf. / 150 CY	Remove gravel and geofabric, then seeding and plantings.
Wetland A (north edge)	Seepage water recovery sump	375 sf. / 44 CY	Remove temporary sump structure, gravel, backfill with salvaged soil, then seeding and plantings.
Wetland A (ditch outlet)	Check dams	100 sf. / 5 CY	Remove sand bags and plastic sheeting, the seeding/plantings.

Restoration Goals

Restoration activity will begin with removal of features permitted for temporary impacts, as itemized in Tables 1 and 2. The majority of these activities involves either hand-removal of sand bags and plastic sheeting or backhoe removal of crushed gravel and geofabric. The plastic sheeting will be hauled away as refuse, while sand bags re-purposed for golf course maintenance. Similarly, salvaged crushed gravel will be temporarily stockpiled on upland, then loaded into dump trucks for re-use in other golf course features and pathways. Geofabric will likely be hauled away as refuse, unless it can be re-purposed for other golf course activity.

The goals of restoration mitigation are:
- Re-establish original slopes, typically 5H:1V or flatter.
- Minimize soil erosion after removal of temporary features.
- Re-establishment of ground cover via broadcast seeding
- Shrub planting to replace previous invasive blackberry brambles
- Reduce growth of non-native species within restoration area
- Provide future nesting and feeding habitat for wildlife.

Restoration Seeding and Planting

Table 3 outlines the anticipated plant species, seed quantity, container quantity for each restoration area. Seed will be sourced from a Willamette or Tualatin Valley cultivator specializing in native seed generation. Container stock will be sourced from an Oregon or Washington nursery utilizing source materials growing in the Pacific Northwest climate. Such plants will be 1 gallon size or larger. Once the temporary features have been removed from the restoration areas, the ground surface will be scarified with rakes or similar tools intended to reverse compaction and create a rough surface for hand broadcast seed.

The container stock materials will be installed first, with each hole dug slightly bigger than the container. A small amount of slow-release, natural fertilizer will be added to each hole prior to plant installation. Any container stock with bound roots will scarified and loosened to promote new root growth. Surplus soil will be placed around the planted stock to form a small circular berm. Such berm can be used to hold water from rain events and/or hand watering (no automated

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irrigation available). A 1-inch mulch layer will be added atop the soil surface within a 1-foot radius of the planted stem. After container stock is planted, then the seed mixture will be hand broadcast.

Table 3. Summary of Restoration Seeding/Planting Amounts by Restoration Area.

Wetlands	Seed or Stock	Species	Amount
Wetland A (access route along south edge)	Seeding, 1875 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	1 lbs. 0.25 lbs. 0.5 lbs. 0.25 lbs.
Wetland A (access route along south edge)	Shrubs, 1875 sf. 1 gal. container	*Rosa pisocarpa* *Cornus alba* *Salix scouleriana*	10 stems 10 stems 25 stems
Wetland A (sump near north edge)	Seeding, 375 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	0.25 lbs. 0.1 lbs. 0.25 lbs. 0.1 lbs.
Wetland A (sump near north edge)	Shrubs, 375 sf. 1 gal. container	*Cornus alba* *Salix scouleriana*	2 stems 10 stems
Wetland A (check dams in outlet ditch)	Seeding, 100 sf.	*Elymus glaucus* *Agrostis exarata* *Festuca rubra* *Deschampsia cespitosa*	0.1 lbs. 0.05 lbs. 0.1 lbs. 0.05 lbs.
Wetland A (check dams in outlet ditch)	Shrubs, 100 sf. 1 gal. container	*Cornus alba*	3 stems

Restoration Success Rate and Monitoring

The container stock survival rate, 2 years after planting, will be at least 75% of the amounts specified in Table 3. Dead plantings will be replaced in sufficient quantities to obtain the 75% survival rate. PGC may elect to install excess plantings at the onset in anticipation of replacement plantings. The seeding success rate will be 80% or greater ground cover and roughly 40% of native grass cover. Supplemental hand broadcast seeding will be employed to increase cover as needed.

Monitoring will occur in the fall of each year for 2 years, or until plant survival goals are met. A spring-time inspection will be conducted to identify dead plants and stresses on plants, in addition to adjusting weed control measures (described in next section). Planting of replacement container stock will be limited to winter-early spring months, or late fall-early winter, since no drip irrigation will be employed for plant survival. An annual monitoring report will be submitted to Oregon Dept. of State Lands no later than December 31 for the two years after planting.

Restoration Mitigation Maintenance

Any non-native shrub or tree growing in the restoration area will be spot-sprayed with an appropriate herbicide, preferably in spring months. A follow-up spot spray will occur in early summer, as needed. Given existing adjacent shade and lack of nutria, chew guards on wood plantings appear unnecessary.

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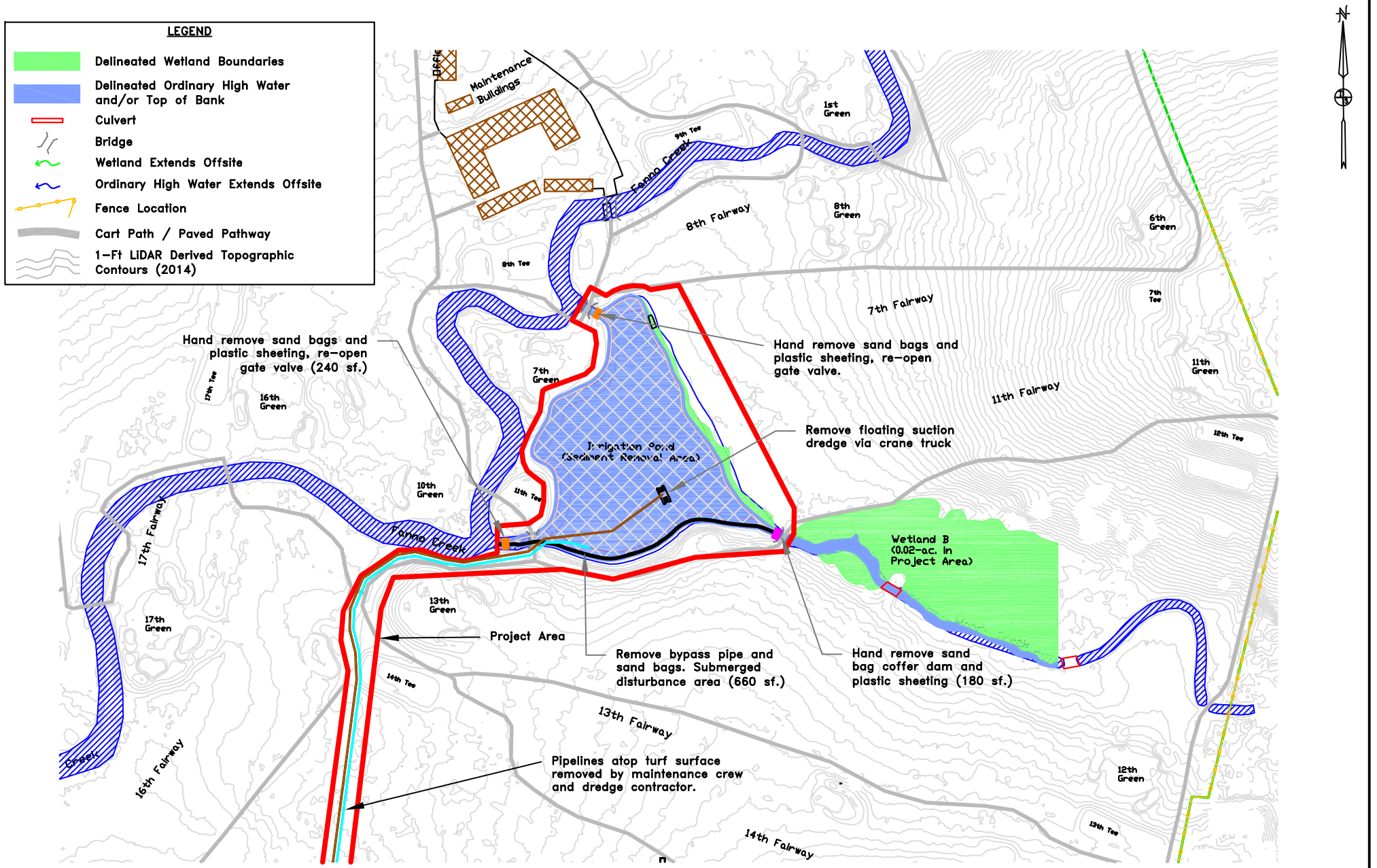


SOURCE: National Oceanic and Atmospheric Administration (NOAA) LiDAR Contours, 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

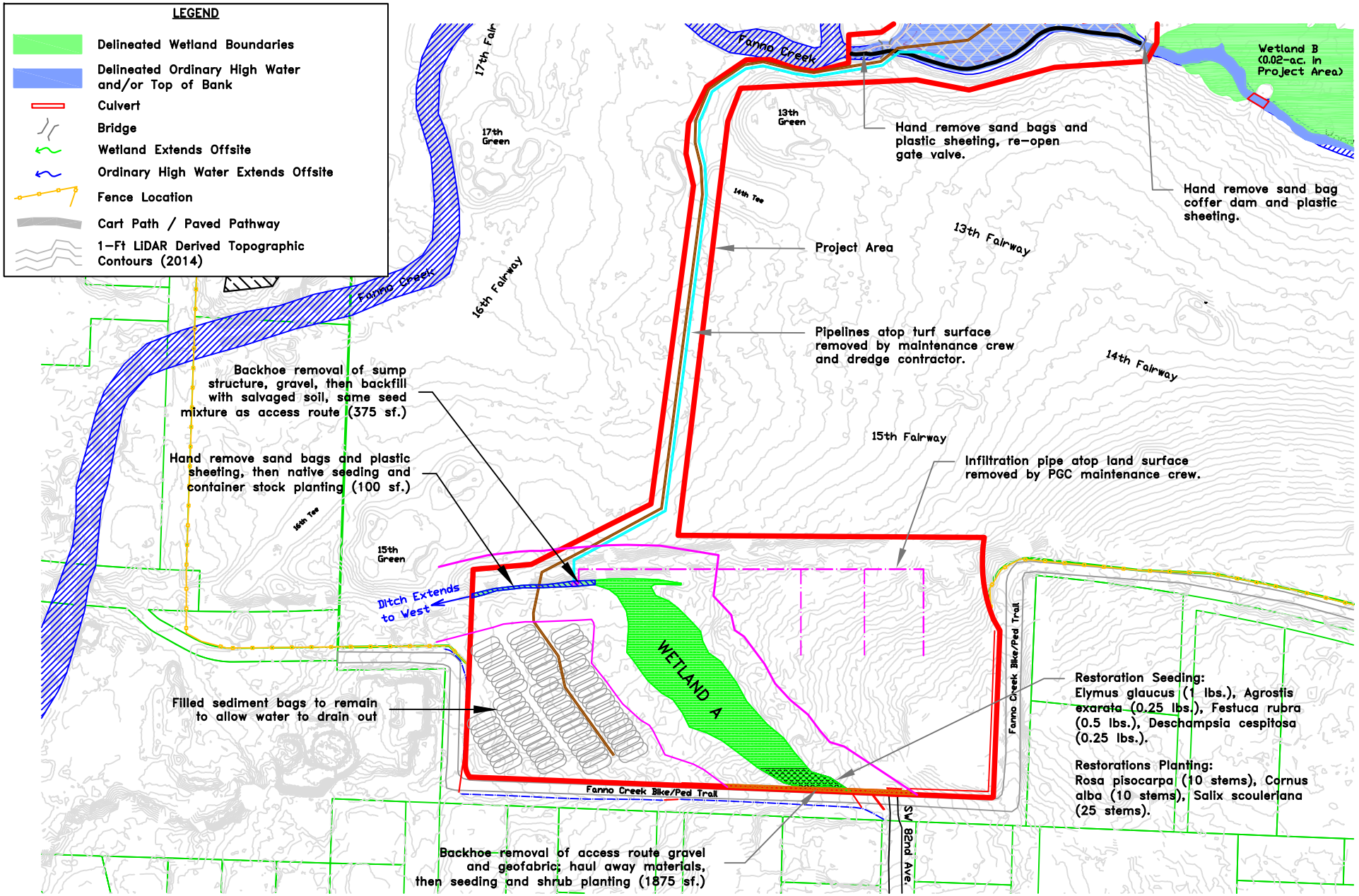
GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

TEMPORARY IMPACTS RESTORATION MITIGATION FOR PORTLAND GOLF CLUB POND SEDIMENT REMOVAL AND BAG PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024

NON-WETLAND WATERS MITIGATION ACTIVITY

EXHIBIT A



SOURCE: National Oceanic and Atmospheric Administration (NOAA) LiDAR Contours, 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

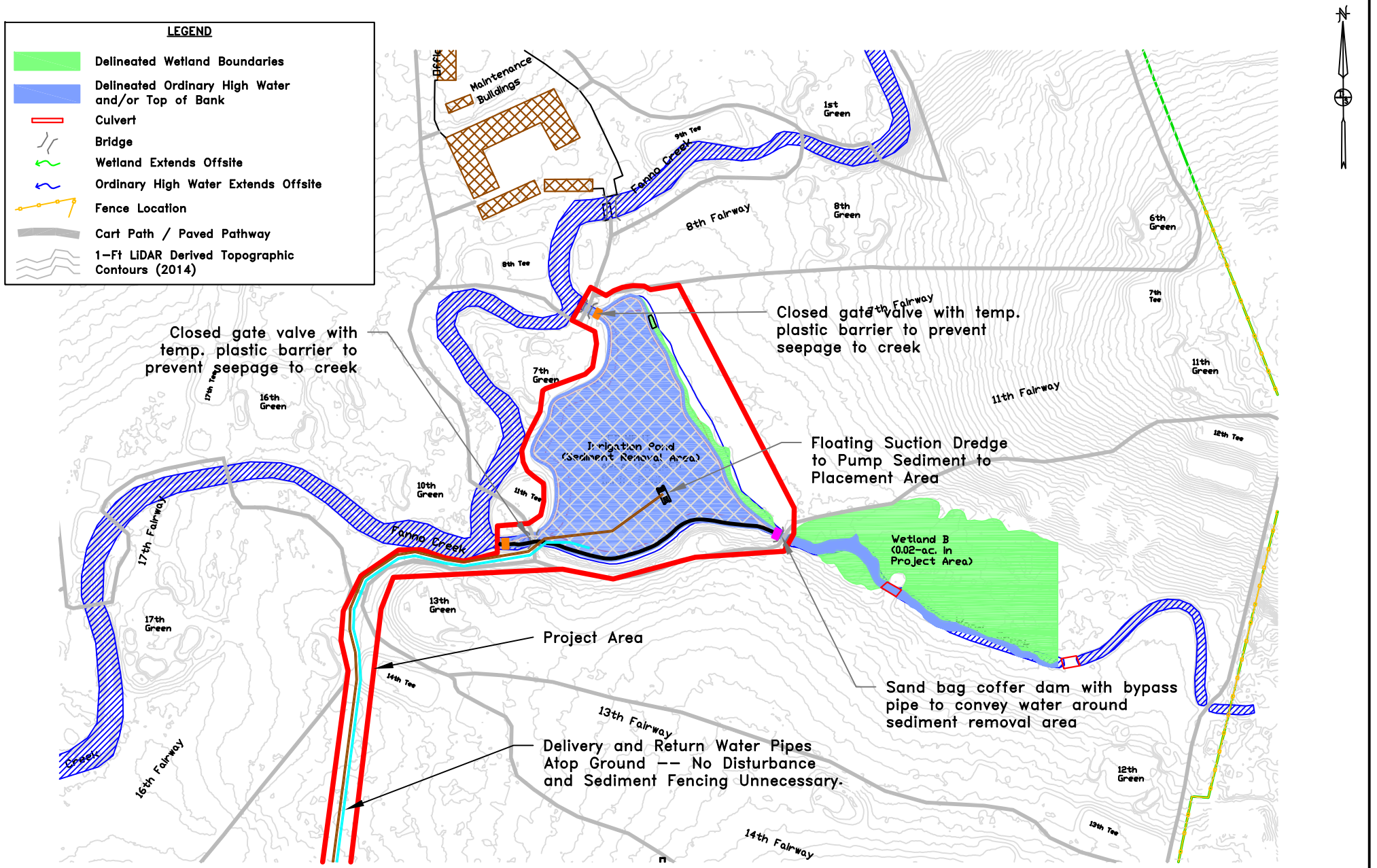
TEMPORARY IMPACTS RESTORATION MITIGATION FOR PORTLAND GOLF CLUB POND SEDIMENT REMOVAL AND BAG PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024

WETLAND MITIGATION ACTIVITY

EXHIBIT B

APPENDIX C – SEDIMENT EROSION DRAWINGS



SOURCE: National Oceanic and Atmospheric Administration (NOAA) LiDAR Contours and NAIP OSIP Aerial Photograph, 2019.

