MITIGATION BANK INSTRUMENT
FOR
GARRET CREEK WETLAND MITIGATION BANK

This Mitigation Bank Instrument (MBI), which describes the establishment, use, operation, and maintenance of the Garret Creek Wetland Mitigation Bank (Bank) is an agreement made and entered into by and among Garret Creek Mitigation Bank LLC (Elton Kemnitz and Steve Binns) (Sponsor(s)), the U.S. Army Corps of Engineers, Portland District (Corps), the Oregon Department of State Lands (DSL), the U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Fish and Wildlife (ODFW), and Clackamas County Soil and Water Conservation District (SWCD).

I. PREAMBLE:

A. Purpose: Whereas, the purpose of this MBI is to establish guidelines, responsibilities, and standards for the establishment, use, operation, and maintenance of the Bank. The Bank will be used for compensatory mitigation for unavoidable impacts to waters of the United States or waters of the State including wetlands that result from activities authorized under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act and Oregon's Removal-Fill Law [Oregon Revised Statutes (ORS) 196.800-196.990 and Oregon Administrative Rule (OAR) 141-085] and for impacts from other activities as the co-chairs may authorize provided that such activities have met all applicable requirements and are authorized by the appropriate authority.

B. Goals and Objectives: Whereas, the primary goals of the Bank are to:

Goal 1—To restore 10.68 acres of wetland and enhance 7.52 acres of cropped wetland to Riverine forested wetland class,

to enhance 0.77 acres of wetland and 2.80 acres of upland riparian habitat,

to enhance 1.72 acres of upland buffer to protect the site from adjacent land uses, and to

to restore stream area within the Bank.

C. Location and Ownership of Parcel: (1) Whereas, the Sponsor has provided proof of ownership or obtained adequate use authority of the mitigation bank site at the legal description described in Exhibit A of this MBI, and as depicted on a plan prepared by Jones & Stokes, dated February 2008 (Exhibit B). Said parcels are hereinafter referred to as the "Property." (2) The Sponsor has not proposed additional phases; therefore, any additional phases of this bank require a modification to the MBI. (3) The Property is located in Clackamas County, Township 5, Range 1, Section 23, Tax Lot 51E2300500, 51E2300501, and 51E2300502. The Bank is approximately 29.82 acres of these tax lots. The address of the Bank is 3371 South Dryland Road, in the City of Molalla, Oregon.

D. Establishment and Use of Credits: Whereas, in accordance with the provisions of this MBI and upon satisfaction of the performance standards contained in the Mitigation Plan (MP) (Exhibit C), mitigation credits determined in accordance with the Instrument (Exhibit C) will be available to be used as mitigation in accordance with all applicable requirements for permits issued under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act and Oregon's Removal-Fill Law [Oregon Revised Statutes (ORS) 196.800-196.990]. The final number of credits will be determined by the MBRT based upon the final approved design and the resulting habitats achieved for each phase of the Bank in accordance with the terms and conditions contained herein.

E. Mitigation Bank Review Team: Whereas, the MBRT consists of:
1. Corps, Co-Chair; and
2. DSL, Co-Chair; and
3. EPA; and
4. USFWS; and
5. DEQ; and
6. ODFW; and
7. SWCD.

H. Disclaimer: Whereas, this MBI does not in any manner affect statutory authorities and responsibilities of the signatory parties.

I. Exhibits: Whereas, the following Exhibits are incorporated by reference to this MBI:
1. "Exhibit A," Legal Property Description/Proof of Ownership and Vicinity Map
2. "Exhibit B," Proposed Site Plan (drawing);
3. "Exhibit C," Mitigation Plan;
4. "Exhibit D," Crediting and Debiting Procedure for the Bank;
5. "Exhibit E," Service Area Map;
6. "Exhibit F," Restrictive Covenant;
7. "Exhibit G" Statement of Sale of Credit for Garret Creek Mitigation Bank;
8. "Exhibit H" Credit ledger.

NOW, THEREFORE, the parties hereto agree as to the following:

II. DEFINITIONS*

1. SPONSOR – A person who is proposing, or has established and/or is maintaining a mitigation bank. The sponsor is the entity that assumes all legal responsibilities for carrying out the terms of the MBI, unless specified otherwise explicitly in the MBI.

2. COMPENSATORY MITIGATION – Activities conducted by an authorization holder, permittee or third party to create, restore or enhance wetland functional attributes to compensate for the adverse effects of project development.

3. CREATION – To convert an area that has never been a wetland to a jurisdictional wetland.

4. CREDIT – A unit of measure of the increase in wetland functional attributes achieved at a mitigation bank site. Wetland credits are the unit of exchange for compensatory mitigation. ORS 196.600(2) further defines this term.

5. DEBIT – A unit of measure representing the reduction of credits at the mitigation bank corresponding to the impact at the project site.

6. ENHANCEMENT – Human activity that increases the function of an existing degraded wetland.

7. INSTRUMENT – The legally binding and enforceable agreement between the Director of DSL, the District Engineer of the Corps, and a mitigation bank sponsor that formally establishes the wetland mitigation bank and stipulates the terms and conditions of its construction, operation, and long-term management.

8. FINANCIAL ASSURANCES – "Financial assurances means the money or other form of financial instrument (for example, surety bonds, trust funds, escrow accounts) required for the sponsor to ensure that the functions of the subject bank are achieved, monitored, and maintained over the long-term pursuant to the terms and conditions of the Mitigation Bank Instrument.

9. FUNCTIONS – The physical, chemical, and biological ecosystem processes of an aquatic resource without regard to their importance to society.

10. LEDGER – An accounting sheet of credits and debits.

11. MITIGATION – Sequentially avoiding impacts, minimizing impacts, and compensating for remaining impacts to aquatic resources; the same meaning as DSL's OAR 141-85-0010 (129).

12. MITIGATION BANK – Wetland(s) and any associated buffer(s) restored, enhanced, created, or protected, whose credits may be sold or exchanged to compensate for unavoidable future wetland losses due to removal, fill, or alteration activities.

12. MITIGATION BANK INSTRUMENT – The legally binding and enforceable agreement between the Director of DSL, the District Engineer of the Corps, and a mitigation bank sponsor that formally

establishes the wetland mitigation bank and stipulates the terms and conditions of its construction, operation, and long-term management.

13. MITIGATION BANK REVIEW TEAM (MBRT) – An advisory committee to the DSL and the Corps on wetland mitigation banks. An interagency group of federal, state, tribal, and/or local regulatory and resource agency representatives which are signatories to an MBI. The Corps and DSL are the co-chairs of the MBRT and the final decision makers.

14. MITIGATION SITE PLAN – A detailed drawing that identifies specifically where aquatic resources and associated upland buffers will be restored, created, enhanced, or preserved on the mitigation bank.

15. PRESERVATION – The protection of ecologically important aquatic resources in perpetuity through the implementation of appropriate legal and physical mechanisms. Preservation may include protection of upland areas adjacent to wetlands or other aquatic resources as necessary to ensure protection and/or enhancement of the aquatic ecosystem.

16. RESTORATION – Re-establishment of wetland hydrology to a former wetland sufficient to support wetland characteristics.

17. PERFORMANCE STANDARDS– The minimum standards required to meet the objectives for which the Bank was established.

18. SERVICE AREA – The boundaries set forth in a MBI that include one or more watersheds identified on the United States Geological Survey, Hydrological Unit Map, 1794, State of Oregon, for which a mitigation bank provides credits to compensate for adverse effects to waters of the United States. Service areas for mitigation banks are not mutually exclusive.

*Derived from:

Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (FR V. 60 No. 228, November 28, 1995);

Cowardin, L.M. et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Fish and Wildlife Service, Office of Biological Services. Washington, D.C. FWS/OBS-79/31. 131 pp.

Oregon Administrative Rules 141-085.

III. AUTHORITIES

The establishment, use, operation and maintenance of the Bank is carried out in accordance with the following authorities:

A. Federal:
1. Clean Water Act (33 USC 1251 et seq.);
2. Rivers and Harbors Act (33 USC 403);
3. Fish and Wildlife Coordination Act (16 USC 661 et seq.);
4. Regulatory Programs of the Corps of Engineers, Final Rule (33 CFR Parts 320-330);
5. Guidelines for Specification of Disposal Sites for Dredged and Fill Material (40 CFR Part 230);
6. Memorandum of Agreement between the EPA and the Department of the Army concerning the Determination of Mitigation Under Clean Water Act, Section 404 (b)(1) Guidelines (February 6, 1990);
7. Federal Guidance for the Establishment, Use, Operation of Mitigation Banks (60 F.R. 58605 et seq. November 28, 1995); and
8. Regulatory Guidance Letter No. 02-02, U.S. Army Corps of Engineers, December 26, 2002

B. State of Oregon:
1. Oregon Administrative Rules (OAR) 141-85-0010 through 141-85-445; and
2. Oregon Revised Statutes (ORS) 196.600-196.990

IV. ESTABLISHMENT OF THE BANK

A. Scope of Work: The Sponsor agrees to perform all necessary work, in accordance with the provisions of this MBI, to establish and maintain aquatic habitats and upland buffers, as described in the Mitigation Plan (Exhibit C), until it is demonstrated to the satisfaction of the Agencies represented on the MBRT (acting through the co-chairs) that the project complies with all provisions contained herein, or until all credits are sold, whichever is later. Work as described above shall include implementing the Mitigation Plan (Exhibit C). Prior to any debiting, the Proposed Site Plan (Exhibit B) for the Bank must be approved by the MBRT (acting through the co-chairs).