Terra Science, Inc.
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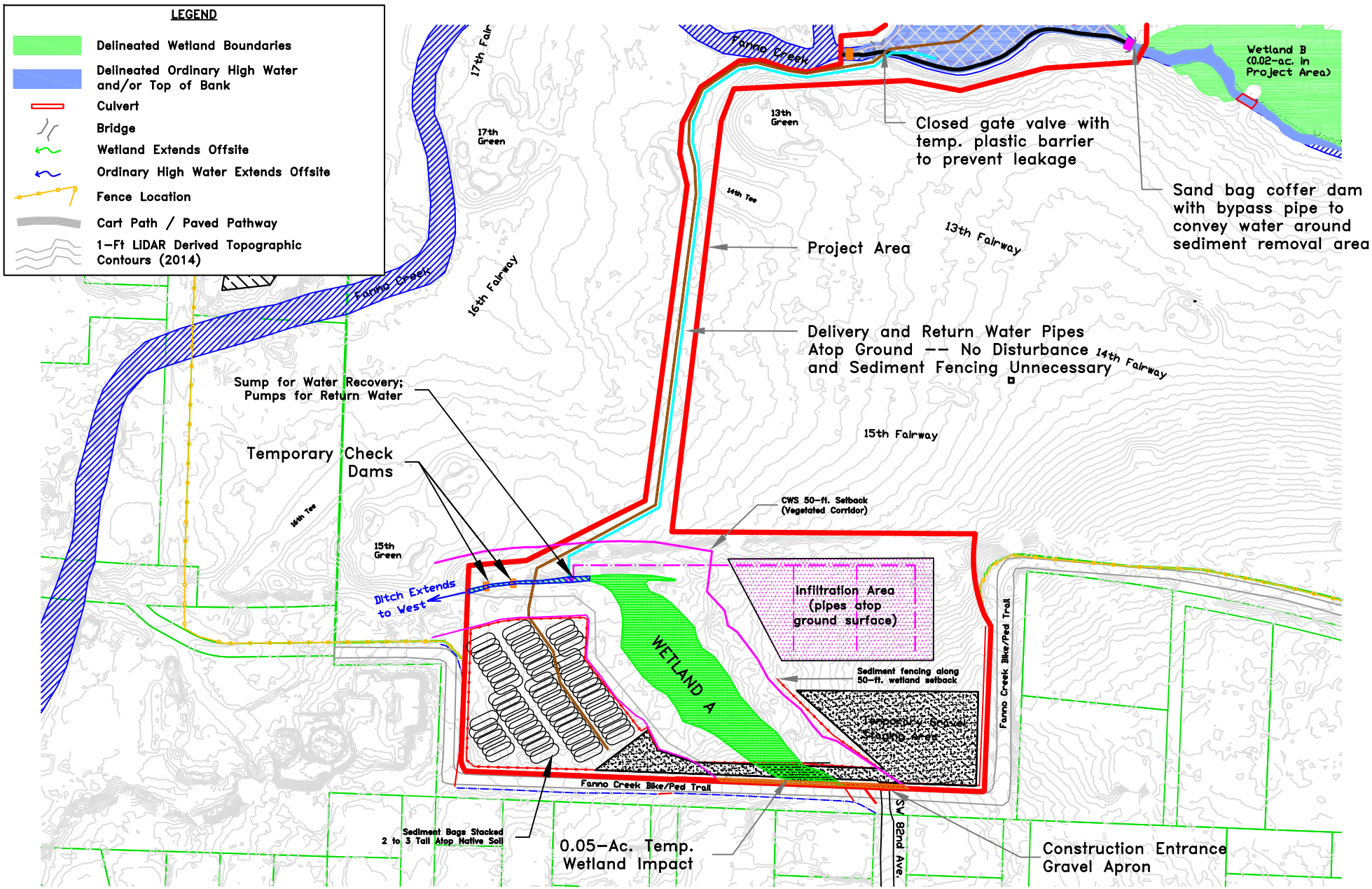
GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EROSION CONTROL FEATURE LOCATIONS (SEDIMENT REMOVAL AREA)

EROSION-1



Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

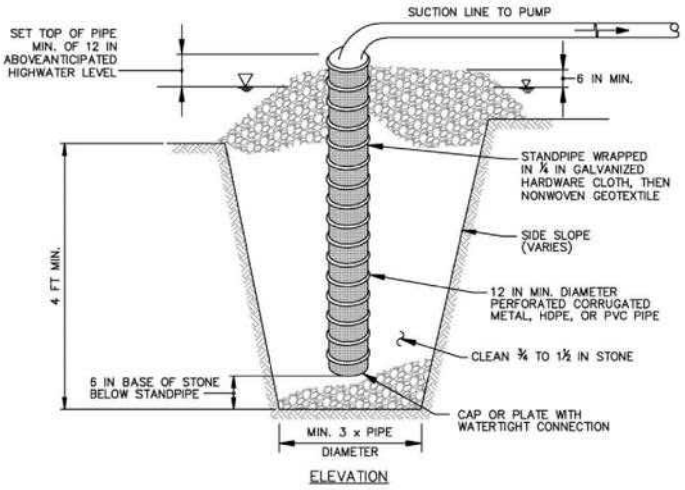
November 2024 (Updated)

EROSION CONTROL FEATURE LOCATIONS (SEDIMENT PLACEMENT AREA)

EROSION-2

STANDARD SYMBOL

⊠SP



ELEVATION

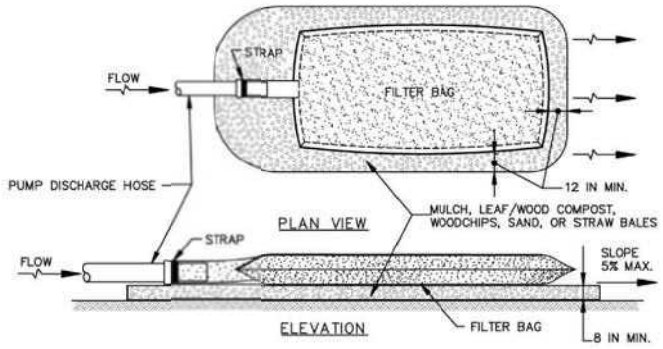
CONSTRUCTION SPECIFICATIONS

1. USE 12 INCH OR LARGER DIAMETER CORRUGATED METAL, HDPE, OR PVC PIPE WITH 1 INCH DIAMETER PERFORATIONS, 6 INCHES ON CENTER. BOTTOM OF PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
2. WRAP PIPE WITH ¼ INCH GALVANIZED HARDWARE CLOTH AND WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE HARDWARE CLOTH.
3. EXCAVATE PIT TO THREE TIMES THE PIPE DIAMETER AND FOUR FEET IN DEPTH. PLACE ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
4. SET TOP OF PIPE MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
5. BACKFILL PIT AROUND THE PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
6. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
7. A SUMP PIT REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, REMOVE PERFORATED PIPE AND REPLACE GEOTEXTILE AND STONE. KEEP POINT OF DISCHARGE FREE OF EROSION.

Control Measure	Problems	Possible Remedies
Inlet Protection	Inlet protection not dewatering and geotextile or stone voids filled with sediment	Replace geotextile or stone.
	Runoff undermining the inlet protection	Key-in geotextile, backfill, and compact.
	Sediment exceeds half the height of the structure	Remove sediment when sediment is half the height of the structure.
	Inlet protection leaning or collapsing	Verify construction of inlet protection. Verify drainage area. Reconstruct inlet protection.
Sump Pit	Discharge from hose is sediment laden	Reconstruct and replace geotextile and stone or install new sump pit.
	Water not entering pipe for pumping	Reconstruct and replace geotextile and stone or install new sump pit.
Portable Sediment Tank	Discharge from outlet is sediment laden	Cease pumping and remove sediment from tank, and replace geotextile. If sediment laden discharge continues, slow pumping rate of flow or use sump pit in conjunction.
	Discharge from outlet is becoming sediment laden once it discharges back onto the ground.	Relocate tank to a stabilized area, or place polyethylene sheeting or use hose to convey discharge to stabilized area.

STANDARD SYMBOL

⊠FB



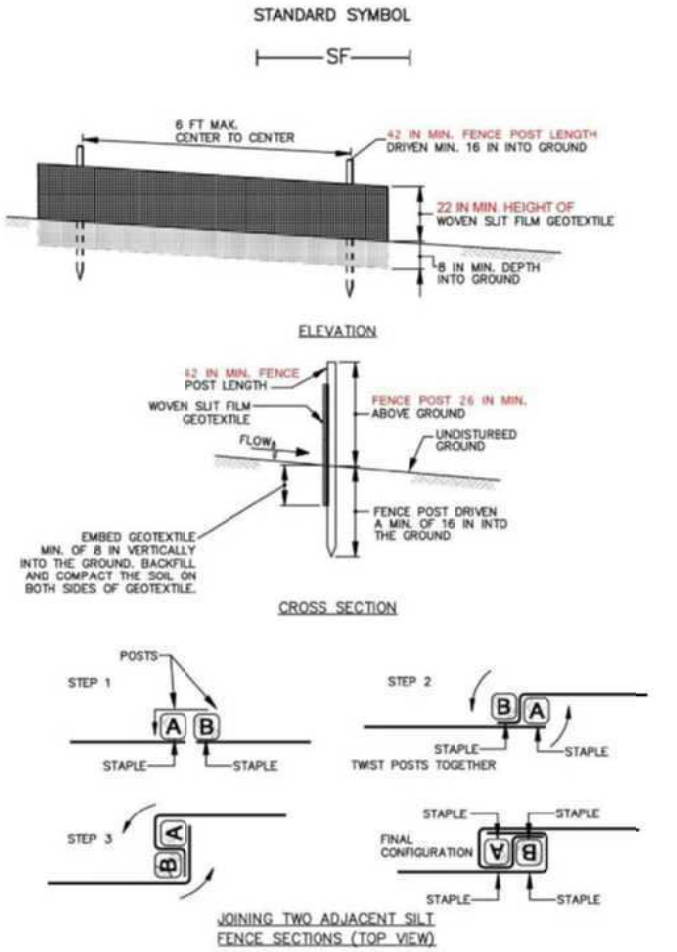
CONSTRUCTION SPECIFICATIONS

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT^2	ASTM D-4491
PERMITTIVITY (SEC^{-1})	1.2 SEC^{-1}	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632

6. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

Control Measure	Problems	Possible Remedies
Filter Bag	Sediment laden discharge is escaping around the hose insert.	Cease pumping and insert discharge hose further into bag. Retie bag around the discharge hose or use heavy hose clamps to create a tight seal. Periodically check this connection.
	Bag is not dewatering efficiently.	Remove and replace bag and dispose of bag in proper location.
	Discharge from bag is becoming sediment laden once it discharges on the ground.	Relocate bag to a stabilized area or place polyethylene sheeting to convey discharge to stabilized area.



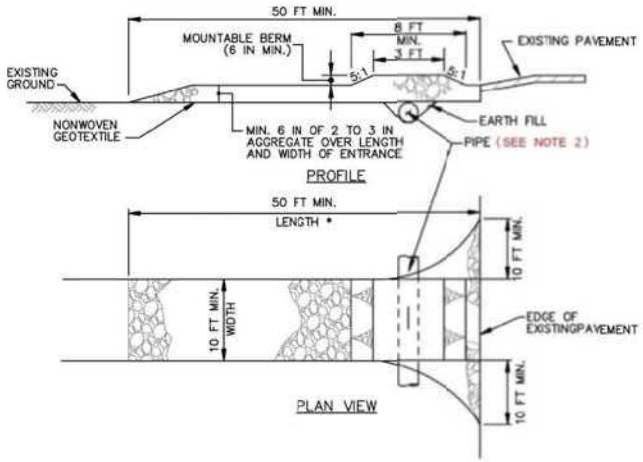
CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± ⅛ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 42 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.

Control Measure	Problems	Possible Remedies
Silt Fence	Flow undermining Fence	Entrench geotextile 8", backfill, and compact.
	Sediment exceeds 25% the height of the fence	Remove sediment when sediment is 25% the height of the fence.
	Fence leaning or collapsing	Verify post size and geotextile. Verify drainage area, slope length, and gradient behind fence. Correct any substandard condition.
	Torn fabric	Replace geotextile from post to post and install properly.
	Runoff escaping around end	Extend fence and turn end upslope.
Temporary Stone Outlet Structure	Excessive sediment	Remove sediment when sediment is within 6" of weir crest.
	Stone voids filled with sediment	Remove sediment filled stone and replace with new stone.
	Displaced stone	Verify drainage area and reconstruct structure.
	Flow escaping around the sides of the structure	Extend stone on each side and provide a low area in the center for spillway.

STANDARD SYMBOL

SCE

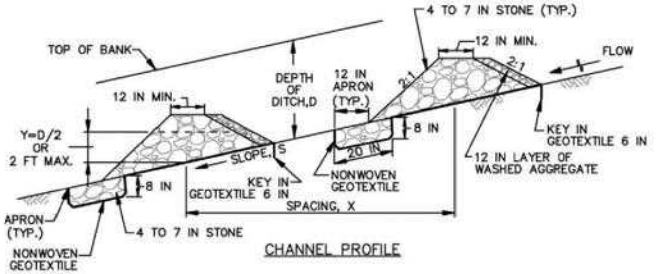


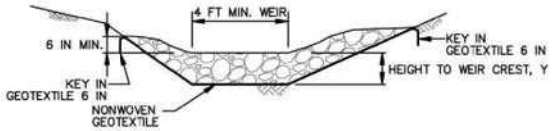
CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

STANDARD SYMBOL

CD



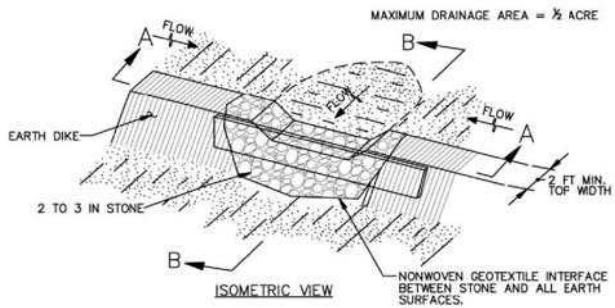


CONSTRUCTION SPECIFICATIONS

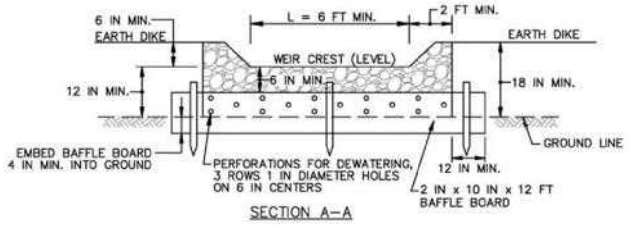
1. PREPARE SWALES IN ACCORDANCE WITH THE CONSTRUCTION SPECIFICATIONS DESCRIBED IN SECTION C-2, STANDARDS AND SPECIFICATIONS FOR TEMPORARY SWALE, OR AS SPECIFIED ON PLAN.
2. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND SIDES OF THE DAM PRIOR TO PLACEMENT OF STONE. CONSTRUCT THE CHECK DAM WITH WASHED 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) WITH SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM TOP WIDTH OF 12 INCHES. PLACE THE STONE SO THAT IT COMPLETELY COVERS THE WIDTH OF THE CHANNEL AND CHANNEL BANKS. FORM THE WEIR SO THAT TOP OF THE OUTLET CREST IS APPROXIMATELY 6 INCHES LOWER THAN THE OUTER EDGES.
3. SET THE HEIGHT FOR THE WEIR CREST EQUAL TO ONE-HALF THE DEPTH OF THE CHANNEL OR DITCH. TO AVOID SCOUR THE MAXIMUM HEIGHT OF THE WEIR CREST MUST NOT EXCEED 2.0 FEET.
4. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE-HALF OF THE HEIGHT OF THE WEIR CREST. MAINTAIN LINE, GRADE, AND CROSS SECTION.

STANDARD SYMBOL

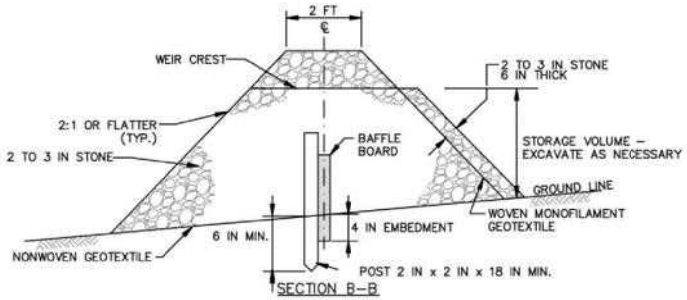
TSOS



ISOMETRIC VIEW



SECTION A–A



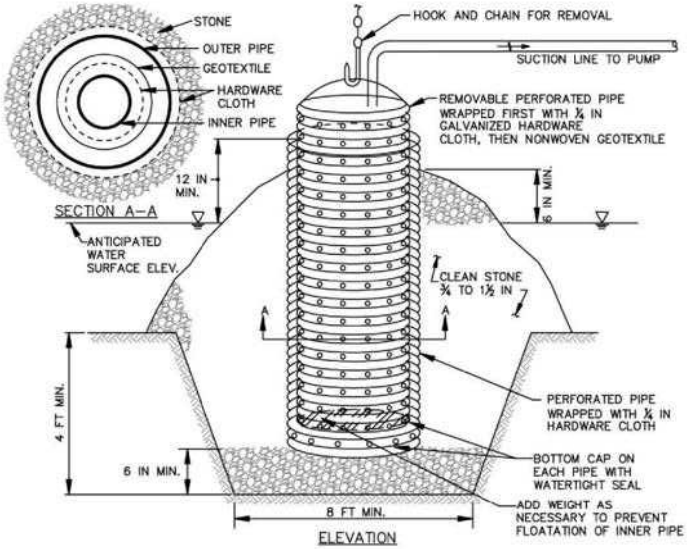
SECTION B–B

CONSTRUCTION SPECIFICATIONS

1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.
2. USE NONWOVEN GEOTEXTILE ON INTERFACE BETWEEN GROUND AND STONE.
3. PERFORATE BAFFLE BOARD WITH 3 ROWS OF 1 INCH DIAMETER HOLES 6 INCHES ON CENTER, EMBED A MINIMUM OF 4 INCHES INTO GROUND, AND EXTEND BAFFEL BOARD MINIMUM OF 12 INCHES INTO EARTH DIKE.

STANDARD SYMBOL

☒RPS



ELEVATION

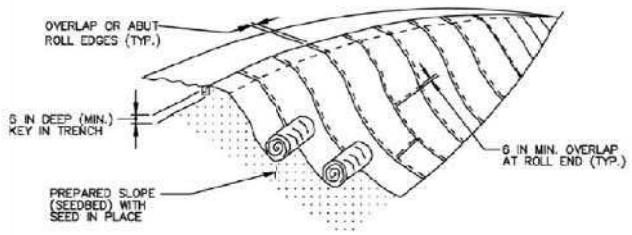
CONSTRUCTION SPECIFICATIONS

1. USE CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS 6 INCHES ON CENTER.
2. USE A MINIMUM 12 INCH DIAMETER INNER PIPE WITH AN OUTER PIPE A MINIMUM 6 INCHES LARGER IN DIAMETER. BOTTOM OF EACH PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
3. WRAP EACH PIPE WITH ¼ INCH GALVANIZED HARDWARE CLOTH. ON INNER PIPE WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H–1 MATERIALS, OVER THE HARDWARE CLOTH.
4. EXCAVATE 8 FEET X 8 FEET X 4 FEET DEEP PIT FOR PIPE PLACEMENT. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
5. SET TOP OF INNER AND OUTER PIPES MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION (OR RISER CREST ELEVATION WHEN DEWATERING A BASIN).
6. BACKFILL PIT AROUND THE OUTER PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
7. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
8. A REMOVABLE PUMPING STATION REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, PULL OUT INNER PIPE AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.

STANDARD SYMBOL

TSSMS – * lb/ft²

(* INCLUDE SHEAR STRESS)

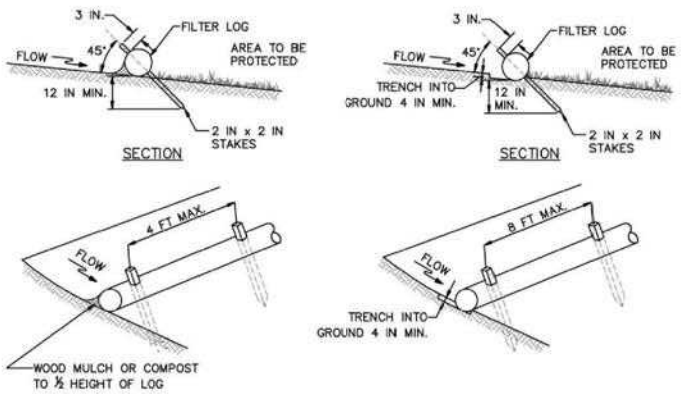


ISOMETRIC VIEW

CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.

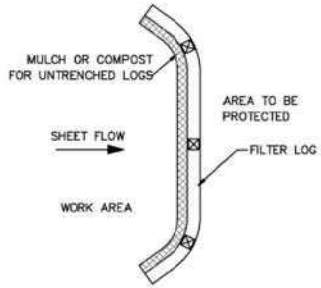
DESIGNATION FL-18 REFERS TO 18 INCH DIAMETER FILTER LOG.



UNTRENCHED INSTALLATION OR ENTRENCHED INSTALLATION*

*THIS APPLICATION MAY NOT BE USED WITH LOGS SMALLER THAN 12 IN.

ISOMETRIC VIEW



PLAN

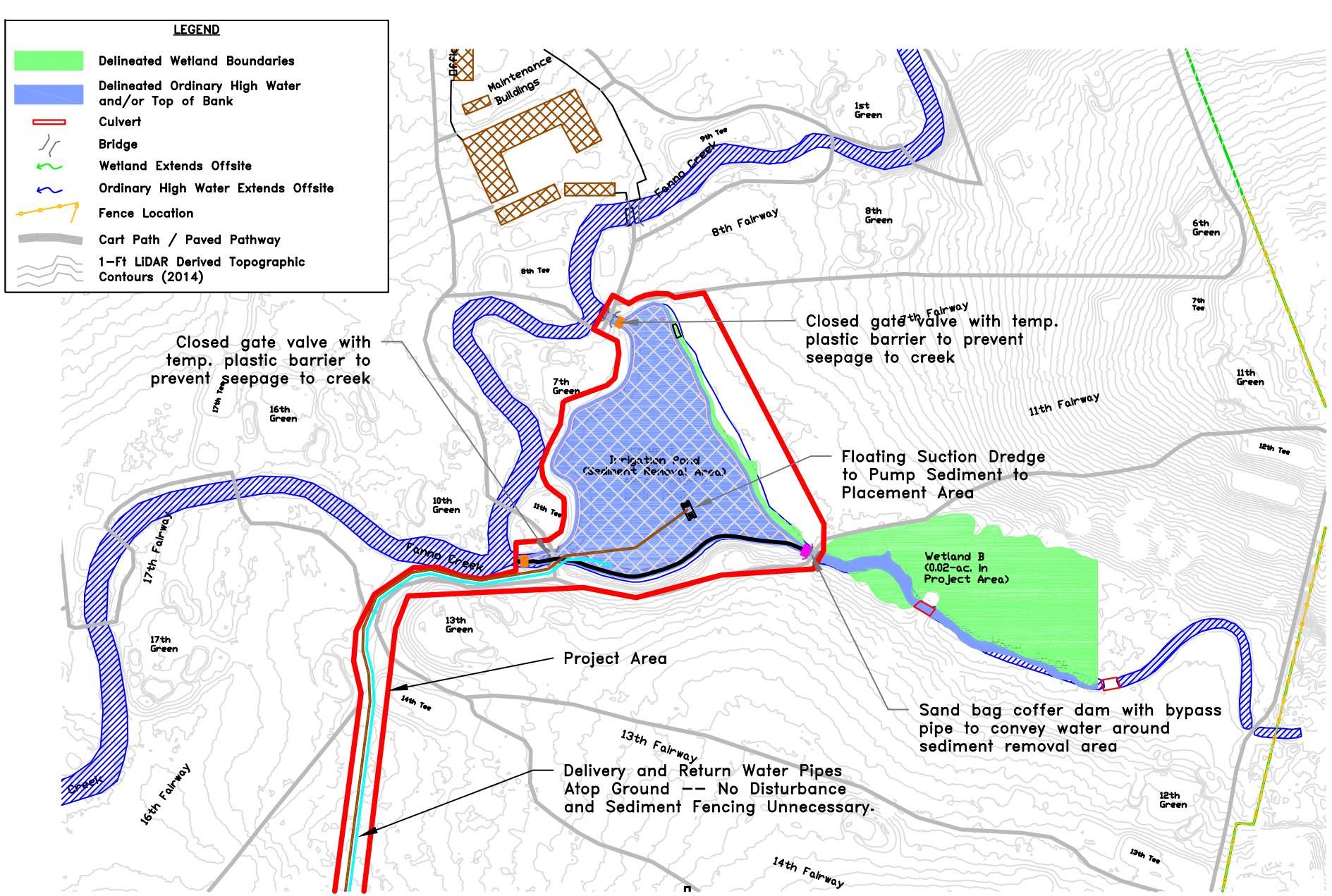
CONSTRUCTION SPECIFICATIONS

1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST (IN ACCORDANCE WITH SECTION H-1 MATERIALS), OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.

Control Measure	Problems	Possible Remedies
Vegetation	Erosion along slopes	Check top-of-slope diversion for positive drainage, install diversion if needed
	Bare soil patches	Fill erosion, regrade eroded slopes, & restabilize
	Sediment at toe-of-slope	Remove sediment, & restabilize
Dikes	Erosion on backside of dike	Verify positive drainage; repair eroded area, compact, & restabilize
	Loose soil	Compact dike
	Erosion on front face of dike	Verify channel lining, repair erosion, & restabilize
Swales	Erosion on slope below swale	Verify positive drainage; repair eroded area, compact, & restabilize
	Water ponding in swale	Verify positive drainage, & regrade swale
	Sediment or debris in channel	Remove material accumulation
	Erosion within swale	Verify channel lining, repair erosion, restabilize & install lining as appropriate; check dams may be necessary

Control Measure	Problems	Possible Remedies
Grass Waterways	Bare areas	Reseed, add lime & fertilizer; install soil stabilization matting
	Channel capacity reduced	Remove sediment/debris accumulations; or mow high growth
Pipe Slope Drain	Blocked inlet or outlet	Remove sediment and debris
	Runoff is eroding slope along pipe	Construct a berm at the inflow point
	Runoff is bypassing inlet	Construct an interceptor berm to direct flow
	Erosion at the outlet	Increase size of riprap apron, use larger riprap; or convey runoff to a more stable outlet
Riprap Lined Waterways	Scour underneath riprap	Verify proper channel dimensions; regrade, install & key-in geotextile, & place riprap
	Scour along the side of the waterway	Verify proper channel dimensions; and reconstruct waterway
	Riprap dislodged	Replace with larger sized riprap

APPENDIX C – SEDIMENT EROSION DRAWINGS



SOURCE: National Oceanic and Atmospheric Administration (NOAA) LiDAR Contours and NAIP OSIP Aerial Photograph, 2019.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

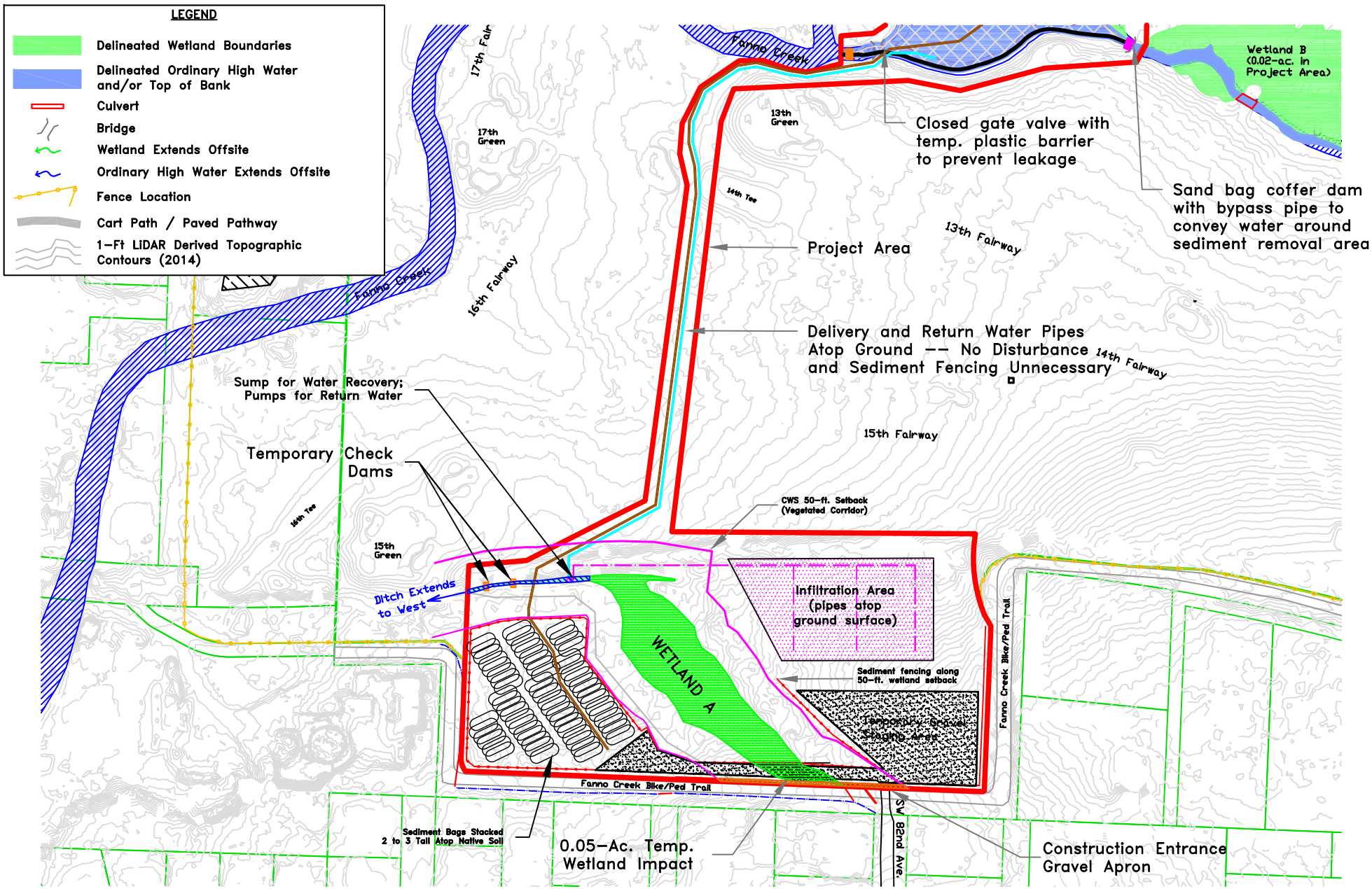
GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

November 2024 (Updated)

EROSION CONTROL FEATURE LOCATIONS (SEDIMENT REMOVAL AREA)

EROSION-1



Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
225 0 225 450 900
1 inch = 450 feet

JOINT PERMIT APPLICATION FOR PORTLAND GOLF CLUB
IRRIGATION POND SEDIMENT REMOVAL AND PLACEMENT
Portion of TAX LOT 1700, T. 1S, R. 1W, Sec. 24 (BC)
Washington County, Oregon

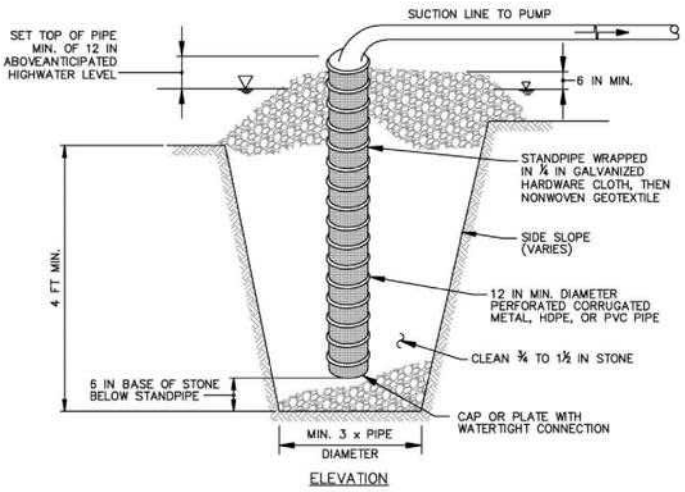
November 2024 (Updated)

EROSION CONTROL FEATURE LOCATIONS (SEDIMENT PLACEMENT AREA)

EROSION-2

STANDARD SYMBOL

⊠SP



ELEVATION

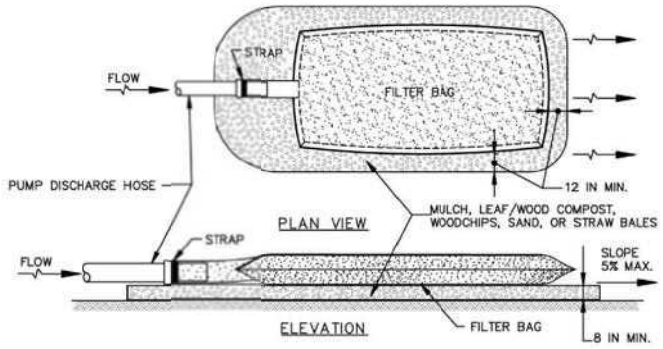
CONSTRUCTION SPECIFICATIONS

1. USE 12 INCH OR LARGER DIAMETER CORRUGATED METAL, HDPE, OR PVC PIPE WITH 1 INCH DIAMETER PERFORATIONS, 6 INCHES ON CENTER. BOTTOM OF PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
2. WRAP PIPE WITH ¼ INCH GALVANIZED HARDWARE CLOTH AND WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, OVER THE HARDWARE CLOTH.
3. EXCAVATE PIT TO THREE TIMES THE PIPE DIAMETER AND FOUR FEET IN DEPTH. PLACE ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
4. SET TOP OF PIPE MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
5. BACKFILL PIT AROUND THE PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
6. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
7. A SUMP PIT REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, REMOVE PERFORATED PIPE AND REPLACE GEOTEXTILE AND STONE. KEEP POINT OF DISCHARGE FREE OF EROSION.

Control Measure	Problems	Possible Remedies
Inlet Protection	Inlet protection not dewatering and geotextile or stone voids filled with sediment	Replace geotextile or stone.
	Runoff undermining the inlet protection	Key-in geotextile, backfill, and compact.
	Sediment exceeds half the height of the structure	Remove sediment when sediment is half the height of the structure.
	Inlet protection leaning or collapsing	Verify construction of inlet protection. Verify drainage area. Reconstruct inlet protection.
Sump Pit	Discharge from hose is sediment laden	Reconstruct and replace geotextile and stone or install new sump pit.
	Water not entering pipe for pumping	Reconstruct and replace geotextile and stone or install new sump pit.
Portable Sediment Tank	Discharge from outlet is sediment laden	Cease pumping and remove sediment from tank, and replace geotextile. If sediment laden discharge continues, slow pumping rate of flow or use sump pit in conjunction.
	Discharge from outlet is becoming sediment laden once it discharges back onto the ground.	Relocate tank to a stabilized area, or place polyethylene sheeting or use hose to convey discharge to stabilized area.