B. Permits: The Sponsor will obtain all appropriate permits or other authorizations needed to construct and maintain the Bank, prior to selling any credits. This MBI does not fulfill or substitute for such authorization.

C. Approval: Upon the co-chair agencies signing this MBI, the MBRT approves the Mitigation Plan (Exhibit C).

D. Financial Assurance Requirements of DSL: Financial assurance for the release of bank credits will be provided by Garret Creek Mitigation Bank LLC from either bank accounts or credit lines established at Key Bank. Financial Assurances will be provided prior to the release of bank credits.

E. Real Estate Provisions: The Sponsor shall record a legal property protection document, such as a restrictive covenant or other protection instrument, on the Bank land and provide a copy to the Corps and DSL prior to the release of any credits. A template restrictive covenant is attached as Exhibit F. A copy of the recorded document shall be provided to the Corps and DSL prior to any release of credits. Upon the final sale of Bank credits, and with prior approval from MBRT, the restrictive covenant will be replaced with a long-term conservation easement held by an approved conservation entity/long-term steward (Steward).

F. Corps Authorization: For the initial release of credits by the Corps (not to exceed 30% of the total number of credits available from the entire bank), the Corps authorization must be issued and activated (i.e. discharge into a water of the U.S.). The Corps will use the enforcement authority outlined in 33 CFR 326 for enforcing the achievement of the performance standards as necessary.

G. As-Built Report: The Sponsor agrees to submit an as-built report to the MBRT co-chairs within 60 days following completion of the grading. The as-built report will describe in detail and substantial deviation from the requirements described in the Mitigation Site Plan submitted to the MBRT co-chairs in accordance with the Instrument and the as-built report shall contain a survey showing finished grades.

V. OPERATION OF THE BANK

A. Service Area: The Bank is established to provide mitigation to compensate for impacts to waters of the United States and/or state waters, including wetlands, within the service area depicted on the excerpt of the USGS Hydrologic Unit Map as shown in Exhibit E. This service area shall include hydrologic unit 17090009, within Marion and Clackamas Counties. The Bank may be used to compensate for impacts beyond the designated service area, on a case-by-case basis.

B. Access: With prior approval the Sponsor will allow, or otherwise provide for, access to the site by members of the MBRT or their agents or designees at reasonable times as necessary to conduct inspections, and compliance monitoring with respect to the requirements of this MBI. The Sponsor also will allow access to the MBRT, their agents and designees to carry out Bank remediation using funds provided through the financial assurance requirements of this MBI to address continued failure to meet Bank performance standards, in the circumstances specified in Section VI of this MBI. Inspecting parties shall not unreasonably disrupt or disturb activities on the property, and will provide written notice within reasonable time prior to the inspection.

C. Projects Eligible to Use the Bank: The Sponsor will be named as the party responsible for providing mitigation once a credit is sold. The following types of projects may be eligible to use the Bank:

1. All activities regulated under Section 10 of the Rivers and Harbors Act, Section 404 of the Clean Water Act, Oregon's Removal-Fill Law [Oregon Revised Statutes (ORS) 196.800-196.990] and other activities as the Corps or DSL may authorize consistent with this MBI may be eligible to use this Bank as compensatory mitigation for unavoidable impacts (some exceptions to this may be granted on a project by project basis); credits purchased may only be used in conjunction with a Corps or DSL permit authorization, to resolve a DSL violation, or in conjunction with other actions as the Corps or DSL may authorize.

2. Permitees under the Corps' regulatory authority and/or under DSL's removal-fill program may withdraw bank credits as a means of providing compensatory mitigation required under those programs.

D. Number of Credits: Credits and debits will be assessed using measurements of the area of impacts and the mitigation land area. The number of credits created by development of this Bank is determined by a combination of land area and mitigation ratios provided in the Mitigation Plan (Exhibit C) as described in the Crediting and Debiting Procedure for the Bank (Exhibit D). The amount to be debited for each impact will depend upon the area of wetlands or waters to be impacted as determined during the permitting process by the respective regulatory agency.

E. Performance Standards: Credits will be released based on the achievement of performance standards. The performance standards are detailed in the Mitigation Plan (Exhibit C).

F. Party Responsible for Mitigation: The Sponsor will be the responsible party for fulfilling the mitigation requirements of the permit applicants to whom credits were sold to.

VI. MAINTENANCE AND MONITORING OF THE BANK

A. Maintenance Provisions: The Sponsor agrees to perform all necessary work to maintain the Bank consistent with the Mitigation Plan (Exhibit C). The Sponsor shall continue with such maintenance activities until completion of the monitoring period described in Section VI.B. Deviation from the approved MBI is subject to review and written approval by co-chairs.

B. Monitoring Provisions: The Sponsor agrees to perform all necessary work to monitor the Bank to demonstrate achievement of the performance standards established in the Mitigation Plan. The details of the monitoring provisions are described in the Mitigation Plan (Exhibit C).

C. Accounting Procedure: The Sponsor shall submit a statement (copy of the receipt) to the Corps and DSL each time credits are sold, a sample of this statement is attached as Exhibit G. In addition, the Sponsor shall submit an annual ledger to the Corps and DSL for distribution to all members of the MBRT, showing all transactions at the Bank for the previous calendar year and a cumulative tabulation of all transactions to date. Annual ledgers and transaction reports shall be submitted to the MBRT until the last credit is sold.

D. Contingency Plans/Remedial Actions: In the event the Bank or a specific phase of the Bank fails to achieve the performance standards specified the Mitigation Plan (Exhibit C), the Sponsor shall develop necessary contingency plans and implement appropriate remedial actions for the Bank or that phase of the bank in coordination with the MBRT. In the event the Sponsor fails to implement necessary remedial actions within one growing season (i.e., by November 1 of the following year) after notification by the Corps and/or DSL that remedial action is necessary the co-chairs will notify the Sponsor that appropriate remedial actions including suspension/revocation of available mitigation credits. The Corps and DSL may implement their respective agencies enforcement authorities over the permit issued at any time.

E. Default: Should the co-chairs determine that the Sponsor is in material default of any provision of this MBI, the co-chairs shall notify the Sponsor that the sale or transfer of any credits will be suspended until the appropriate deficiencies have been remedied. Upon notice of such suspension, the Sponsor agrees to immediately cease all sales or transfers of mitigation credits until the Corps and DSL inform the Sponsor that sales or transfers may be resumed. Should the Sponsor remain in default, the MBRT, acting through the Corps and DSL, may terminate the MBI and any subsequent Bank operations. Upon termination, the Sponsor agrees to perform and fulfill all obligations under this MBI relating to credits that were sold or transferred prior to termination.

F. Bank Closure: At the end of the monitoring period, upon satisfaction of the performance standards, the Corps and DSL shall issue a written "bank closure certification" to the Sponsor. DSL will notify the financial security holder, and thereafter any remaining requirement for financial assurances will cease. The Sponsor may be allowed to utilize any portion of the Bank lands that have not had compensation credits debited from it provided the utilization does not adversely impact the areas from which compensatory mitigation credit has been debited. Upon bank closure, the Long-Term Management Fund shall be conveyed to the Steward of the Bank lands.

G. Long-Term Ownership and Preservation: The Sponsor will be responsible for long-term stewardship of the Bank after the active monitoring period has ended and the Bank has been closed as described above. Before the end of the active monitoring period, the Sponsor shall transfer the title or conservation easement to an MBRT-approved long-term steward or equivalent land protection plan. At that time, the Steward shall be responsible for managing the Bank in perpetuity in accordance with the terms of a long-term management plan and real estate provisions, including the terms of the legal property protection document described in Section IV. E, which is provided in Exhibit F. If the appointed Steward declines to accept title of the Bank and the associated Long-Term Management Fund, the Sponsor shall then transfer title of the Bank and the associated Long-Term Management Fund to a public resource agency or non-profit agency engaged in conservation activities, subject to written approval of the receiving entity by the MBRT. If no public resource agency or nonprofit agency engaged in conservation activities is willing to accept title to and responsibility for the Bank lands, then the Sponsor will be the Long-Term Steward until another party acceptable to the MBRT agrees to accept title to and management responsibility for the Bank land.

To receive the last 15% of credits, a long term management plan must be approved by the co-chairs.

VII. RESPONSIBILITIES OF THE MITIGATION BANK REVIEW TEAM

A. The agencies represented on the MBRT agree to provide appropriate oversight in carrying out provisions of this MBI through the co-chairs.

B. The agencies represented on the MBRT agree to review and provide comments on all project plans, annual monitoring reports, credit review reports, and remediation plans, for the Bank. Comments, if any, will be submitted within a timely manner from the date of submittal. If comments are not received within the time required in the co-chairs rules or regulations, those comments may not be considered.