STANDARD SYMBOL

⊠FB



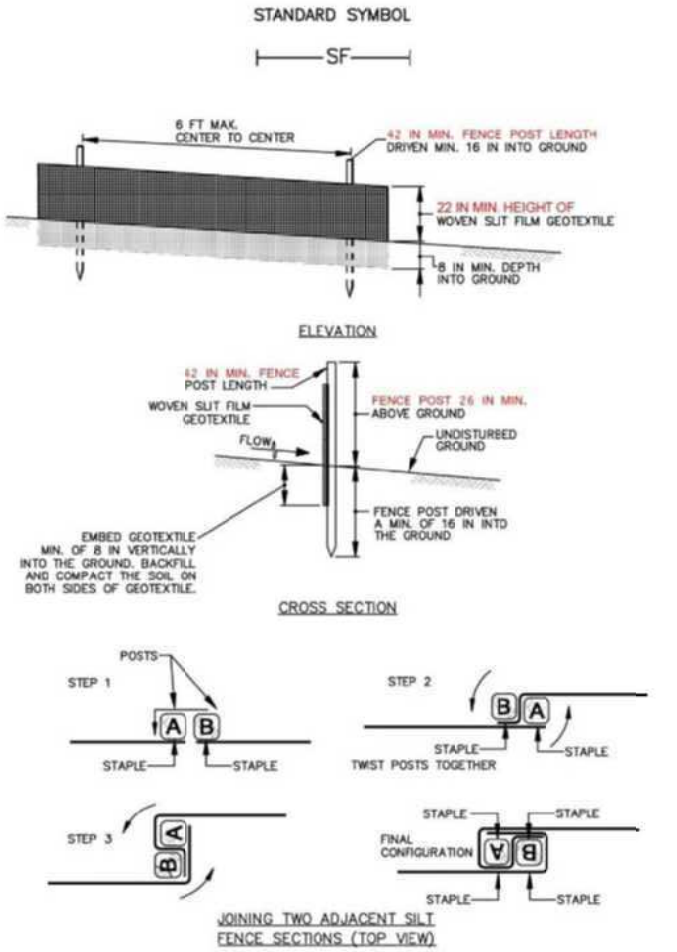
CONSTRUCTION SPECIFICATIONS

1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. USE NONWOVEN GEOTEXTILE WITH DOUBLE STITCHED SEAMS USING HIGH STRENGTH THREAD. SIZE SLEEVE TO ACCOMMODATE A MAXIMUM 4 INCH DIAMETER PUMP DISCHARGE HOSE. THE BAG MUST BE MANUFACTURED FROM A NONWOVEN GEOTEXTILE THAT MEETS OR EXCEEDS MINIMUM AVERAGE ROLL VALUES (MARV) FOR THE FOLLOWING:

GRAB TENSILE	250 LB	ASTM D-4632
PUNCTURE	150 LB	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT^2	ASTM D-4491
PERMITTIVITY (SEC^{-1})	1.2 SEC^{-1}	ASTM D-4491
UV RESISTANCE	70% STRENGTH @ 500 HOURS	ASTM D-4355
APPARENT OPENING SIZE (AOS)	0.15-0.18 MM	ASTM D-4751
SEAM STRENGTH	90%	ASTM D-4632

6. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

Control Measure	Problems	Possible Remedies
Filter Bag	Sediment laden discharge is escaping around the hose insert.	Cease pumping and insert discharge hose further into bag. Retie bag around the discharge hose or use heavy hose clamps to create a tight seal. Periodically check this connection.
	Bag is not dewatering efficiently.	Remove and replace bag and dispose of bag in proper location.
	Discharge from bag is becoming sediment laden once it discharges on the ground.	Relocate bag to a stabilized area or place polyethylene sheeting to convey discharge to stabilized area.



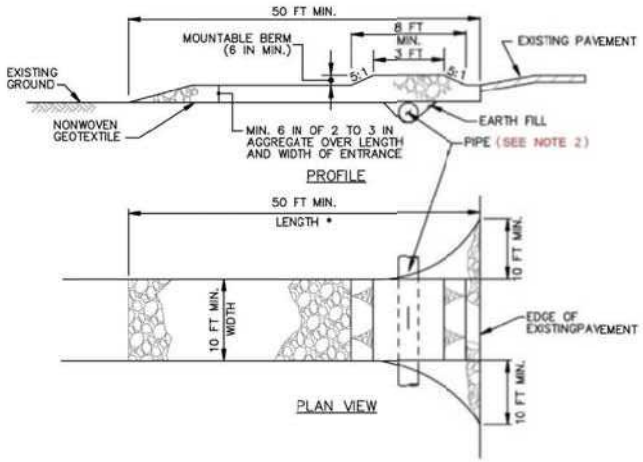
CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± ⅛ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 42 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.

Control Measure	Problems	Possible Remedies
Silt Fence	Flow undermining Fence	Entrench geotextile 8", backfill, and compact.
	Sediment exceeds 25% the height of the fence	Remove sediment when sediment is 25% the height of the fence.
	Fence leaning or collapsing	Verify post size and geotextile. Verify drainage area, slope length, and gradient behind fence. Correct any substandard condition.
	Torn fabric	Replace geotextile from post to post and install properly.
	Runoff escaping around end	Extend fence and turn end upslope.
Temporary Stone Outlet Structure	Excessive sediment	Remove sediment when sediment is within 6" of weir crest.
	Stone voids filled with sediment	Remove sediment filled stone and replace with new stone.
	Displaced stone	Verify drainage area and reconstruct structure.
	Flow escaping around the sides of the structure	Extend stone on each side and provide a low area in the center for spillway.

STANDARD SYMBOL

SCE

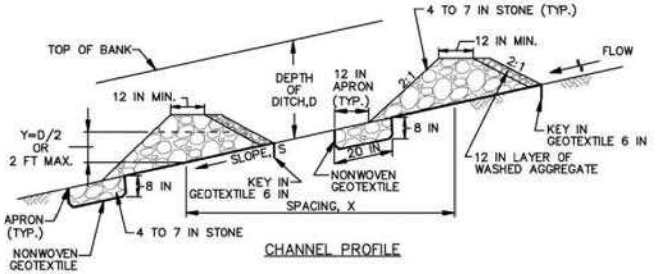


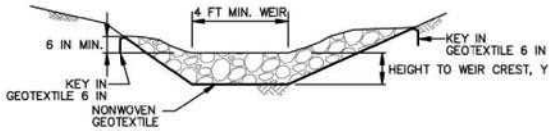
CONSTRUCTION SPECIFICATIONS

1. PLACE STABILIZED CONSTRUCTION ENTRANCE IN ACCORDANCE WITH THE APPROVED PLAN. VEHICLES MUST TRAVEL OVER THE ENTIRE LENGTH OF THE SCE. USE MINIMUM LENGTH OF 50 FEET (*30 FEET FOR SINGLE RESIDENCE LOT). USE MINIMUM WIDTH OF 10 FEET. FLARE SCE 10 FEET MINIMUM AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
2. PIPE ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD THE SCE UNDER THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PROTECT PIPE INSTALLED THROUGH THE SCE WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 12 INCHES OF STONE OVER THE PIPE. PROVIDE PIPE AS SPECIFIED ON APPROVED PLAN. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE IS NOT NECESSARY. A MOUNTABLE BERM IS REQUIRED WHEN SCE IS NOT LOCATED AT A HIGH SPOT.
3. PREPARE SUBGRADE AND PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
4. PLACE CRUSHED AGGREGATE (2 TO 3 INCHES IN SIZE) OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) AT LEAST 6 INCHES DEEP OVER THE LENGTH AND WIDTH OF THE SCE.
5. MAINTAIN ENTRANCE IN A CONDITION THAT MINIMIZES TRACKING OF SEDIMENT. ADD STONE OR MAKE OTHER REPAIRS AS CONDITIONS DEMAND TO MAINTAIN CLEAN SURFACE, MOUNTABLE BERM, AND SPECIFIED DIMENSIONS. IMMEDIATELY REMOVE STONE AND/OR SEDIMENT SPILLED, DROPPED, OR TRACKED ONTO ADJACENT ROADWAY BY VACUUMING, SCRAPING, AND/OR SWEEPING. WASHING ROADWAY TO REMOVE MUD TRACKED ONTO PAVEMENT IS NOT ACCEPTABLE UNLESS WASH WATER IS DIRECTED TO AN APPROVED SEDIMENT CONTROL PRACTICE.

STANDARD SYMBOL

CD



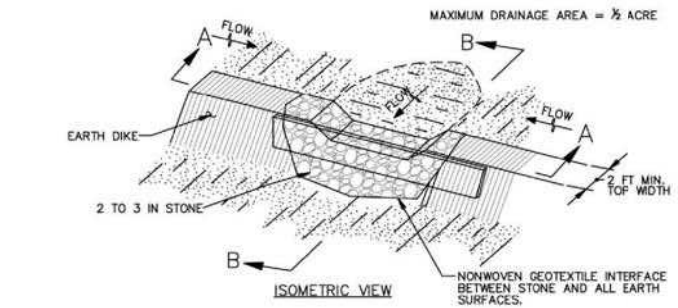


CONSTRUCTION SPECIFICATIONS

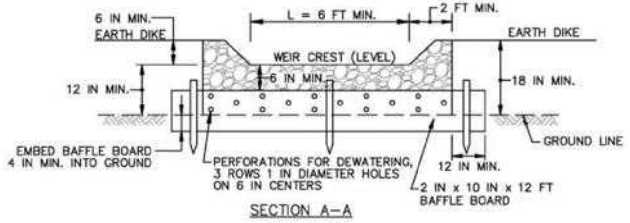
1. PREPARE SWALES IN ACCORDANCE WITH THE CONSTRUCTION SPECIFICATIONS DESCRIBED IN SECTION C-2, STANDARDS AND SPECIFICATIONS FOR TEMPORARY SWALE, OR AS SPECIFIED ON PLAN.
2. PLACE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND SIDES OF THE DAM PRIOR TO PLACEMENT OF STONE. CONSTRUCT THE CHECK DAM WITH WASHED 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE (WITHOUT REBAR) WITH SIDE SLOPES OF 2:1 OR FLATTER AND A MINIMUM TOP WIDTH OF 12 INCHES. PLACE THE STONE SO THAT IT COMPLETELY COVERS THE WIDTH OF THE CHANNEL AND CHANNEL BANKS. FORM THE WEIR SO THAT TOP OF THE OUTLET CREST IS APPROXIMATELY 6 INCHES LOWER THAN THE OUTER EDGES.
3. SET THE HEIGHT FOR THE WEIR CREST EQUAL TO ONE-HALF THE DEPTH OF THE CHANNEL OR DITCH. TO AVOID SCOUR THE MAXIMUM HEIGHT OF THE WEIR CREST MUST NOT EXCEED 2.0 FEET.
4. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ONE-HALF OF THE HEIGHT OF THE WEIR CREST. MAINTAIN LINE, GRADE, AND CROSS SECTION.

STANDARD SYMBOL

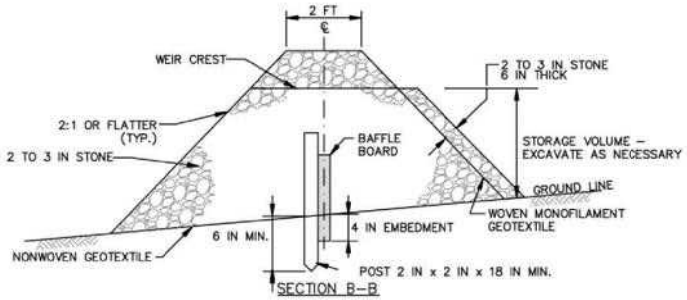
TSOS



ISOMETRIC VIEW



SECTION A–A



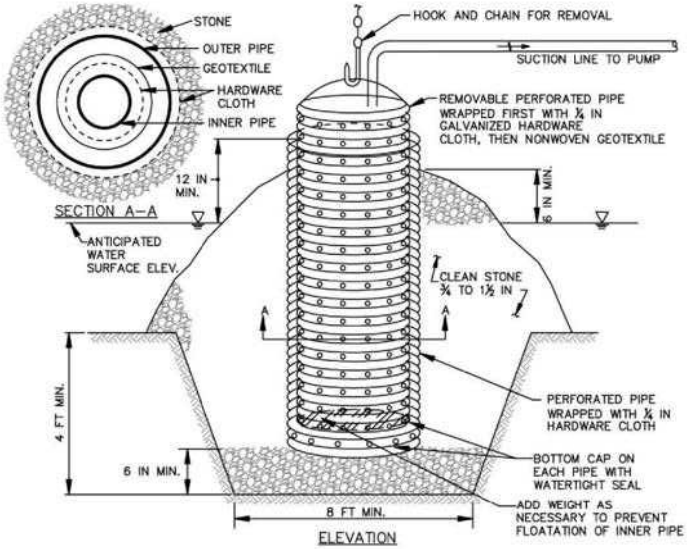
SECTION B–B

CONSTRUCTION SPECIFICATIONS

1. PROVIDE STORAGE VOLUME AS SPECIFIED ON APPROVED PLANS.
2. USE NONWOVEN GEOTEXTILE ON INTERFACE BETWEEN GROUND AND STONE.
3. PERFORATE BAFFLE BOARD WITH 3 ROWS OF 1 INCH DIAMETER HOLES 6 INCHES ON CENTER, EMBED A MINIMUM OF 4 INCHES INTO GROUND, AND EXTEND BAFFEL BOARD MINIMUM OF 12 INCHES INTO EARTH DIKE.

STANDARD SYMBOL

☒RPS



ELEVATION

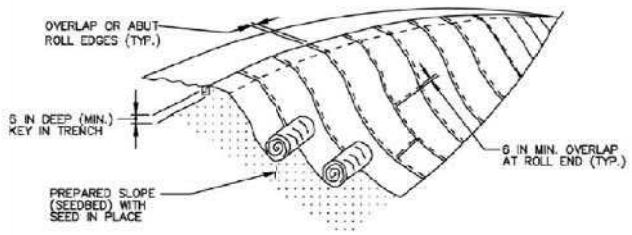
CONSTRUCTION SPECIFICATIONS

1. USE CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS 6 INCHES ON CENTER.
2. USE A MINIMUM 12 INCH DIAMETER INNER PIPE WITH AN OUTER PIPE A MINIMUM 6 INCHES LARGER IN DIAMETER. BOTTOM OF EACH PIPE MUST BE CAPPED WITH WATERTIGHT SEAL.
3. WRAP EACH PIPE WITH ¼ INCH GALVANIZED HARDWARE CLOTH. ON INNER PIPE WRAP NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H–1 MATERIALS, OVER THE HARDWARE CLOTH.
4. EXCAVATE 8 FEET X 8 FEET X 4 FEET DEEP PIT FOR PIPE PLACEMENT. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE, 6 INCHES IN DEPTH PRIOR TO PIPE PLACEMENT.
5. SET TOP OF INNER AND OUTER PIPES MINIMUM 12 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION (OR RISER CREST ELEVATION WHEN DEWATERING A BASIN).
6. BACKFILL PIT AROUND THE OUTER PIPE WITH ¾ TO 1½ INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE AND EXTEND STONE A MINIMUM OF 6 INCHES ABOVE ANTICIPATED WATER SURFACE ELEVATION.
7. DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
8. A REMOVABLE PUMPING STATION REQUIRES FREQUENT MAINTENANCE. IF SYSTEM CLOGS, PULL OUT INNER PIPE AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.

STANDARD SYMBOL

TSSMS – * lb/ft²

(* INCLUDE SHEAR STRESS)

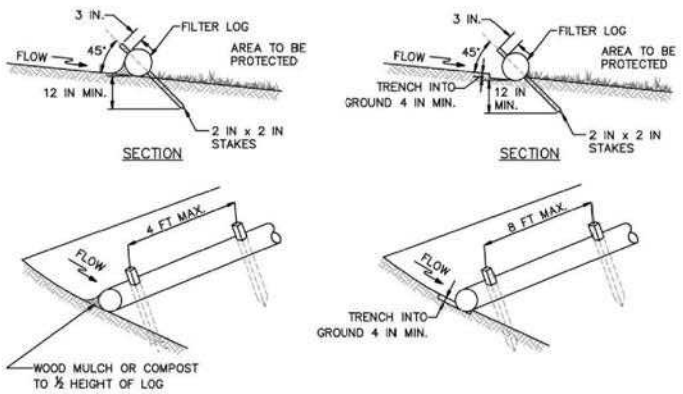


ISOMETRIC VIEW

CONSTRUCTION SPECIFICATIONS

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION 6-4 VEGETATIVE STABILIZATION.

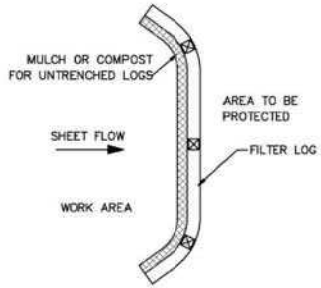
DESIGNATION FL-18 REFERS TO 18 INCH DIAMETER FILTER LOG.



UNTRENCHED INSTALLATION OR ENTRENCHED INSTALLATION*

*THIS APPLICATION MAY NOT BE USED WITH LOGS SMALLER THAN 12 IN.

ISOMETRIC VIEW



PLAN

CONSTRUCTION SPECIFICATIONS

1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST (IN ACCORDANCE WITH SECTION H-1 MATERIALS), OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.

Control Measure	Problems	Possible Remedies
Vegetation	Erosion along slopes	Check top-of-slope diversion for positive drainage, install diversion if needed
	Bare soil patches	Fill erosion, regrade eroded slopes, & restabilize
	Sediment at toe-of-slope	Remove sediment, & restabilize
Dikes	Erosion on backside of dike	Verify positive drainage; repair eroded area, compact, & restabilize
	Loose soil	Compact dike
	Erosion on front face of dike	Verify channel lining, repair erosion, & restabilize
Swales	Erosion on slope below swale	Verify positive drainage; repair eroded area, compact, & restabilize
	Water ponding in swale	Verify positive drainage, & regrade swale
	Sediment or debris in channel	Remove material accumulation
	Erosion within swale	Verify channel lining, repair erosion, restabilize & install lining as appropriate; check dams may be necessary

Control Measure	Problems	Possible Remedies
Grass Waterways	Bare areas	Reseed, add lime & fertilizer; install soil stabilization matting
	Channel capacity reduced	Remove sediment/debris accumulations; or mow high growth
Pipe Slope Drain	Blocked inlet or outlet	Remove sediment and debris
	Runoff is eroding slope along pipe	Construct a berm at the inflow point
	Runoff is bypassing inlet	Construct an interceptor berm to direct flow
	Erosion at the outlet	Increase size of riprap apron, use larger riprap; or convey runoff to a more stable outlet
Riprap Lined Waterways	Scour underneath riprap	Verify proper channel dimensions; regrade, install & key-in geotextile, & place riprap
	Scour along the side of the waterway	Verify proper channel dimensions; and reconstruct waterway
	Riprap dislodged	Replace with larger sized riprap

APPENDIX E – WETLAND DELINEATION

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

January 12, 2022

Portland Golf Club
Attn: Lonnie Lister, General Manager
5900 SW Scholls Ferry Road
Portland, OR 97225

Re: WD # 2021-0646 **Approved**
Wetland Delineation Report for Irrigation Pond Maintenance
Washington County; T1S R1W S24B TL1700 (Portion)
City of Beaverton Local Wetlands Inventory Wetland WO-3

Dear Lonnie Lister:

The Department of State Lands has reviewed the wetland delineation report prepared by Terra Science, Inc. for the site referenced above. Please note that the study area includes only a portion of the tax lot described above (see the attached maps). Based upon the information presented in the report, we concur with the wetland and waterway boundaries as mapped in Figure 6, 6A, 6B and 6C of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 3 wetlands (Wetland A, B and C, totaling approximately 2.19 acres), Woods Creek, and a pond (Irrigation Pond) were identified. The wetlands, creek and pond are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). In addition, Fanno Creek, an essential salmonid stream with a managed connection to the irrigation pond, is located just outside the study area boundary. Fill or removal of any amount of material below Fanno Creek's OHWL may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal, other state agencies or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, PWS, the Jurisdiction Coordinator for Washington County at (503) 986-5246.