C. The agencies represented on the MBRT agree to review and confirm reports on evaluation of performance standards prior to approving the release of credits.

D. The agencies represented on the MBRT will conduct inspections, as necessary to verify the number of credits available at the Bank. Based on these inspections, the MBRT may recommend corrective actions to the Sponsor, until the terms and conditions of the MBI have been determined to be fully satisfied or until all credits have been sold, whichever is later.

VIII. OTHER PROVISIONS

A. Force Majeure: The Sponsor will not be responsible for Bank failure that is attributed to natural catastrophes such as flood, drought, disease, and regional pest infestation, that the co-chairs, determines is beyond the reasonable control of the Sponsor to prevent or mitigate.

B. Dispute Resolution: Resolution of disputes concerning the signatories' compliance with this MBI, including the determinations they make as specified in this MBI shall be in accordance with those stated in the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 Fed.Reg. 58610 and 58611, November 28, 1995) or any subsequent regulations. Disputes related to satisfaction of performance standards may be subject to independent review from government agencies or academia that are not part of the MBRT. The MBRT will evaluate any such input and determine whether the performance standards have been met. Appeals of any DSL decisions shall be processed according to OAR 141-085-0075 and OAR 141-085-0445.

C. Validity, Modification, and Termination of the MBI: This MBI will become valid on the latter date of the representative of the Corps or DSL signs this MBI. This MBI may only be amended or modified with the written approval of the Sponsor(s), Corps, and DSL. Any of the MBRT members may terminate their participation upon written notification to all the signatory parties. Any such termination shall not invalidate this MBI. Participation of the MBRT agency seeking termination will end thirty (30) days after written notification.

D. Specific Language of MBI Shall Be Controlling: To the extent that specific language in this document changes, modifies, or deletes terms and conditions contained in those documents that are incorporated into the MBI by reference, and that are not independently legally binding. The specific language within the MBI shall be controlling.

E. Notice: Any notice required or permitted hereunder shall be deemed to have been given either (i) when delivered by hand, or (ii) three (3) days following the date deposited in the United States mail, postage prepaid, by registered or certified mail, return receipt requested, or (iii) sent by Federal Express or similar next day nationwide delivery system, addressed as follows (or addressed in such other manner as the party being notified shall have requested by written notice to the other party):

Garret Creek Mitigation Bank LLC
3371 S Dryland Road
Molalla, OREGON 97038

U.S. Army Corps of Engineers
CENWP-OD-G- Policy Specialist
P.O. Box 2946
Portland Oregon 97208-2946

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

F. Entire MBI: This MBI constitutes the entire agreement between the parties concerning the subject matter hereof and supersedes all prior agreements or undertakings.

G. Modification: This MBI may not be modified except by the written agreement of the DSL, Corps and the Sponsor. In the event the Sponsor determines that modifications must be made in the Mitigation Plan to ensure successful establishment of habitat within the Bank, the Sponsor shall submit a written request for such modification to the co-chairs, for approval. The co-chairs will distribute this request to the MBRT to seek their recommendations. The MBRT agrees to not unreasonably withhold or delay such approval. Documentation of implemented modifications shall be made consistent with this MBI.

H. Invalid Provisions: In the event any one or more of the provisions contained in this MBI are held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability will not affect any other provisions hereof, and this MBI shall be construed as if such invalid, illegal or unenforceable provision had not been contained herein.

I. Headings and Captions: Any paragraph heading or captions contained in this MBI shall be for convenience of reference only and shall not affect the construction or interpretation of any provisions of this MBI.

J. Counterparts: This MBI may be executed by the parties in any combination, in one or more counterparts, all of which together shall constitute but one and the same instrument.

K. Binding: This MBI shall be immediately, automatically, and irrevocably binding upon the Sponsor and its heirs, successors, assigns and legal representatives upon signing by the Sponsor, the Corps, and DSL even though it may not, at that time or in the future, be executed by the other potential parties to this MBI. The signing of this MBI by EPA, DEQ, ODFW, or the USFWS, or other agency, city or county shall cause the signing agency to become a party to this MBI upon signing, even though all or any of the other potential parties have not signed the MBI.

L. Liability of Regulatory Agencies: The responsibility for financial success and risk to the investment initiated by the Sponsor rests solely with the Sponsor. The regulatory agencies (Corps and DSL) that are parties to this MBI administer their regulatory programs to best protect and serve the public's interest in its wetlands and waterways, and not to guarantee the financial success of mitigation banks, specific individuals, or entities. Accordingly, there is no guarantee of profitability for any individual mitigation bank. Sponsors should not construe this MBI as a guarantee in any way that the regulatory agencies will ensure sale of credits from this Bank or that the regulatory agencies will forgo other mitigation options that may also serve the public interest. Since the regulatory agencies do not control the number of

mitigation banks proposed or the resulting market impacts upon success or failure of individual banks, in depth market studies of the potential and future demand for bank credits are the sole responsibility of the sponsor.

M. Grant Program Participation: According to the Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (Guidance) published in the Federal Register on November 28, 1995, by the Corps, EPA, the Natural Resource Conservation Service, USFWS, and the National Marine Fisheries Service, wetlands restored through the Conservation Reserve Program or similar programs cannot be used to generate credits from a mitigation bank. In accordance with the Guidance, Federally-funded wetland restoration projects cannot be used to generate credits within this mitigation bank.

N. Suspension of Credits: The co-chairs may suspend the sale of credits if new information received by the MBRT indicates information in this MBI was falsely presented or due to a breach of this MBI.

O. Sale of Bank Property: If you transfer title of this property, you must notify the Corps and DSL in writing prior to the sale of your property.

IN WITNESS WHEREOF, the parties hereto have executed this MBI on the date herein below last written by the Co-Chairs.

Elton Kemnitz, Owner
Garret Creek Mitigation Bank, LLC

7-3-2008
Date

Steven Binns, Owner
Garret Creek Mitigation Bank LLC

7/3/2008
Date

MITIGATION BANK REVIEW TEAM

By the MBRT Co-Chairs:

Steven Miles
Colonel, Corps of Engineers
District Engineer

8 July 2008
Date

Louise Solliday, Director
Oregon Department of State Lands

7/8/08
Date

By the MBRT members of the Garret Creek Mitigation Bank:

Paul Henson
State Supervisor
Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service

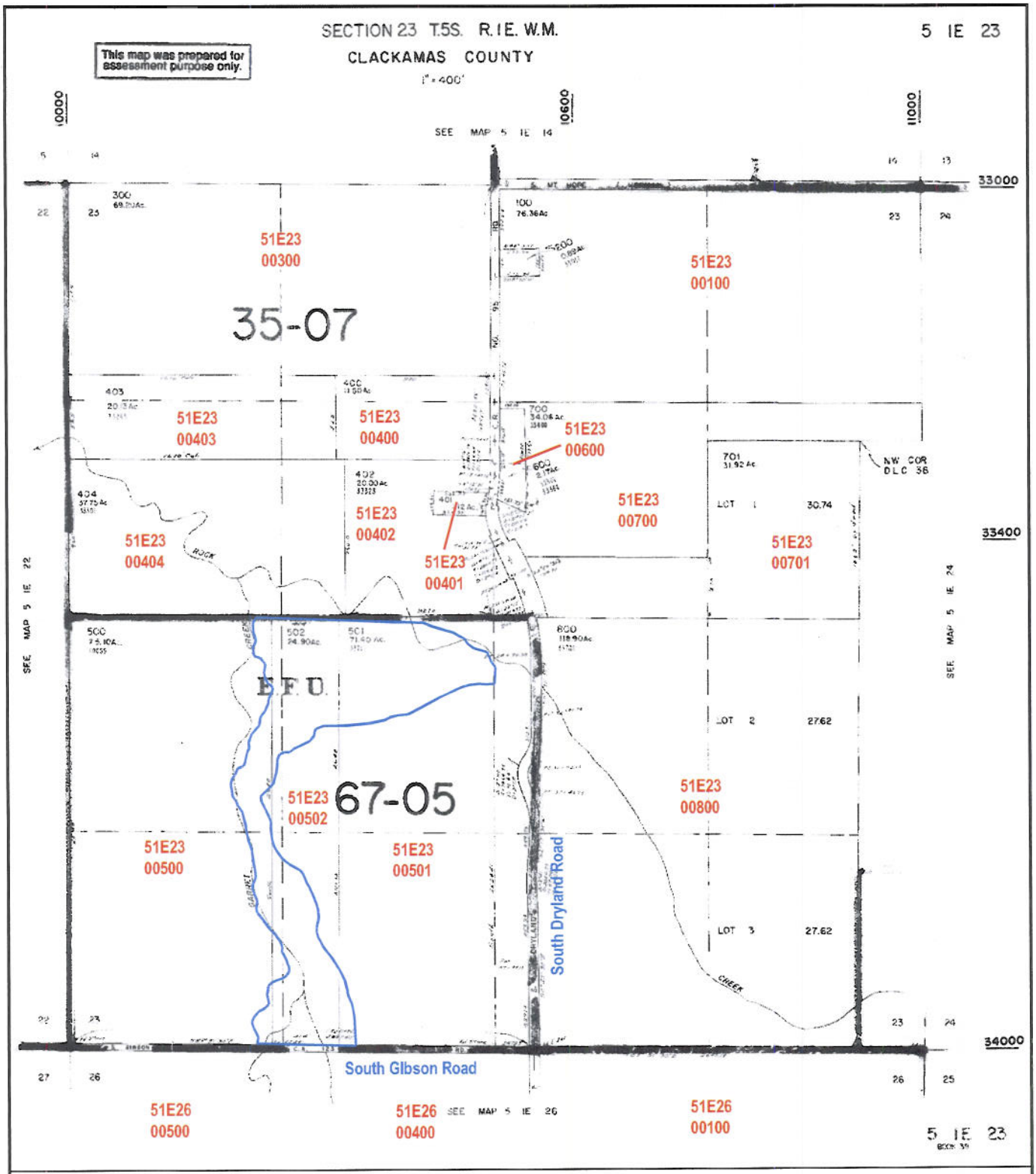
16 Dec 08
Date

By the MBRT members of the Garret Creek Mitigation Bank:

_____ _____

Exhibit A

Legal Property Description/Proof of Ownership and Vicinity Map



N

Not to Scale

Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Legal Description of Bank Properties	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 14, 2008 – 12:11pm	EXHIBIT A PROJECT NO. 00256.07

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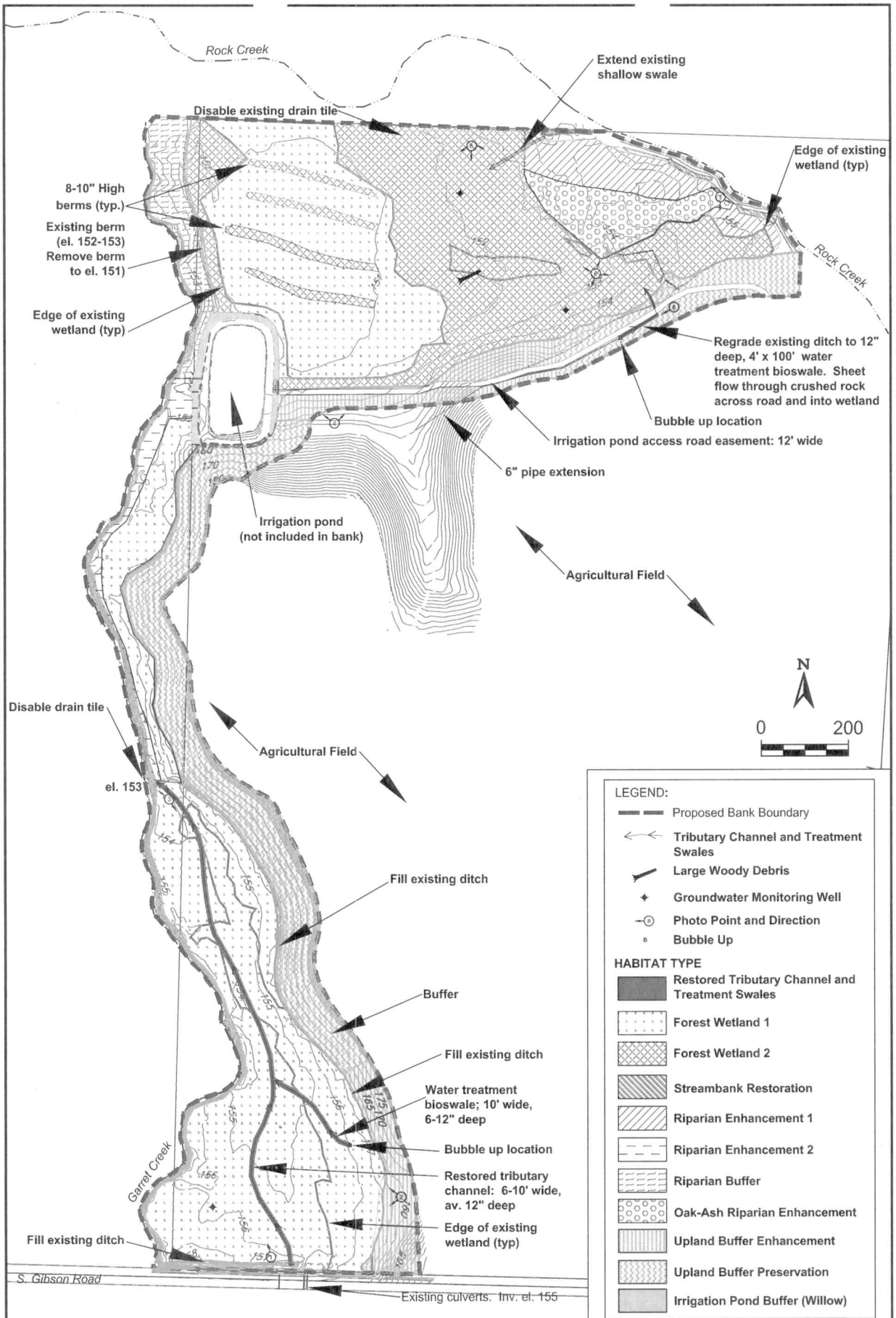
Exhibit B
Proposed Site Plan



ICF Jones & Stokes an ICF International Company 317 SW Alder Street, Suite 800 Portland, OR 97204	**Habitat Types**	Project: **Garret Creek Wetland Mitigation Bank**	Client: **Elton Kemnitz**	Notes: Author: Apr 10, 2008 – 1:57pm	EXHIBIT **B** PROJECT NO. 00256.07

G:\Projects\Kemnitz Farms\Resources\CAD-GIS\CAD\Kemnitz_bank.dwg

Exhibit C
Mitigation Plan

Wetland Mitigation Plan

Garret Creek Mitigation Bank ■ Garret Creek Mitigation Bank, LLC ■ July 2008

Jones & Stokes

Wetland Mitigation Plan
Garret Creek Mitigation Bank

Prepared for:

Garret Creek Mitigation Bank, LLC
33711 S. Dryland Road
Molalla, OR 97038

Prepared by:

Jones & Stokes
317 SW Alder Street, Suite 800
Portland, OR 97204
Contact: Brent Haddaway
503/248-9507 Ext. 224

July 2008

This document should be cited as:
Jones & Stokes. 2008. Mitigation Plan. Garret Creek Mitigation Bank. July. (J&S 00256.07.) Portland, OR. Prepared for Garret Creek Mitigation Bank, LLC.

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Appendices

Tables

Figures

Acronyms

Corps	U.S. Army Corps of Engineers
DSL	Oregon Department of State Lands
GIS	Geographic Information Systems
LWI	Local Wetland Inventory
MBI	Mitigation Bank Instrument
MBRT	Mitigation Bank Review Team
NWI	National Wetland Inventory
Property owner	Elton Kemnitz
Bank	Garret Creek Mitigation Bank

Chapter 1. Introduction

Garret Creek Mitigation Bank, LLC, proposes development of the Garret Creek Mitigation Bank (Bank) to compensate for wetland and stream impacts within the Molalla-Pudding Basin (Exhibit E). The 29.82-acre Bank includes:

- wetland restoration and cropped wetland enhancement,
- wetland and riparian upland enhancement,
- upland and riparian buffer enhancement and preservation, and
- stream channel restoration.

The Bank will generate both wetland and stream credits, making it a valuable tool in compensating for aquatic resource impacts in its service area. This mitigation plan provides all information necessary to satisfy the compensatory mitigation requirements of the U.S. Army Corps of Engineers (Corps) and Oregon Department of State Lands (DSL), in accordance with DSL's Mitigation Plan Checklist (Oregon Department of State Lands 2003). This plan describes:

- the Bank;
- existing ecological conditions;
- goals and objectives for the Bank;
- restoration, enhancement, and preservation activities;
- the design concept, including grading and planting plans;
- anticipated functional gains;
- success criteria and performance standards; and
- maintenance, monitoring, and stewardship of the Bank.

1.1. Project Overview

The Bank will provide mitigation bank service to a rapidly developing area of Clackamas and Marion counties, Oregon. The site includes degraded wetlands and streams that will be restored and enhanced to provide a broad suite of ecological functions. Drain tiles and ditches that currently drain onsite wetlands will be disabled to restore wetland acreage and function. Existing croplands will be graded to restore floodplain functions, and native plant communities will be established. Vegetative buffers will be preserved or enhanced to assure the site is protected from adjacent agricultural land use.

The Bank will be a self-sustaining wetland complex with respect to its hydrogeomorphic and biologic conditions. The Bank is intended to provide compensation for unavoidable wetland losses associated with permitted wetland removal, fill, or alteration activities for developments that lack adequate area for onsite mitigation or the opportunity to provide "in-kind" compensation, or for which the Bank provides environmentally preferable mitigation.