Sincerely,

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Jason Clinch, Terra Science, Inc.
Washington County Planning Department
Danielle Erb, Corps of Engineers
Michael De Blasi, DSL

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

Fully completed and signed report cover forms and applicable fees are required before report review timelines are initiated by the Department of State Lands. Make checks payable to the Oregon Department of State Lands. To pay fees by credit card, go online at: https://apps.oregon.gov/DSL/EPS/program?key=4.

Attach this completed and signed form to the front of an unbound report or include a hard copy with a digital version (single PDF file of the report cover form and report, minimum 300 dpi resolution) and submit to:

Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.

A single PDF of the completed cover from and report may be e-mailed to: Wetland_Delineation@dsl.state.or.us.
For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

Contact and Authorization Information

☒ Applicant ☒ Owner Name, Firm and Address:
Portland Golf Club
Attn: Lonnie Lister, General Manager
5900 S.W. Scholls Ferry Road
Portland, OR 97225

Business phone # **(503) 292-2651**
Mobile phone # (optional) **N/A**
E-mail: **N/A**

☐ Authorized Legal Agent, Name and Address (if different):
N/A

Business phone # **N/A**
Mobile phone # (optional) **N/A**
E-mail: **N/A**

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.
Typed/Printed Name: Lonnie Lister Signature: [signature]
Date: 11/17/2021 Special instructions regarding site access: **Please contact wetland consultant prior to entering site.**

Project and Site Information

Project Name: **Portland Golf Club**
Latitude: **45.471435°N** Longitude: **-122.760355°W**
Proposed Use: **Irrigation Pond Maintenance**
Tax Map # **1S 1W 24** Tax Lot(s) **Portion of 1700**
Tax Map # Tax Lot(s)
Project Street Address (or other descriptive location):
5900 S.W. Scholls Ferry Rd
Township **1S** Range **1W** Section **24** QQ **B**
Township Range Section QQ
Waterway: **Fanno Creek** River Mile: **Unknown**
City: **Portland** County: **Washington**
USGS / NWI Quad(s): **Beaverton, OR**

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Terra Science, Inc., Attn: Jason Clinch
4710 S.W. Kelly Avenue, Suite 100
Portland, Oregon 97239

Phone # **(503) 274-2100**
Mobile phone # **N/A**
E-mail: **jason@terrascience.com**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: [signature] Date: 11-19-2021

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: **±17.43 acres** Total Wetland Acreage: **2.19 acres**

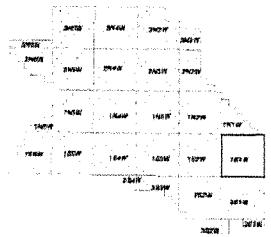
Check Box Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☐ EFSC/ODOE Proj. Mgr:
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL #:

☒ Fee payment submitted **$ 475**
☐ Fee ($100) for resubmittal of rejected report
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL #: Expiration date:
☒ LWI shows wetlands or waters on parcel
Wetland ID code: **Multiple ID codes**

For Office Use Only

DSL Reviewer: CS Fee Paid Date: ____/____/____ DSL WD #: 2021-0646
Date Delineation Received: 11 / 19 / 2021 Scanned: ☐ Electronic: ☒ DSL App. #: ____



WASHINGTON COUNTY OREGON
SECTION 24 T1S R1W W.M.
SCALE 1" = 400'

36	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6
12	7	8	9	10	11	12	7
13	18	17	16	15	14	13	18
24	19	20	21	22	23	24	19
25	30	29	28	27	26	25	30
35	31	32	33	34	35	36	31
1	6	5	4	3	2	1	6

FOR ADDITIONAL MAPS VISIT OUR WEBSITE AT
www.co.washington.or.us

BB	BA	AB	AA
	B	A	
BC	BD	AC	AD
CB	CA	DB	DA
	C	D	
CC	CD	DC	DD

Cancelled Taxlots For: 1S124
300,400-1100,1102,1200-1400,100,101,
102,103,104,200,201,1601,1901,2000,
1502,2301.

CARTOGRAPHY

PLOT DATE: December 11, 2015
FOR ASSESSMENT PURPOSES ONLY - DO NOT RELY ON FOR OTHER USE

Map areas delineated by either gray shading or a cross-hatching pattern are for reference only and may not indicate the most current property boundaries. Please consult the appropriate map for the most current information.

PORTLAND
BEAVERTON
1S 1 24

1S 1 24

SOURCE: ORMAP website, Washington County Assessor's Map 1S 1 24, 2021. Available at: <https://ormap.net/gis/index.html>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

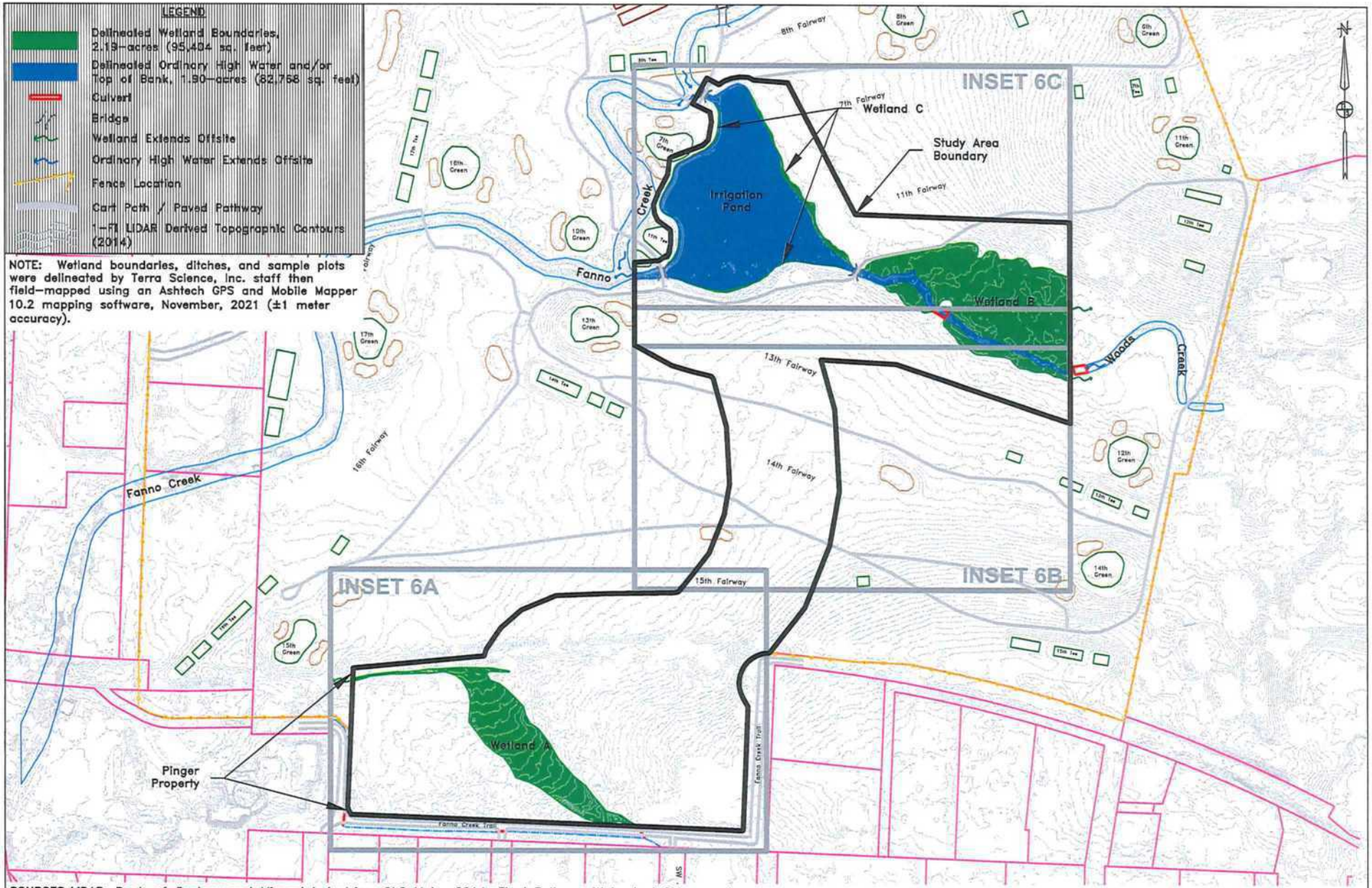
GRAPHIC SCALE
500' 0' 500' 1000' 2000'

WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

November 2021

TAX LOT MAP
1S 1 24

FIGURE 2



Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
125' 0' 125' 250' 500'

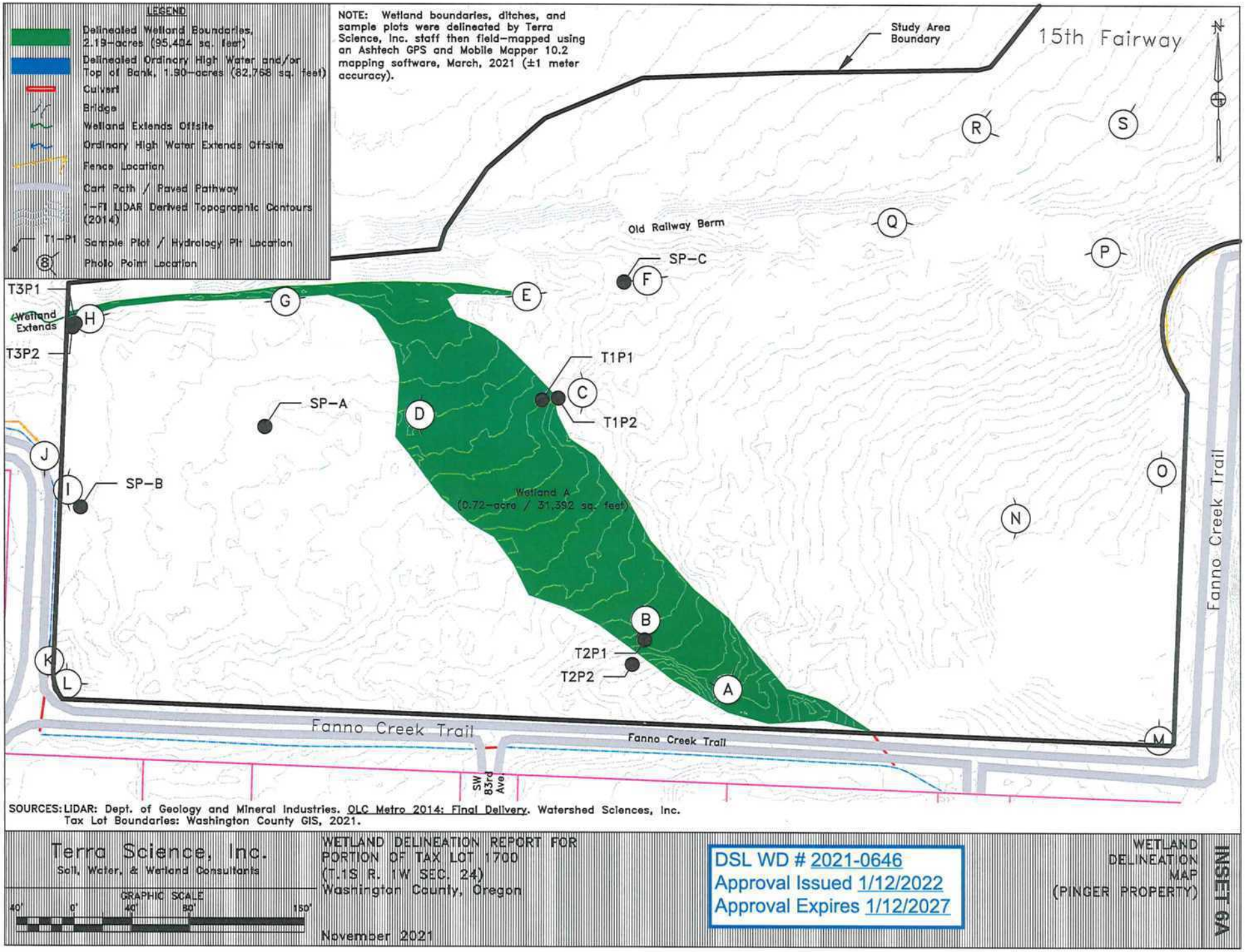
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

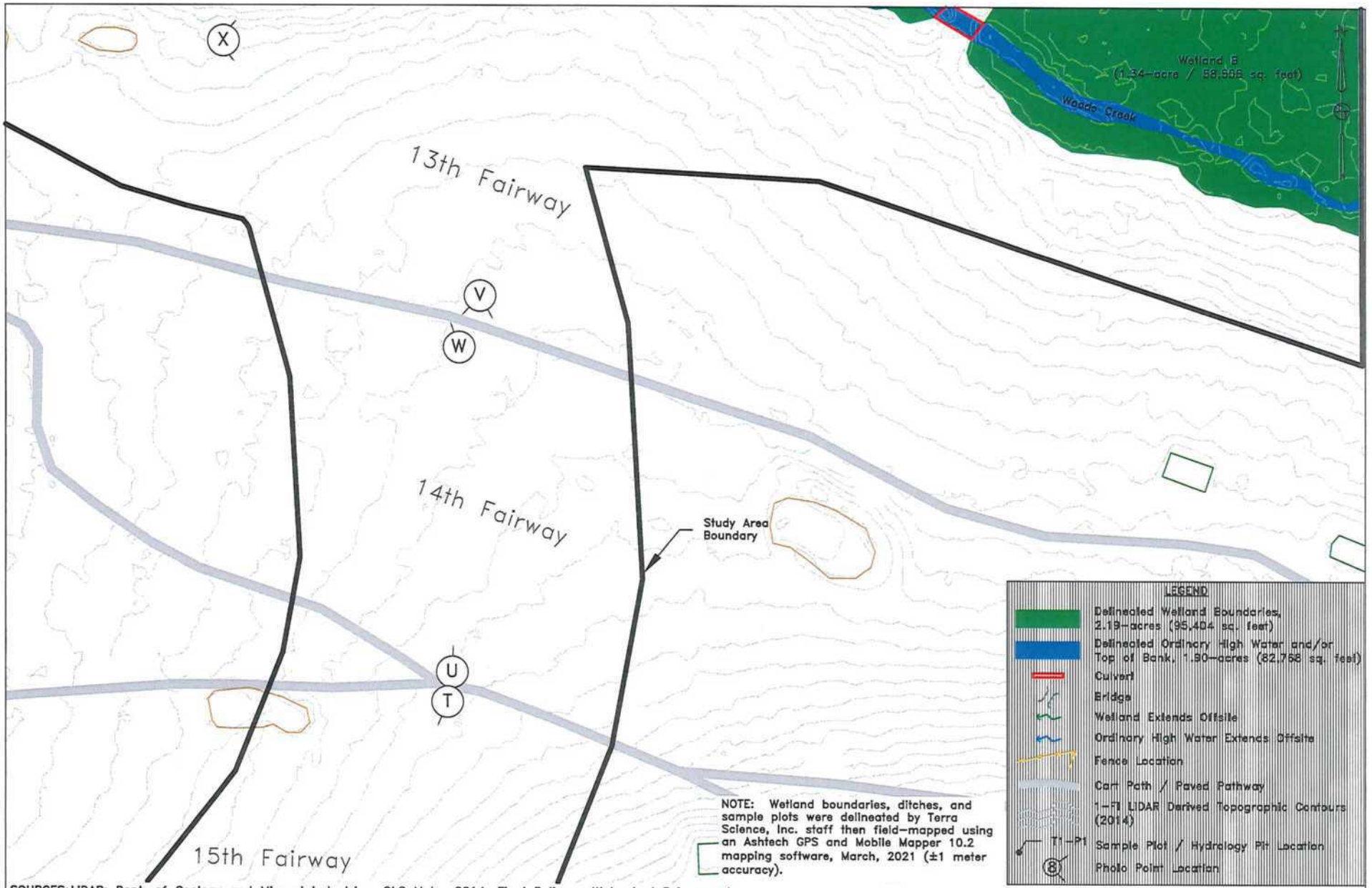
November 2021

DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027

WETLAND DELINEATION INDEX MAP

FIGURE 6


LEGEND
Delineated Wetland Boundaries, 2.19-acres (95,404 sq. feet)
Delineated Ordinary High Water and/or Top of Bank, 1.90-acres (82,758 sq. feet)
Culvert
Bridge
Wetland Extends Offsite
Ordinary High Water Extends Offsite
Fence Location
Cart Path / Paved Pathway
1-Ft LIDAR Derived Topographic Contours (2014)
T1-P1 Sample Plot / Hydrology Pit Location
Photo Point Location
NOTE: Wetland boundaries, ditches, and sample plots were delineated by Terra Science, Inc. staff then field-mapped using an Ashtech GPS and Mobile Mapper 10.2 mapping software, March, 2021 (±1 meter accuracy).
Study Area Boundary
15th Fairway
Old Railway Berm
SP-C
SP-A
SP-B
T3P1
T3P2
Wetland Extends
T1P1
T1P2
T2P1
T2P2
Wetland A
(0.72-acre / 31,392 sq. feet)
Fanno Creek Trail
Fanno Creek Trail
Fanno Creek Trail
SW 83rd Ave.
SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.
Terra Science, Inc.
Soil, Water, & Wetland Consultants
GRAPHIC SCALE
40' 0' 40' 80' 160'
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon
November 2021
DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027
WETLAND DELINEATION MAP
(PINGER PROPERTY)
INSET 6A