1.2. Service Area

The service area for the Bank includes developing areas with similar geomorphic and ecological conditions as the bank site. The entire service area is located within the Molalla-Pudding Basin (Hydrologic Unit Code 17090009) and encompasses 567,543 acres (Exhibit E). The service area is within western Clackamas and eastern Marion counties and includes the towns of Molalla, Canby, Woodburn, Aurora, Mount Angel, Hubbard, Silverton, and eastern Salem. No wetland mitigation banks currently exist within the basin, where development pressures are resulting in unavoidable wetland impacts. The Garret Creek Mitigation Bank service area will overlap the service area of one existing mitigation bank (Weathers Wetland Mitigation Bank), and will border two others: Mud Slough and Foster Creek mitigation banks. The Weathers Wetland Mitigation Bank service area would overlap the western portion of the Bank; both service areas would include the cities of Hubbard, Woodburn, Mt. Angel and eastern Salem. The Mud Slough Mitigation Bank and Foster Creek Mitigation Bank service areas border Garret Creek Mitigation Bank to the north and east.

Most of the service area is currently used for agriculture. Undeveloped areas within the service area support Douglas-fir (*Psuedotsuga menzesii*), Oregon white oak (*Quercus garryana*), western hazel (*Corylus cornuta*), grasslands on terraces, sedges (*Carex* spp.), roses (*Rosa* spp.), willows (*Salix* spp.), Oregon ash (*Fraxinus latifolia*), black cottonwood (*Populus balsamifera*), and blackberry (*Rubus* spp.) along drainages (Soil Conservation Service 1982).

Wetlands are most common in the western portion of the service area at lower elevations. These areas are dominated by agricultural land use, likely causing wetlands to be drained to varying degrees and native vegetation to be removed. Streams have likely been channelized or become incised because of land conversion, decreasing floodplain interaction and reducing hydroperiod within the streams and in surrounding wetlands.

1.3. Demand Analysis

The service area includes developing communities, state and interstate highways, and rural areas zoned for development. The expanding population and increasing land values will limit the ability of developers to avoid impacts to wetlands and other waters of the U. S. or State of Oregon, creating substantial demand for a mitigation bank.

1.3.1. Geographic Information System Analysis Methods and Results

Demand analysis was performed using Geographic Information Systems (GIS) to determine where unavoidable impacts to wetlands and streams are likely to occur. Since many developers would likely be able to avoid or minimize impacts to wetlands, a relatively small portion of the areas identified in the GIS query were assumed to have a high likelihood of being impacted. National Wetland Inventory (NWI) or Local Wetland Inventory (LWI) maps were not available for portions of the service area, including much of the low-lying areas capable of supporting wetlands. Mapped hydric soils were used in-lieu of NWI because they could be universally applied across the basin. The GIS analysis was performed using the following steps:

- Hydric soil polygons (Natural Resource Conservation Service 2007) and areas within 100 feet of streams displayed on StreamNet (StreamNet 2007) were identified as areas likely to support wetlands within the service area.
- Urban, rural industrial, rural residential and agricultural zoning were overlaid onto areas likely to support wetlands and streams within the Molalla-Pudding Basin. Areas likely to support wetlands and streams were identified and total acres calculated. Each zoning type was assigned an estimated avoidance percentage based on land value. Wetlands within higher-valued lands were considered more likely to be developed. The areas remaining after applying the avoidance percentage establish the estimated banking demand.

Avoidance percentages were assumed to be high because mitigation sequencing requires avoidance or minimization of wetland impacts before compensatory mitigation. The results of the demand analysis are displayed in Table 1.

Table 1. Demand Analysis Results

Analyzed Area	Urban	Rural Industrial	Rural Residential	Agricultural	Total Banking Demand
Hydric Soils (acres)	14,808	1,571	6,851	161,385	184,615
Riparian (acres)	635	68	783	12,267	13,753
Estimated Wetland Area	15,443	1,639	7,634	173,652	198,368
Avoidance Percentage	90% (13,899 ac)	95% (1,557 ac)	99% (7,557 ac)	99.9% (173,478 ac)	99.4% (197,194 ac)
Net Banking Demand (credits)	909	14	77	174	1,174

1.3.2. Recent Permit History within the Service Area

Recent removal/fill permit history within the service area was also reviewed to assess banking demand. The DSL permitting database was queried for the number of permits granted that required compensatory mitigation between July 2002 and July 2007 (Table 2). Data were collected in two categories: permitted projects that provided (onsite or offsite) compensatory mitigation and permitted projects that submitted "payment in lieu" funds to DSL.

Payment in lieu mitigation is a lower priority than banking (Oregon Department of State Lands 2007) and therefore projects permitted by this method within the service area could be expected to use an approved bank. Compensatory mitigation permit data provided by DSL do not differentiate between onsite (higher priority than banking) and offsite mitigation (equal priority to banking).

Table 2. Service Area Removal/Fill Permit Summary July 1, 2002 – June 30, 2007

Impacts Compensated by Payment in Lieu	Impacts Compensated by Compensatory Mitigation
Number of Projects—4	Number of Projects—18
Total Acres—0.428	Total Acres—59.68

Data provided by DSL indicate that the Bank would be able to sell all credits in approximately 5 years under the following assumptions:

- Approximately the same wetland mitigation will occur that will be permitted by payment in lieu mitigation.
- The equivalent of one quarter of the impact area that was mitigated by compensatory mitigation during the last 5 years would use the Bank to meet mitigation requirements in the future.

adjacent hill slopes. The Rock Creek floodplain to the north of the Bank is vegetated by mature Oregon ash and Oregon white oak wetland/riparian forest. West of the Bank, the Garret Creek floodplain is a mix of pasture, hayfields, and native vegetation. The southern boundary of the bank site is Gibson Road, a two-lane county road. The eastern boundary is predominantly hillslope that will serve as buffer for the Bank, screening it from agricultural activities on adjacent land. Most of the buffer is currently vegetated by native trees and Himalayan blackberry (*Rubus armeniacus)*, although portions of the buffer are actively farmed.

2.2. Existing Land Use

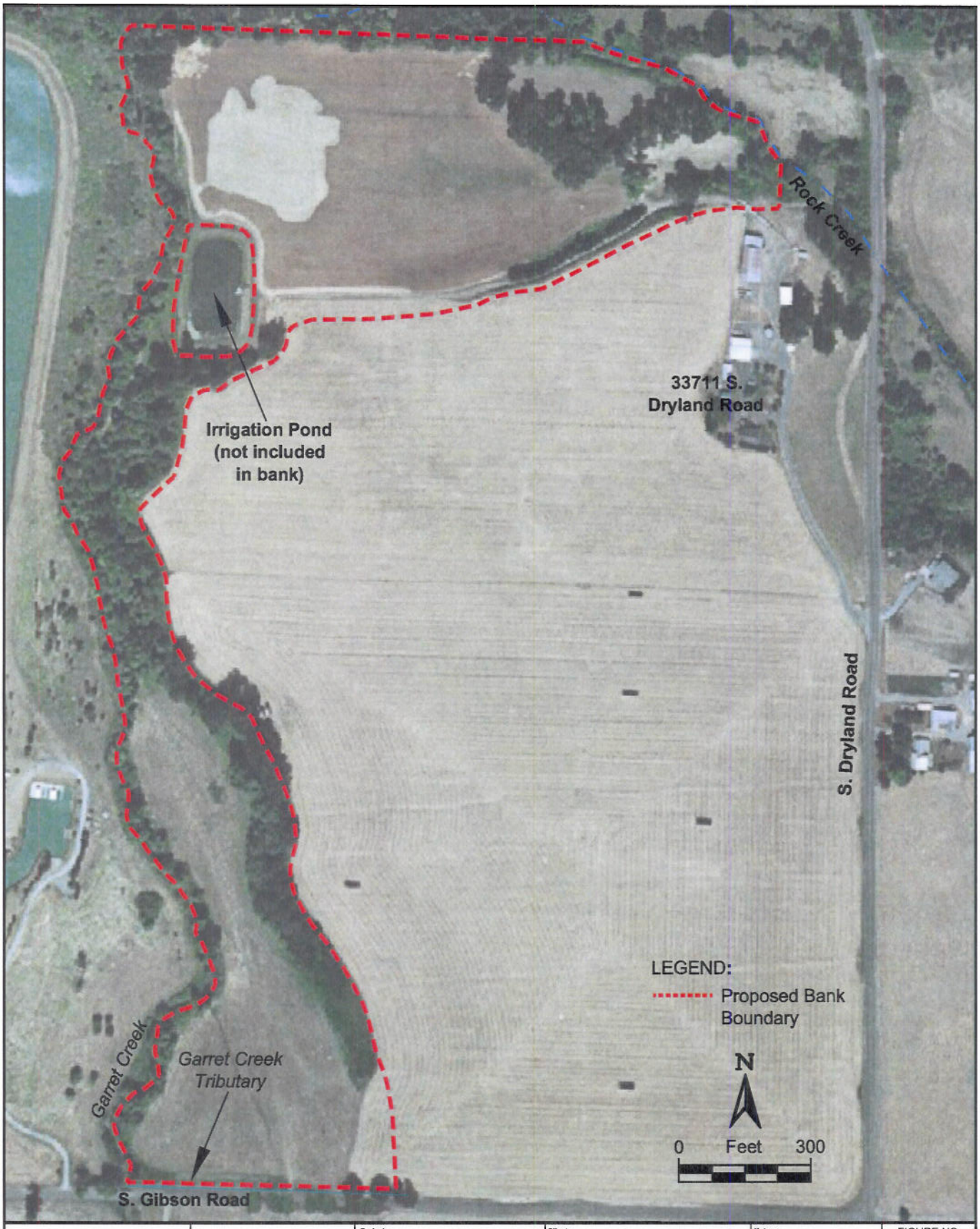
Current land uses for the site are agricultural crop production, pasture, and wetland forest with an informal roadway (Figure 1). Cultivated crops include oats, winter wheat, barley, and corn; pastureland has been used to raise cattle.

Current farming activities within the site began in 1983, after the land was cleared and drained. Agricultural areas encompass the northwestern and southern croplands and portions of the site buffer where slope steepness does not prohibit farm equipment use. The northwestern pasture and southern cropland have been cleared and reseeded with crops at least once every 3 years since 1983. When market and weather conditions favor hay production, these fields may be left vegetated with hay crops over winter months. The northeastern pasture and upland riparian pasture have been used as pasture or for hay production since 1983 (Kemnitz pers. comm.).

Pasture areas are dominated by nonnative grass species but include an Oregon white oak (*Quercus garryana*) and Oregon ash (*Fraxinus latifolia*) grove with an understory of common camas (*Camassia quamash*) and snowberry (*Symphoricarpos albus*). The pasture is approximately 24% wetland, primarily due to hillside spring discharge.

The wetland forest separates the northwestern and southern cropland, and is too wet to be farmed. The property owner constructed an informal roadway through the forested wetland to provide direct access between the two croplands. The roadway was roughly graded by Mr. Kemnitz without surfacing with roadbed material. The roadway is partially vegetated by native and pasture grasses, allowing vehicular access between May and October in most years.

The portions of Kemnitz Farms to remain as active farmland are located south and east of the bank site. The agricultural areas produce row-crops, making effective onsite buffering between the Bank and the cropland necessary. An irrigation pond was constructed within the wetland floodplain, adjacent to the northwestern cropland. The current property owner or future landowners will retain use of the irrigation pond to irrigate the upper cropland.



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Existing Conditions	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 14, 2008 - 11:51am	FIGURE NO. 1 PROJECT NO. 00256.07

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Gibson Road runs south of the southern cropland, and the county right-of-way creates the southern border of the site. Gibson Road connects S. Dryland Road to Barlow Road, providing access primarily to local residents.

2.2.1. Historical Land Use

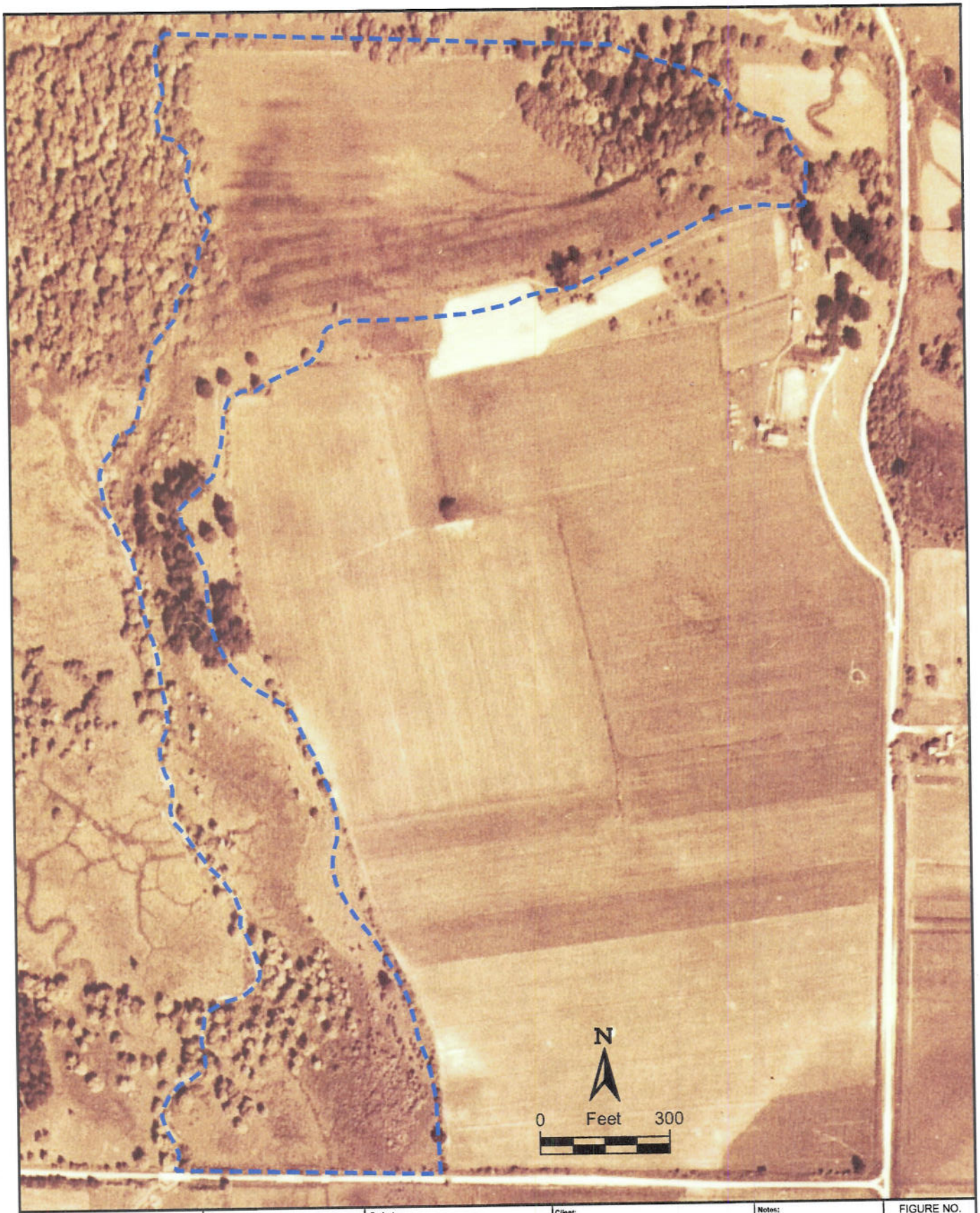
The current landowner purchased the bank property in 1980. At the time of purchase, the Bank was undeveloped pasture, wetlands, floodplain, and stream. Most of the Bank was vegetated with mature Oregon ash, with Oregon white oak occurring in higher areas. Flood events from both creeks were more frequent in the early 1980s, occurring regularly in winter months and several times during spring in normal years. Onsite wetlands were wet throughout spring and into summer (Kemnitz pers. comm.).

An aerial photo from 1936 (Figure 2) shows the northwest cropland and adjacent hillslopes were cleared, as well as the northern portion of the existing forested wetland. The southern cropland is mostly cleared or covered with herbaceous vegetation. The Garret Creek tributary channel is visible crossing the southern cropland, and discharging to Garret Creek in a grove of trees. The portions of Kemnitz Farms outside of the Bank have been in agricultural use since before 1919.

2.2.2. Adjacent Land Use

Garret Creek, Rock Creek, and the wetland riparian forest border the site to the west and north, providing adjacent habitat and floodplain function. Floodplain forests for both creeks are vegetated by native trees and shrubs, with a mix of native and exotic herbaceous vegetation. A man-made lake has been constructed within the floodplain of Garret Creek, approximately 150 feet west of the Bank. The lake and the surrounding floodplains of both creeks are privately owned, and the remaining floodplain near the Bank is undeveloped.

As indicated previously, the property surrounding the Bank is zoned agricultural. The portions of Kemnitz Farms that are not associated with the Bank will continue to produce varying row crops, dependent on market demands. The study area was likely used for seasonal grazing prior to being cleared and drained for row crops in 1983 (Kemnitz pers. comm.).



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	1936 Aerial Photo	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 14, 2008 – 11:31am	FIGURE NO. 2 PROJECT NO. 00256.07

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Table 4. Soils Mapped in the Study Area

Mapping Unit	Soil Unit Name	Drainage Class	Hydric/Hydric Inclusions	Location within Study Area
84	Wapato silty clay loam	Poorly drained	Yes	Northwest cropland and half of northeast pasture. Small portion of southern cropland
25	Cove silty clay loam	Poorly drained	Yes	Majority of southern cropland
91C	Woodburn silt loam, 8–15% slopes	Moderately well drained	No/Yes	Buffer areas, portions of all other areas.