X
13th Fairway
V
W
14th Fairway
Study Area Boundary
U
T
15th Fairway
Wetland B
(1.34-acre / 58,556 sq. feet)
Wapato Creek
LEGEND
Delineated Wetland Boundaries, 2.19-acres (95,404 sq. feet)
Delineated Ordinary High Water and/or Top of Bank, 1.90-acres (82,768 sq. feet)
Culvert
Bridge
Wetland Extends Offsite
Ordinary High Water Extends Offsite
Fence Location
Cart Path / Paved Pathway
1-Ft LIDAR Derived Topographic Contours (2014)
T1-P1
Sample Plot / Hydrology Pit Location
Photo Point Location
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Soil, Water, & Wetland Consultants
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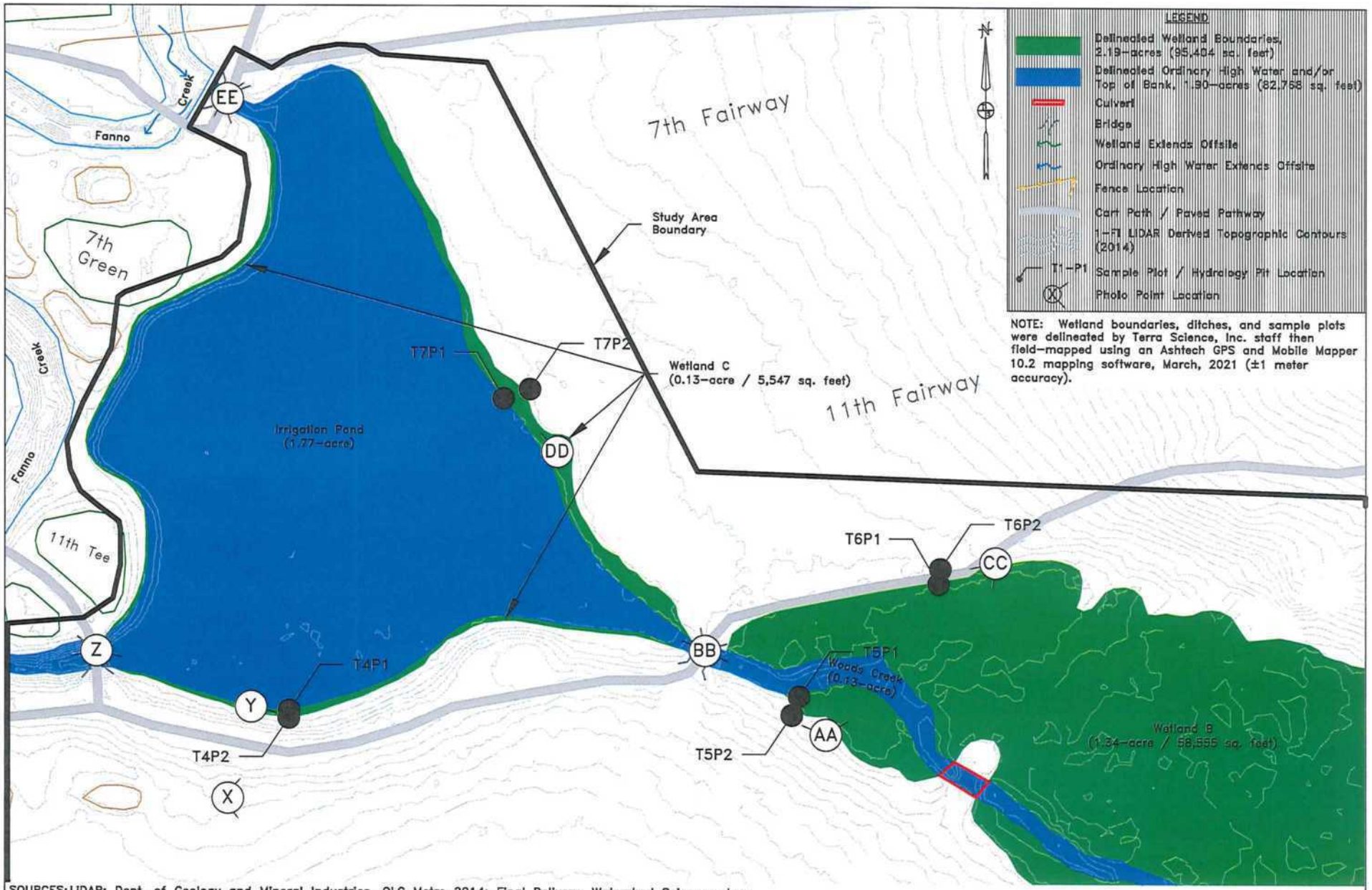
40' 0' 40' 80' 160'
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon
November 2021
DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027
WETLAND DELINEATION MAP
INSET 6B



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

November 2021

DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027

WETLAND DELINEATION MAP

INSET 6C

APPENDIX E – WETLAND DELINEATION

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

January 12, 2022

Portland Golf Club
Attn: Lonnie Lister, General Manager
5900 SW Scholls Ferry Road
Portland, OR 97225

Re: WD # 2021-0646 **Approved**
Wetland Delineation Report for Irrigation Pond Maintenance
Washington County; T1S R1W S24B TL1700 (Portion)
City of Beaverton Local Wetlands Inventory Wetland WO-3

Dear Lonnie Lister:

The Department of State Lands has reviewed the wetland delineation report prepared by Terra Science, Inc. for the site referenced above. Please note that the study area includes only a portion of the tax lot described above (see the attached maps). Based upon the information presented in the report, we concur with the wetland and waterway boundaries as mapped in Figure 6, 6A, 6B and 6C of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the study area, 3 wetlands (Wetland A, B and C, totaling approximately 2.19 acres), Woods Creek, and a pond (Irrigation Pond) were identified. The wetlands, creek and pond are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). In addition, Fanno Creek, an essential salmonid stream with a managed connection to the irrigation pond, is located just outside the study area boundary. Fill or removal of any amount of material below Fanno Creek's OHWL may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal, other state agencies or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, PWS, the Jurisdiction Coordinator for Washington County at (503) 986-5246.

Sincerely,

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: Jason Clinch, Terra Science, Inc.
Washington County Planning Department
Danielle Erb, Corps of Engineers
Michael De Blasi, DSL

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

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For submittal of PDF files larger than 10 MB, e-mail DSL instructions on how to access the file from your ftp or other file sharing website.

Contact and Authorization Information

☒ Applicant ☒ Owner Name, Firm and Address:
Portland Golf Club
Attn: Lonnie Lister, General Manager
5900 S.W. Scholls Ferry Road
Portland, OR 97225

Business phone # **(503) 292-2651**
Mobile phone # (optional) **N/A**
E-mail: **N/A**

☐ Authorized Legal Agent, Name and Address (if different):
N/A

Business phone # **N/A**
Mobile phone # (optional) **N/A**
E-mail: **N/A**

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.
Typed/Printed Name: Lonnie Lister Signature: [signature]
Date: 11/17/2021 Special instructions regarding site access: **Please contact wetland consultant prior to entering site.**

Project and Site Information

Project Name: **Portland Golf Club**
Proposed Use: **Irrigation Pond Maintenance**
Project Street Address (or other descriptive location): **5900 S.W. Scholls Ferry Rd**
City: **Portland** County: **Washington**

Latitude: **45.471435°N** Longitude: **-122.760355°W**
Tax Map # **1S 1W 24** Tax Lot(s) **Portion of 1700**
Tax Map # Tax Lot(s)
Township **1S** Range **1W** Section **24** QQ **B**
Township Range Section QQ
Waterway: **Fanno Creek** River Mile: **Unknown**
USGS / NWI Quad(s): **Beaverton, OR**

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
Terra Science, Inc., Attn: Jason Clinch
4710 S.W. Kelly Avenue, Suite 100
Portland, Oregon 97239

Phone # **(503) 274-2100**
Mobile phone # **N/A**
E-mail: **jason@terrascience.com**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: [signature] Date: 11-19-2021

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No | Study Area size: **±17.43 acres** | Total Wetland Acreage: **2.19 acres**

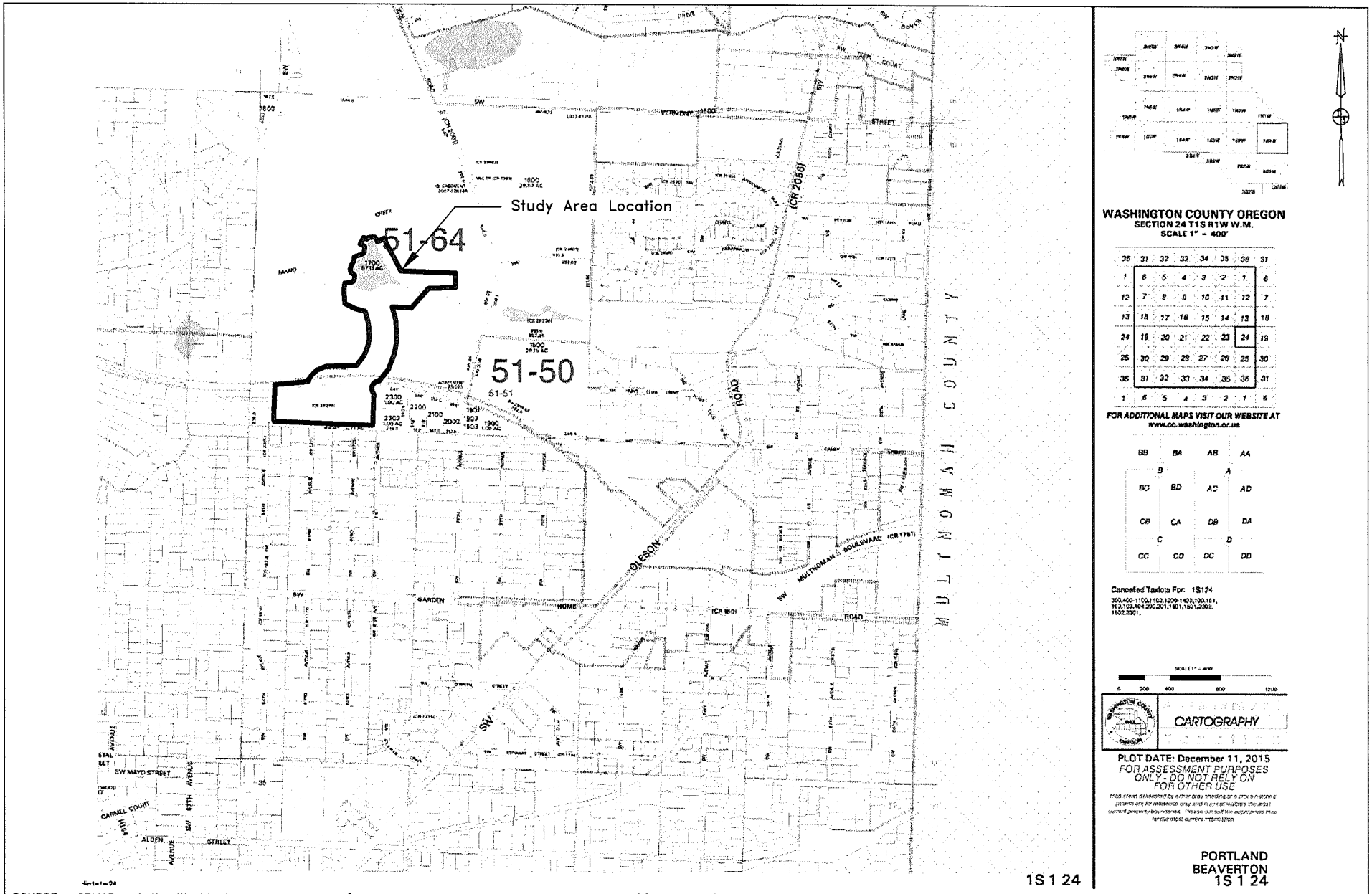
Check Box Applicable Boxes Below

☐ R-F permit application submitted
☐ Mitigation bank site
☐ EFSC/ODOE Proj. Mgr:
☐ Wetland restoration/enhancement project (not mitigation)
☐ Previous delineation/application on parcel
If known, previous DSL #:

☒ Fee payment submitted **$ 475**
☐ Fee ($100) for resubmittal of rejected report
☐ Request for Reissuance. See eligibility criteria. (no fee)
DSL #: Expiration date:
☒ LWI shows wetlands or waters on parcel
Wetland ID code: **Multiple ID codes**

For Office Use Only

DSL Reviewer: CS Fee Paid Date: ____/____/____ DSL WD #: 2021-0646
Date Delineation Received: 11 / 19 / 2021 Scanned: ☐ Electronic: ☒ DSL App. #: ____



SOURCE: ORMAP website, Washington County Assessor's Map 1S 1 24, 2021. Available at: <https://ormap.net/gis/index.html>

Terra Science, Inc.
Soil, Water, & Wetland Consultants

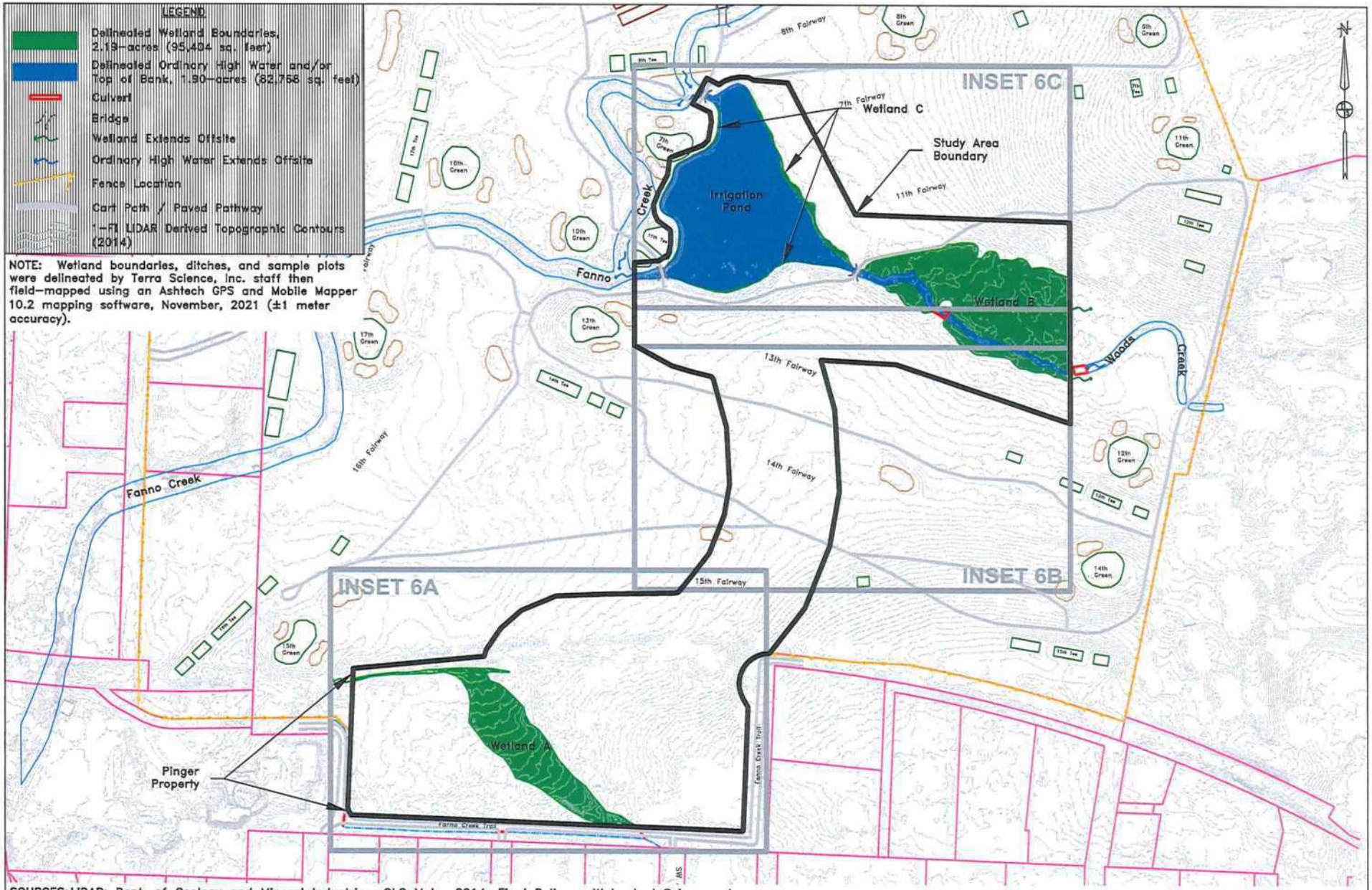
GRAPHIC SCALE
500' 0' 500' 1000' 2000'

WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

November 2021

TAX LOT MAP
1S 1 24

FIGURE 2



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
125' 0' 125' 250' 500'

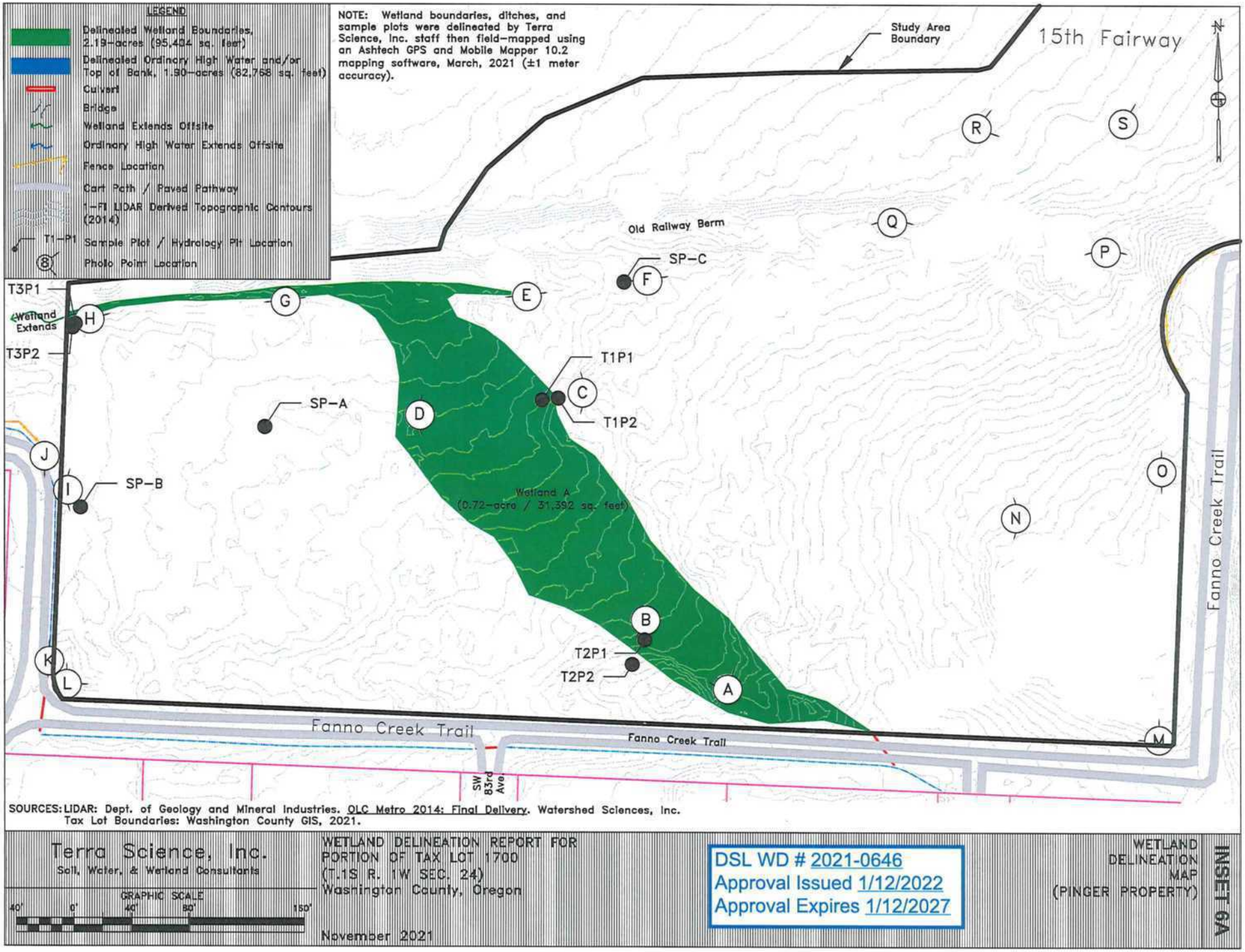
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

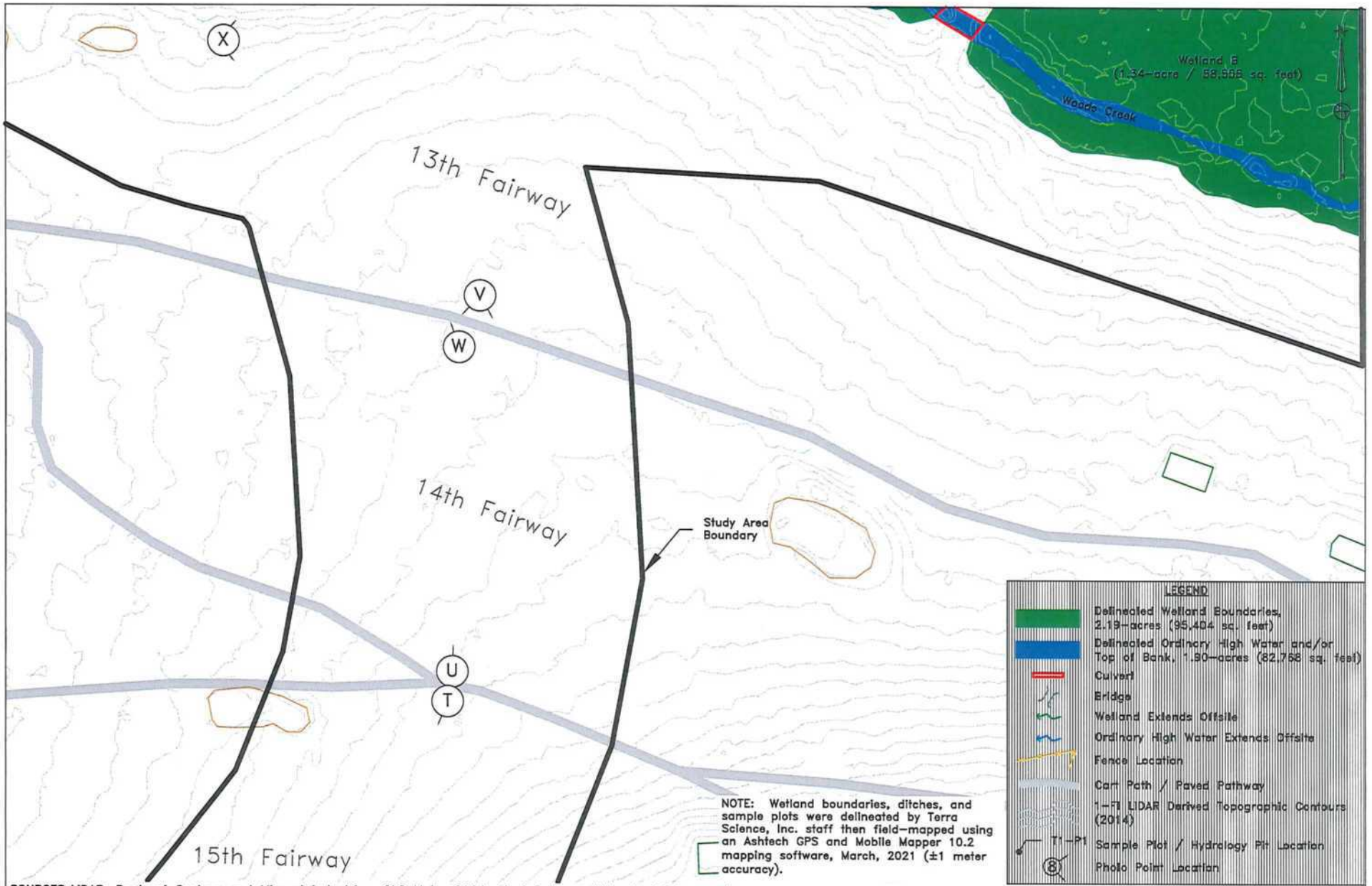
November 2021

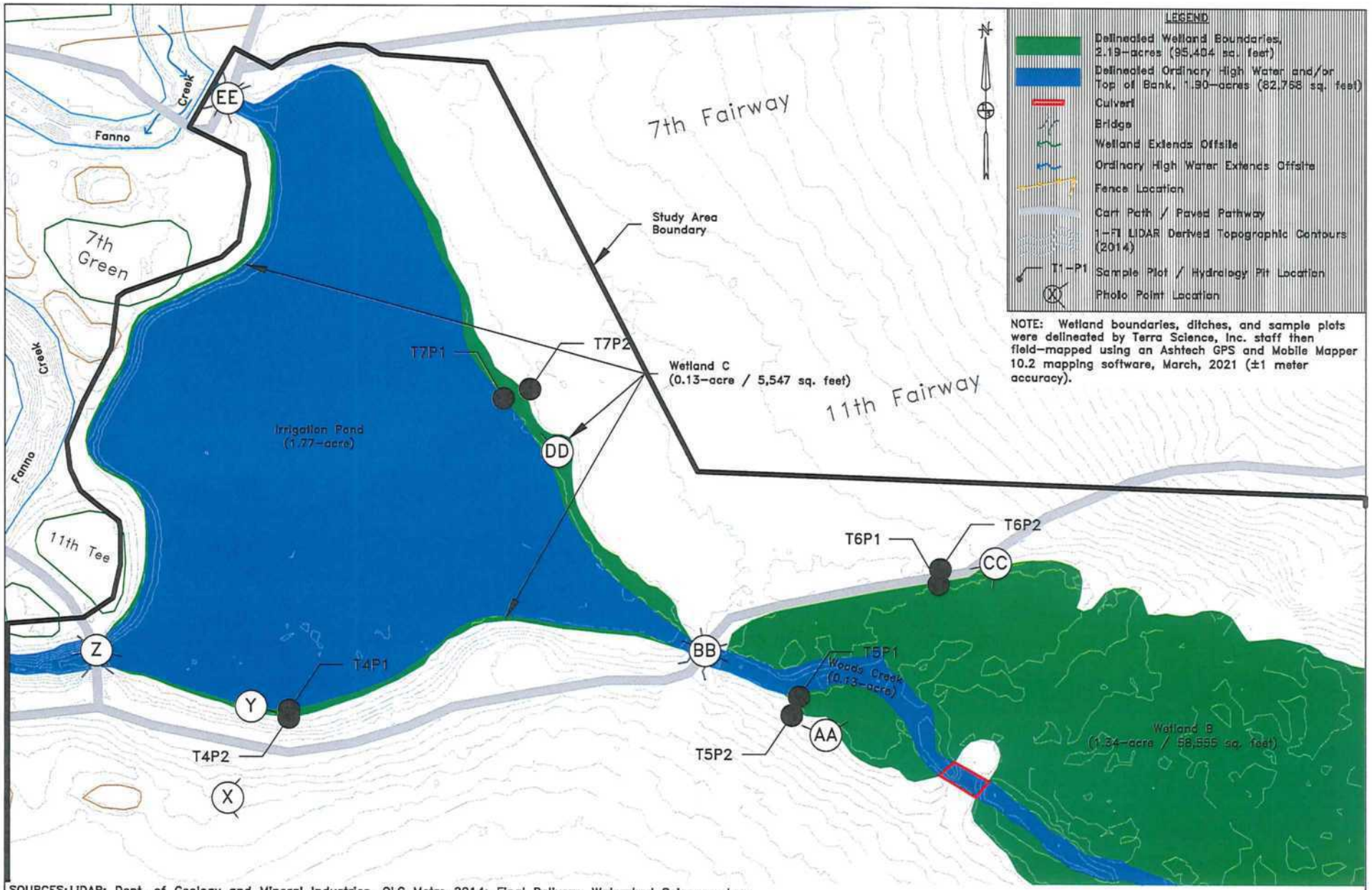
DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027

WETLAND DELINEATION INDEX MAP

FIGURE 6


LEGEND
Delineated Wetland Boundaries, 2.19-acres (95,404 sq. feet)
Delineated Ordinary High Water and/or Top of Bank, 1.90-acres (82,758 sq. feet)
Culvert
Bridge
Wetland Extends Offsite
Ordinary High Water Extends Offsite
Fence Location
Cart Path / Paved Pathway
1-Ft LIDAR Derived Topographic Contours (2014)
T1-P1 Sample Plot / Hydrology Pit Location
Photo Point Location
NOTE: Wetland boundaries, ditches, and sample plots were delineated by Terra Science, Inc. staff then field-mapped using an Ashtech GPS and Mobile Mapper 10.2 mapping software, March, 2021 (±1 meter accuracy).
Study Area Boundary
15th Fairway
Old Railway Berm
SP-C
SP-A
SP-B
T3P1
T3P2
Wetland Extends
T1P1
T1P2
T2P1
T2P2
Wetland A
(0.72-acre / 31,392 sq. feet)
Fanno Creek Trail
Fanno Creek Trail
Fanno Creek Trail
SW 83rd Ave.
SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.
Terra Science, Inc.
Soil, Water, & Wetland Consultants
GRAPHIC SCALE
40' 0' 40' 80' 150'
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon
November 2021
DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027
WETLAND DELINEATION MAP
(PINGER PROPERTY)
INSET 6A


X
13th Fairway
V
W
14th Fairway
Study Area Boundary
U
T
15th Fairway
Wetland B
(1.34-acre / 58,556 sq. feet)
Wapato Creek
LEGEND
Delineated Wetland Boundaries, 2.19-acres (95,404 sq. feet)
Delineated Ordinary High Water and/or Top of Bank, 1.90-acres (82,768 sq. feet)
Culvert
Bridge
Wetland Extends Offsite
Ordinary High Water Extends Offsite
Fence Location
Cart Path / Paved Pathway
1-Ft LIDAR Derived Topographic Contours (2014)
T1-P1
Sample Plot / Hydrology Pit Location
8
Photo Point Location
NOTE: Wetland boundaries, ditches, and sample plots were delineated by Terra Science, Inc. staff then field-mapped using an Ashtech GPS and Mobile Mapper 10.2 mapping software, March, 2021 (±1 meter accuracy).
SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.
Terra Science, Inc.
Soil, Water, & Wetland Consultants
GRAPHIC SCALE
40' 0' 40' 80' 160'
WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon
November 2021
DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027
WETLAND DELINEATION MAP
INSET 6B



SOURCES: LIDAR: Dept. of Geology and Mineral Industries. OLC Metro 2014: Final Delivery. Watershed Sciences, Inc.
Tax Lot Boundaries: Washington County GIS, 2021.

Terra Science, Inc.
Soil, Water, & Wetland Consultants

GRAPHIC SCALE
40' 0' 40' 80' 150'

WETLAND DELINEATION REPORT FOR
PORTION OF TAX LOT 1700
(T.1S R. 1W SEC. 24)
Washington County, Oregon

November 2021

DSL WD # 2021-0646
Approval Issued 1/12/2022
Approval Expires 1/12/2027

WETLAND DELINEATION MAP

INSET 6C

From: 401applications * DEQ
Sent: Tue, 8 Oct 2024 16:30:18 +0000
To: NEGRU Delia * DEQ
Subject: FW: Provisional Notification for Portland Golf Club, NWP-2023-24
Attachments: 20241008 NWP Provisional Ltr 401-only NWP-2023-24.pdf

Filed here:

\\deqnwr1\wqshare\401\PROJECTS\AWAITING Corps Number or Determination\2023-00024_Portland_Golf_Club

---

From: Neal, Michael T CIV USARMY CENWP (USA) <Michael.T.Neal@usace.army.mil>
Sent: Tuesday, October 8, 2024 7:44 AM
To: Lonnie Lister <llister@portlandgolfclub.com>
Cc: pscoles@terrascience.com; DEBLASI Michael * DSL <Michael.DEBLASI@dsl.oregon.gov>; 401applications * DEQ <401applications@deq.oregon.gov>
Subject: Provisional Notification for Portland Golf Club, NWP-2023-24

Mr. Lister,

Please see the attached Nationwide Permit provisional notification letter and enclosures for your project to temporarily discharge fill material into Wetland A and route return water flows into Junor Lake, Corps No. NWP-2023-24. This is not a permit verification letter.

Let me know if you have any questions or concerns.

Sincerely,

Michael

Michael Neal, PWS
Regulatory Project Manager
U.S. Army Corps of Engineers – Portland District
333 SW First Avenue, P.O. Box 2946
Portland, OR 97208-2946
Office: 503.808.4380
Michael.T.Neal@usace.army.mil

Website: http://www.nwp.usace.army.mil/Missions/Regulatory.aspx
Customer survey: https://regulatory.ops.usace.army.mil/customer-service-survey/

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

October 8, 2024

Regulatory Branch
Corps No. NWP-2023-24-1

Mr. Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225
llister@portlandgolfclub.com

Dear Mr. Lister:

The U.S. Army Corps of Engineers (Corps) has received your request for a Department of the Army (DA) permit to temporarily discharge fill material for in-water work area isolation and dredged material dewatering and access activities associated with the hydraulic suction dredging (removal) of accumulated sediments. The project is proposed in Junor Lake (irrigation pond) and Wetland A located on Portland Golf Club property at 5900 SW Scholls Ferry Road in Portland, Washington County, Oregon at Latitude/Longitude: 45.472900°, -122.760619°. Your project has been assigned Corps No. NWP-2023-24-1. Please refer to this number in all future correspondence.

This letter is a provisional notification that your proposed project may qualify for authorization by Nationwide Permit (NWP) No. 33, Temporary Construction, Access, and Dewatering (Federal Register, December 27, 2021, Vol. 86, No. 245) and NWP 16, Return Water from Upland Contained Disposal Areas (Federal Register, December 27, 2021, Vol. 86, No. 245) provided you obtain a Clean Water Act Section 401 Water Quality Certification (WQC) decision from the Oregon Department of Environmental Quality (DEQ). You are not authorized to begin work in waters of the United States until: (1) you obtain and submit to our office a 401 WQC or the WQC requirement becomes waived and (2) you receive written verification from our office that the project is authorized by NWP 33 and NWP 16.

Your project requires a 401 WQC from DEQ. Please contact DEQ regarding this requirement at: 401 Water Quality Permit Coordinator, Oregon Department of Environmental Quality, 700 NE Multnomah Street, Suite 600, Portland, Oregon, 97232, by telephone at (503) 229-5623, or visit DEQ's website (https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Nationwide.aspx). If you do not request a 401 WQC within 30 days of the date of this letter, we may withdraw your permit application.

After obtaining a 401 WQC you must submit a copy of the 401 WQC to our office. The proposed work cannot be authorized by NWP if DEQ denies the 401 WQC. Please contact me if DEQ denies the 401 WQC for your project.

Upon receiving the 401 WQC, the Corps will notify the U.S Environmental Protection Agency (EPA). The EPA may take up to 30 days to review your project and to determine if the project may affect water quality in a neighboring jurisdiction. The 401 WQC process will be complete if EPA determines the project may not affect water quality in a neighboring jurisdiction or if EPA does not act within the 30 days. The EPA will notify you, the Corps and the neighboring jurisdiction if EPA determines the project may affect water quality in a neighboring jurisdiction.