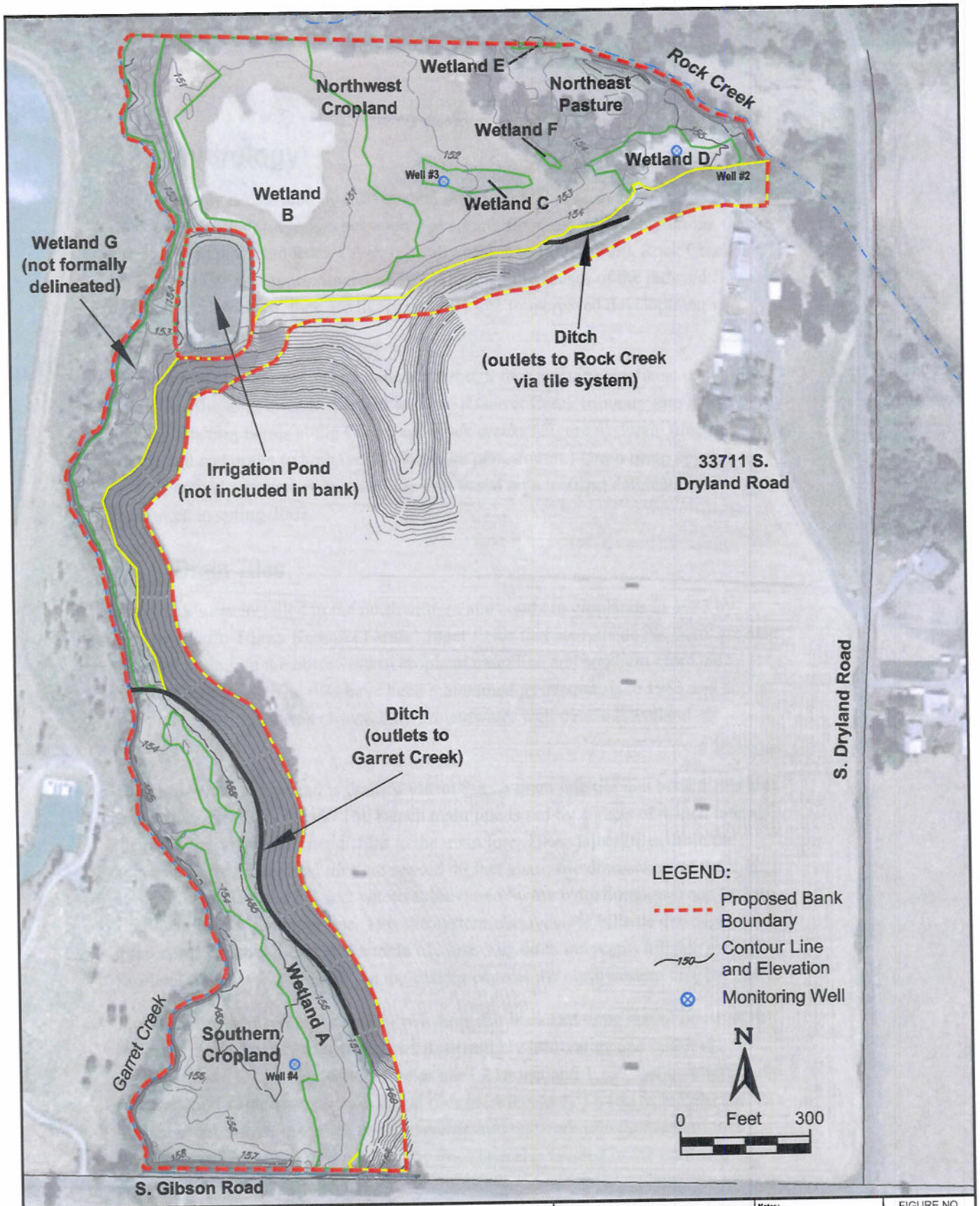
Source: Natural Resources Conservation Service 2007

The wetlands on site are underlain with Cove silty clay loam and Wapato silty clay loam soils that have been drained by ditching, tiling, and creek relocation.

Soils observed on site during wetland delineation fieldwork generally matched mapped soil descriptions except the upland pasture areas (which were mapped as Wapato silty clay loam). Soils outside the upland pasture were high in clay content, with clay content increasing with depth. Soils were examined to depths of 32 inches in the Southern cropland, 50 inches in the northwest cropland, and 16 inches elsewhere within the Bank.

2.3.1. Topography

Wetland and riparian portions of the Bank are flat, gently sloping downward to the north and east. Elevations range from 145 to 157 feet in wetland and riparian areas, with maximum elevation of the buffers at approximately 187 feet National Geodetic Vertical Datum; Figure 3 shows site topography and existing wetlands (Section 2.6, *Wetlands*). The wetland and riparian areas have been leveled for farming, so there are only slight elevation changes. The only significant elevation changes in wetland and riparian areas are along the stream banks and within two distinct depressions that occur north of the oak and ash grove, including an upland depression and a portion of a remnant Rock Creek oxbow. Both creeks are bordered by berms and are incised within the Bank. The buffers are generally steep; most of the buffer area is on 3:1 slopes, and flatten to 12:1 slopes in actively farmed areas.



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Existing Wetlands and Topography	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 19, 2008 – 1:12pm	FIGURE NO. 3 PROJECT NO. 00256.07

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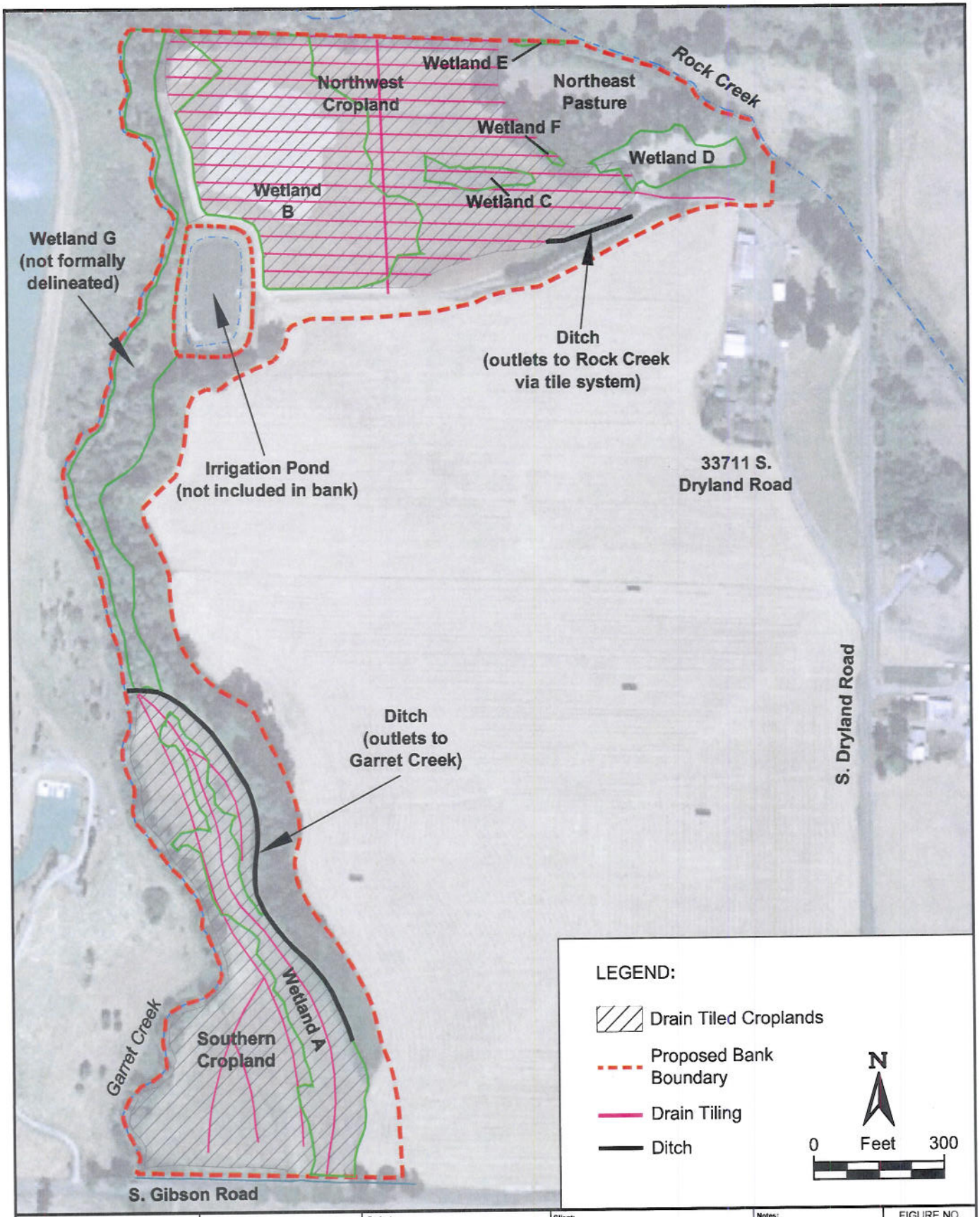

Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Bank Drainage Features	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 19, 2008 – 12:30pm	FIGURE NO. 4 PROJECT NO. 00256.07

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The northeast pasture has a 4-inch drain tile located at the base of the adjacent hillside to intercept spring discharge. The property owner originally excavated a ditch in this location in 1983, then installed the drain tile, surrounded it with drainfield rock, and buried it in 1984. The property owner states that the ditch functioned better than the tile, but he did not feel removing the drain tile and restoring the ditch was worth the necessary labor. The tile routes water into the tile system in the northwestern pasture.