In order for your project to be authorized by NWP, you will be required to comply with all of the NWP 33 and NWP 16 Terms and Conditions, the NWP Regional Conditions, the conditions of the 401 WQC if applicable, and any special conditions we add to the NWP verification. The full text of NWP 33 and NWP 16 and all conditions are available on our website (https://www.nwp.usace.army.mil/Missions/Regulatory/Nationwide/). For your information, Enclosure 1 lists the special conditions we are proposing to add to the NWP verification.

If you propose to modify the proposed project as a result of coordination with DEQ, you must submit a revised project description and revised project drawings for our review. Substantial changes may require additional evaluation of your permit application.

We recommend that you do not award construction contracts until you receive a written verification from our office that the project is authorized. Since a DA permit is necessary for this work, do not commence construction before obtaining our NWP verification letter. If you have any questions regarding the process described above or the proposed permit conditions, please contact me by telephone at (503) 808-4380 or by email at michael.t.neal@usace.army.mil.

Sincerely,

Michael Neal

Michael Neal
Project Manager, Regulatory Branch

Enclosure

cc:
Terra Science (Phil Scoles, pscoles@terrascience.com)
Oregon Department of State Lands (Mike DeBlasi, michael.deblasi@dsl.oregon.gov)
Oregon Department of Environmental Quality (401applications@deq.oregon.gov)

Corps No. NWP-2023-24

Proposed Nationwide Permit verification special conditions. Any enclosure numbers referenced below would pertain to the Nationwide Permit verification letter, as applicable.

a. Permittee shall dispose of excavated materials at a suitable upland location, and materials shall be adequately stabilized to minimize increases in turbidity levels and indirect impacts to wetlands and other aquatic systems. The material shall be placed in a location and manner that prevents its discharge into waterways or wetlands. In the event of spills, affected material shall be taken to an appropriate upland location (and properly disposed of in accordance with any state standards or requirements).

From: Neal, Michael T CIV USARMY CENWP (USA)
Sent: Thu, 12 Dec 2024 18:44:43 +0000
To: TATTAM Shelley * DEQ; 401applications * DEQ
Cc: Lonnie Lister; pscoles@terrascience.com
Subject: NWP-2023-24-1; Water Quality Certification Request– Reasonable Period of Time for a project in Junor Lake and Wetland A in Washington County, Oregon

Hello Shelley,

The U.S. Army Corps of Engineers (Corps) has received confirmation from the Oregon Department of Environmental Quality (DEQ) that it has received a request for water quality certification under Section 401 of the Clean Water Act. The Corps reference number for this project is provided in the subject line above.

The Corps has received an application for a Department of the Army permit from Portland Golf Club (PGC) to discharge return water from an upland contained dredged material disposal area below the ordinary high water mark of Junor Lake and temporarily discharge fill material below the OHWM of Junor Lake and within Wetland A for work area isolation, dewatering, and construction access. The project is proposed in Junor Lake and Wetland A located at PGC, 900 SW Scholls Ferry Road, Portland, Washington County, Oregon (latitude, longitude: 45.472900°, -122.760619°). The Corps is evaluating the application for authorization by Nationwide Permit (NWP) No. *16, Return Water from Upland Contained Disposal Areas* and NWP No. *33, Temporary Construction, Access, and Dewatering.*

Based on our coordination, DEQ received a request for water quality certification for the proposed project on December 5, 2024. The reasonable period of time for DEQ to act on the certification request for this project is 180 days from the day DEQ received the certification request.

If DEQ fails or refuses to act on the certification request by *June 3, 2025*, we will consider the requirement to obtain a certification waived unless DEQ has coordinated with the Corps regarding a time extension.

Please include the Corps reference number provided in the subject line of this email in all future correspondence. If you have any questions, feel free to contact me by email or by telephone at the number below.

Sincerely,

Michael

Michael Neal, PWS
Regulatory Project Manager
U.S. Army Corps of Engineers – Portland District
333 SW First Avenue, P.O. Box 2946
Portland, OR 97208-2946
Office: 503.808.4380
Michael.T.Neal@usace.army.mil

Website: http://www.nwp.usace.army.mil/Missions/Regulatory.aspx
Customer survey: https://regulatory.ops.usace.army.mil/customer-service-survey/

Oregon Department of Environmental Quality

Request for Certification

401 Program
700 NE Multnomah Street, Suite 600
Portland, OR 97232

How to submit this form

Submit this form and a Joint Permit Application through Your DEQ Online using the "(401) - Dredge and Fill Certification Application" template. For questions regarding Your DEQ Online or help setting up an account please visit the Your DEQ Online Help page.

Please note that a pre-filing meeting request must be submitted at least 30 days prior to submitting this request for certification form for all **Standard Individual Permit** reviews.

Identify the project proponent(s)			
Name:			
Portland Golf Club (Attn. Lonnie Lister)			
Address:			
5900 S.W. Scholls Ferry Rd., Portland, OR 97225			
Email:			
pscoles@terrascience.com			
Identify the applicable federal licensing or permitting agency			
▣ **U.S. Army Corps of Engineers**		☐ **U.S. Coast Guard**	
☐ **U.S. Environmental Protection Agency**		☐ **Federal Energy Regulatory Commission**	
Permit type (e.g. Section 401 Permit):		Section 401 WQ Certification	
Project information			
Proposed project name:			
Portland Golf Club Junor Lake Dredging			
Address:			
5900 S.W. Scholls Ferry Rd., Portland, OR 97225			
County:	Washington	**Latitude**	**Longitude**
		45.472900° N	-122.760619° W
Waterbody that may be affected:			
Woods Creek, tributary to Fanno Creek. Project has temporary impact of 0.05-acre to Wetland A for access to sediment bag placement area.			

List the location of any discharge(s) that may result from the proposed activity:

Junor Lake (sediment removal location, temporary bypass pipe for Woods Ck.)
Woods Creek (temporary coffer dam and check dams)
Wetland A (temporary access road between staging area and sediment bag placement area)
Wetland A (temporary sump to capture seepage water from sediment bags)
Ditch outlet of Wetland A (temporary check dam)

Describe the methods and means proposed to monitor the discharge and the equipment or measures planned to treat, control, or manage the discharge:

Dredge project will remove sediment from Junor Lake, an irrigation pond in the south-center of the golf course. Dredging will remove 5300 CY of silt and clay from irrigation pond, using suction dredge on floating barge. The dredge slurry will be pumped into sediment bags, located on upland in the extreme south part of the golf course property. Water seeping from sediment bags will be re-captured and pumped back to the dredge location to keep the dredge barge afloat. Dredge staff will monitor and direct dredging, as well as direct dredge slurry into sediment bags. Golf course staff will monitor conveyance pipe between irrigation pond and sediment bag placement area.

There will be temporary fill placed in Woods Creek and the outlet of Wetland A to retain water and prevent offsite sediment export. These are temporary impacts (no permanent wetland impacts). The south edge of Wetland A will be temporarily filled (0.05-acre) for an access road between staging area and sediment bag placement area. Minor grading is expected on upland for the sediment bag and staging areas. Staging area will have temporary surface of crushed rock that is removed after dredging. No permanent impervious or semi-impervious surfaces.

Extensive detail included in Joint Permit Application text, drawings (Appendix A), restoration plan (Appendix B), erosion control plan (Appendix C), and alternatives analysis (Appendix D).

Include a list of all other federal, interstate, tribal, state, territorial, or local agency authorizations required for the proposed project, including all approvals or denials already received:

Oregon Dept. of State Lands (DSL #63610-FP) -- pending
Corps of Engineers (NWP2023-24) -- provisional approval
Clean Water Services (service provider letter, erosion control) --pending
Washington County (land use, grading permit) -- pending

Certifications	
The project proponent hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief.	
Initial:	Phil Scoles (wetland consultant for Portland Golf Club)
Date:	November 22, 2024.

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's Civil Rights and Environmental Justice page.

Oregon Department of Environmental Quality

Request for Certification

401 Program
700 NE Multnomah Street, Suite 600
Portland, OR 97232

How to submit this form

Submit this form and a Joint Permit Application through Your DEQ Online using the "(401) - Dredge and Fill Certification Application" template. For questions regarding Your DEQ Online or help setting up an account please visit the Your DEQ Online Help page.

Please note that a pre-filing meeting request must be submitted at least 30 days prior to submitting this request for certification form for all **Standard Individual Permit** reviews.

Identify the project proponent(s)			
Name:			
Portland Golf Club (Attn. Lonnie Lister)			
Address:			
5900 S.W. Scholls Ferry Rd., Portland, OR 97225			
Email:			
pscoles@terrascience.com			
Identify the applicable federal licensing or permitting agency			
▣ **U.S. Army Corps of Engineers**		☐ **U.S. Coast Guard**	
☐ **U.S. Environmental Protection Agency**		☐ **Federal Energy Regulatory Commission**	
Permit type (e.g. Section 401 Permit):		Section 401 WQ Certification	
Project information			
Proposed project name:			
Portland Golf Club Junor Lake Dredging			
Address:			
5900 S.W. Scholls Ferry Rd., Portland, OR 97225			
County:	Washington	**Latitude**	**Longitude**
		45.472900° N	-122.760619° W
Waterbody that may be affected:			
Woods Creek, tributary to Fanno Creek. Project has temporary impact of 0.05-acre to Wetland A for access to sediment bag placement area.			

Translation or other formats

Español | □□어 | 繁體中文 | Русский | Tiếng Việt | العربية

800-452-4011 | TTY: 711 | deqinfo@deq.oregon.gov

State of Oregon DEQ Department of Environmental Quality

List the location of any discharge(s) that may result from the proposed activity:

Junor Lake (sediment removal location, temporary bypass pipe for Woods Ck.)
Woods Creek (temporary coffer dam and check dams)
Wetland A (temporary access road between staging area and sediment bag placement area)
Wetland A (temporary sump to capture seepage water from sediment bags)
Ditch outlet of Wetland A (temporary check dam)

Describe the methods and means proposed to monitor the discharge and the equipment or measures planned to treat, control, or manage the discharge:

Dredge project will remove sediment from Junor Lake, an irrigation pond in the south-center of the golf course. Dredging will remove 5300 CY of silt and clay from irrigation pond, using suction dredge on floating barge. The dredge slurry will be pumped into sediment bags, located on upland in the extreme south part of the golf course property. Water seeping from sediment bags will be re-captured and pumped back to the dredge location to keep the dredge barge afloat. Dredge staff will monitor and direct dredging, as well as direct dredge slurry into sediment bags. Golf course staff will monitor conveyance pipe between irrigation pond and sediment bag placement area.

There will be temporary fill placed in Woods Creek and the outlet of Wetland A to retain water and prevent offsite sediment export. These are temporary impacts (no permanent wetland impacts). The south edge of Wetland A will be temporarily filled (0.05-acre) for an access road between staging area and sediment bag placement area. Minor grading is expected on upland for the sediment bag and staging areas. Staging area will have temporary surface of crushed rock that is removed after dredging. No permanent impervious or semi-impervious surfaces.

Extensive detail included in Joint Permit Application text, drawings (Appendix A), restoration plan (Appendix B), erosion control plan (Appendix C), and alternatives analysis (Appendix D).

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Oregon Dept. of State Lands (DSL #63610-FP) -- pending
Corps of Engineers (NWP2023-24) -- provisional approval
Clean Water Services (service provider letter, erosion control) --pending
Washington County (land use, grading permit) -- pending

Certifications	
The project proponent hereby certifies that all information contained herein is true, accurate, and complete to the best of my knowledge and belief.	
Initial:	Phil Scoles (wetland consultant for Portland Golf Club)
Date:	November 22, 2024.

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's Civil Rights and Environmental Justice page.

This document has not been provided to Portland Golf Club.

This document has not been provided to Portland Golf Club.

From: Neal, Michael T CIV USARMY CENWP (USA)
Sent: Tue, 8 Oct 2024 14:44:13 +0000
To: Lonnie Lister
Cc: pscoles@terrascience.com; DEBLASI Michael * DSL; 401applications * DEQ
Subject: Provisional Notification for Portland Golf Club, NWP-2023-24
Attachments: 20241008 NWP Provisional Ltr 401-only NWP-2023-24.pdf

Mr. Lister,

Please see the attached Nationwide Permit provisional notification letter and enclosures for your project to temporarily discharge fill material into Wetland A and route return water flows into Junor Lake, Corps No. NWP-2023-24. This is not a permit verification letter.

Let me know if you have any questions or concerns.

Sincerely,

Michael

Michael Neal, PWS
Regulatory Project Manager
U.S. Army Corps of Engineers – Portland District
333 SW First Avenue, P.O. Box 2946
Portland, OR 97208-2946
Office: 503.808.4380
Michael.T.Neal@usace.army.mil

Website: http://www.nwp.usace.army.mil/Missions/Regulatory.aspx
Customer survey: https://regulatory.ops.usace.army.mil/customer-service-survey/

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

October 8, 2024

Regulatory Branch
Corps No. NWP-2023-24-1

Mr. Lonnie Lister
Portland Golf Club
5900 SW Scholls Ferry Road
Portland, OR 97225
llister@portlandgolfclub.com

Dear Mr. Lister:

The U.S. Army Corps of Engineers (Corps) has received your request for a Department of the Army (DA) permit to temporarily discharge fill material for in-water work area isolation and dredged material dewatering and access activities associated with the hydraulic suction dredging (removal) of accumulated sediments. The project is proposed in Junor Lake (irrigation pond) and Wetland A located on Portland Golf Club property at 5900 SW Scholls Ferry Road in Portland, Washington County, Oregon at Latitude/Longitude: 45.472900°, -122.760619°. Your project has been assigned Corps No. NWP-2023-24-1. Please refer to this number in all future correspondence.

This letter is a provisional notification that your proposed project may qualify for authorization by Nationwide Permit (NWP) No. 33, Temporary Construction, Access, and Dewatering (Federal Register, December 27, 2021, Vol. 86, No. 245) and NWP 16, Return Water from Upland Contained Disposal Areas (Federal Register, December 27, 2021, Vol. 86, No. 245) provided you obtain a Clean Water Act Section 401 Water Quality Certification (WQC) decision from the Oregon Department of Environmental Quality (DEQ). You are not authorized to begin work in waters of the United States until: (1) you obtain and submit to our office a 401 WQC or the WQC requirement becomes waived and (2) you receive written verification from our office that the project is authorized by NWP 33 and NWP 16.

Your project requires a 401 WQC from DEQ. Please contact DEQ regarding this requirement at: 401 Water Quality Permit Coordinator, Oregon Department of Environmental Quality, 700 NE Multnomah Street, Suite 600, Portland, Oregon, 97232, by telephone at (503) 229-5623, or visit DEQ's website (https://www.oregon.gov/deq/wq/wqpermits/Pages/Section-401-Nationwide.aspx). If you do not request a 401 WQC within 30 days of the date of this letter, we may withdraw your permit application.

After obtaining a 401 WQC you must submit a copy of the 401 WQC to our office. The proposed work cannot be authorized by NWP if DEQ denies the 401 WQC. Please contact me if DEQ denies the 401 WQC for your project.

Upon receiving the 401 WQC, the Corps will notify the U.S Environmental Protection Agency (EPA). The EPA may take up to 30 days to review your project and to determine if the project may affect water quality in a neighboring jurisdiction. The 401 WQC process will be complete if EPA determines the project may not affect water quality in a neighboring jurisdiction or if EPA does not act within the 30 days. The EPA will notify you, the Corps and the neighboring jurisdiction if EPA determines the project may affect water quality in a neighboring jurisdiction.

In order for your project to be authorized by NWP, you will be required to comply with all of the NWP 33 and NWP 16 Terms and Conditions, the NWP Regional Conditions, the conditions of the 401 WQC if applicable, and any special conditions we add to the NWP verification. The full text of NWP 33 and NWP 16 and all conditions are available on our website (https://www.nwp.usace.army.mil/Missions/Regulatory/Nationwide/). For your information, Enclosure 1 lists the special conditions we are proposing to add to the NWP verification.

If you propose to modify the proposed project as a result of coordination with DEQ, you must submit a revised project description and revised project drawings for our review. Substantial changes may require additional evaluation of your permit application.

We recommend that you do not award construction contracts until you receive a written verification from our office that the project is authorized. Since a DA permit is necessary for this work, do not commence construction before obtaining our NWP verification letter. If you have any questions regarding the process described above or the proposed permit conditions, please contact me by telephone at (503) 808-4380 or by email at michael.t.neal@usace.army.mil.

Sincerely,

Michael Neal

Michael Neal
Project Manager, Regulatory Branch

Enclosure

cc:
Terra Science (Phil Scoles, pscoles@terrascience.com)
Oregon Department of State Lands (Mike DeBlasi, michael.deblasi@dsl.oregon.gov)
Oregon Department of Environmental Quality (401applications@deq.oregon.gov)

Corps No. NWP-2023-24

Proposed Nationwide Permit verification special conditions. Any enclosure numbers referenced below would pertain to the Nationwide Permit verification letter, as applicable.

a. Permittee shall dispose of excavated materials at a suitable upland location, and materials shall be adequately stabilized to minimize increases in turbidity levels and indirect impacts to wetlands and other aquatic systems. The material shall be placed in a location and manner that prevents its discharge into waterways or wetlands. In the event of spills, affected material shall be taken to an appropriate upland location (and properly disposed of in accordance with any state standards or requirements).

From: TATTAM Shelley * DEQ
Sent: Thu, 12 Dec 2024 16:21:36 +0000
To: Neal, Michael T CIV USARMY CENWP (USA)
Cc: TEACH Haley * DEQ
Subject: Valid Request for Certification received by DEQ for Portland Gold Club Irrigation Pond project (2023-24-1)

Good morning,

The Oregon Department of Environmental Quality (DEQ) has received a 401 water quality certification (WQC) request for the Portland Gold Club Irrigation Pond project (2023-24-1). The certification request is valid as of December 5, 2024 and DEQ's review for the 401 WQC has begun.

DEQ has a reasonable period of 180 days to issue a decision. Please respond confirming the date of the agreed upon reasonable period of time.

Shelley Tattam (*she/her*)
401 Program Project Manager
Oregon Department of Environmental Quality
700 NE Multnomah St. Ste 600
Portland, OR 97232
Cell: 971-276-9201