2.4.2. Ditching

Two ditches drain hillside seeps and runoff, routing water away from wetland floodplain and directly into both creeks. The ditches are located at the base of the hillside as buffer, one ditch in the northwest cropland and a second in the southern cropland. Both ditches are greater than 1 foot deep and are cleared regularly to maintain drainage. The northwest cropland ditch outlets to Rock Creek via the drain tile system. The southern cropland ditch flows through a culvert at the north end of the southern cropland and outlets to Garret Creek.

2.4.3. Creek Relocation

A seasonal Garret Creek tributary was relocated in 1980 from its course through the southern cropland into a ditch along Gibson Road. The tributary entered the property through two, 6-foot culverts under Gibson road and flowed northwesterly across the southern cropland before joining Garret Creek where the cropland begins to narrow. The historic channel can still be seen as a slight linear depression. The tributary still flows through the remnant channel during flood events.

The tributary stream now flows under Gibson road via culvert and then is routed due west within the straight roadside ditch to Garret Creek. The ditch is vegetated, but receives sediment and debris from Gibson road.

2.4.4. Creek Berming

The land owner constructed berms along both Rock and Garret creeks in 1984 to reduce flooding. The highest berm runs along the western edge of the northwestern cropland, standing approximately 3 feet tall. This berm is constructed from soil that was excavated to build the irrigation pond. Berms bordering Garret Creek along the southern cropland and Rock Creek along the northeastern pasture are lower, approximately 18 inches in height. These lower berms were built by bulldozing land-clearing material to the creek bank.

The berm along Garret Creek in the northwest cropland includes a culvert that allows flood water to flow into the northwest cropland. As floods recede, water pools in a shallow depression within the cropland, and appears to entrap fish. Mr. Kemnitz

installed the culvert intending for floodwaters to drain out of the cropland as creek levels dropped, but installed the culvert too high to completely drain the cropland.

The berms have been effective in reducing the frequency of flood events. Flood events in these areas were routine prior to berm construction and are now limited to larger winter storms, occurring approximately 1 to 2 times annually in the northeastern pasture, and 2 to 3 times annually in the southern cropland (Kemnitz pers. comm.).

A culvert was installed in the berm along the northwestern cropland in 1985 in an attempt to improve drainage. The culvert is situated a few inches higher than the lowest portion of the northwestern cropland, and therefore cannot completely drain the area when creek levels drop. Overall, installing the culvert created wetter conditions in the northwestern cropland because water now flows through the culvert at lower creek levels than were necessary to overtop the berm (Kemnitz pers. comm.).

2.5. Water Quality

Water quality functions provided by onsite wetlands have been greatly reduced by removing vegetation, reducing residence time of surface and shallow groundwater, and by active farming that introduces contaminants. Onsite wetlands are ineffective at slowing flood water velocities to recruit sediment because vegetation that would provide surface roughness has been removed. Removing vegetation also results in low vegetative biomass capable of uptaking dissolved chemicals introduced from creek flows, runoff from surrounding farm fields, or from direct application on farmed portions of the Bank.

Reduced residence time of waters within the soil profile diminishes the opportunity for soils to adsorb dissolved nutrients. On site soils are high in clay content and cat ion exchange capacity, allowing them to adsorb nutrients in anaerobic conditions. The reduced residence time results in reduced nutrient trapping duration.

2.6. Wetlands

Existing wetlands are shown on Figure 3. A total of 9.15 acres of wetlands were identified within the Bank (Table 5). Wetlands A, B, C, and F (croplands) encompass approximately 7.52 acres and Wetlands D and E (pasture) encompass 0.65 acre. Wetland G (forested wetland) encompasses 0.98 acres. (Jones & Stokes 2007).

Throughout the site, wetland area has been greatly reduced by draining activities based on 2007 wetland delineation data (Jones and Stokes 2007) compared to relic hydric soils. Relic hydric soils were observed throughout the northwest southern cropland areas. Most of the remaining wetlands have been altered by agriculture. The

existing site is classified primarily as slope/flat emergent wetland due to agricultural alterations. Overbank flooding frequency and area has been decreased by rerouting a Garret Creek tributary and berming the banks of both Garret and Rock Creeks. Wetland hydrology is provided to the site by seeps and precipitation, and leaves the site primarily via ditches and drain tiles. Native tree and shrubs were mostly removed and replaced with pasture or row crops. Vegetation communities are maintained as pasture grasses, row-crops or hay.

Table 5. Wetlands and Other Waters Delineated within the Mitigation Bank

Wetland/Water	Dominant HGM Class	Dominant Cowardin Class	Brief Description	Connectivity	Area
Wetland A	Flat	PEM	Cropped wetland fed by spring and seasonal high water table.	Outlets to Garret Creek via drain tile	2.33 acres
Wetland B	Flat	PEM	Cropped wetland fed by spring and seasonal high water table.	Outlets to Rock Creek via drain tile	4.87 acres
Wetland C	Flat	PEM	Cropped wetland fed by spring and seasonal high water table.	Outlets to Rock Creek via drain tile	0.25 acre
Wetland D	Flat	PEM	Pasture wetland fed by springs and seasonal high water table	Outlets to Rock Creek via drain tile	0.63 acre
Wetland E	Depressional	PEM	Pasture wetland with seasonal high water table	No outlet	0.02 acre
Wetland F	Flat	PEM	Borders cropland and pasture area, within informal road.	Outlets to Rock Creek via drain tile	0.02 acre
Wetland G	Slope/flat	PFO	Forested wetland along Garret Creek.	Outlets to Garret Creek via ditch on southern end	0.98 acres
Rock Creek	Riverine	RSS	Borders site in NE corner	Tributary to Pudding River	523 feet
Garret Creek	Riverine	RSS	Forms W site boundary	Tributary to Rock Creek	2,944 feet
Garret Creek Tributary	Riverine	RUB	Flows in Gibson Road Ditch	Tributary to Garrett Creek	285 feet
South Ditch	NA	NA	Drains hillside springs	Outlets to Garret Creek.	1,037 linear feet
North Ditch	NA	NA	Drains hillside springs	Outlets to Rock Creek via NW cropland tile system	210 linear feet

PEM—palustrine emergent; PFO—palustrine forested; RSS—riverine scrub shrub; RUB—riverine unconsolidated bottom

2.7. Streams and Special Status Fish Species

Rock Creek is a listed as Essential Salmonid Habitat within the bank. Rock Creek is used by Chinook (*Oncorhynchus tshawytscha)* for rearing and migration and by steelhead (*O. mykiss*) for rearing, spawning and migration (StreamNet 2007). Rock Creek flows only until July or August within the Bank, but is perennial downstream of the Bank. Garret Creek is a tributary to Rock Creek and still flows perennially within the Bank (Kemnitz pers. comm.).

The Oregon Heritage Information Center was contacted to identify any rare, threatened, and endangered plants or animals in the vicinity of the Bank. Winter steelhead were the only species identified to occur within the vicinity of the Bank.

Within the site, both creeks are partially contained by berms constructed in 1984 to prohibit overbank flooding, as discussed in Section 2.4.4, *Hydrology—Creek Berming*.

2.8. Uplands

The Bank includes effectively drained wetlands that have been converted to uplands, riparian uplands, and upland buffer areas (Figure 3).

2.8.1. Effectively Drained Areas

Much of the northwest and southern croplands appear to be effectively drained, former wetlands. As previously mentioned in Section 2.4, *Hydrology*, these areas have been ditched, tiled, and separated from overbank creek flooding. These areas occur in mapped hydric soils that included hydric soil field indicators. These areas were determined to be upland based on soil saturation level observations in spring 2007 (Jones & Stokes 2007). Native vegetation has been removed, and the effectively drained areas are now used to grow various row crops.

2.8.2. Riparian Uplands

The riparian upland areas include the Oregon white oak and Oregon ash grove, the upland pasture along the bank of Rock Creek, and a fringe of upland along Garret Creek. These areas are vegetated by Oregon ash, Oregon white oak, common camas, snowberry, tall fescue, and scattered weeds. This area includes an upland depression between the oak and ash grove and the bermed bank of Rock Creek.

2.8.3. Informal Roadway

Much of the informal roadway that connects the northwest cropland and southern cropland has been converted to upland by soil compaction. This area was determined

to be upland because no soil saturation was observed early in the growing season during a normal rainfall year (2008). Unaltered wetlands adjacent to the informal road were saturated to the surface. The informal roadway is sparsely vegetated by reed canarygrass.

2.8.4. Buffers

Potential wetlands within the site buffer areas were not formally delineated, but the buffer appears to be upland based on topography and vegetation. The buffers are generally steep slopes that separate the farmlands and floodplains. The areas are vegetated by big leaf maple (*Acer macrophylum*), Douglas-fir, and black cottonwood (*Populus balsamifera*) with a Himalayan blackberry understory or are actively farmed fields. The buffers also include seeps that may be wetland, but these areas were not delineated.

Chapter 3. Mitigation Site Selection and Justification

3.1. Site Location

The bank location is ideal to compensate for future impacts in its service area, the Molalla-Pudding Basin. The Bank is located centrally to major drainages (Molalla River, Pudding River, and Butte Creek) and largest population centers of Molalla, Silverton, Woodburn, and Canby (Appendix C). The Bank is situated between 150 and 185 feet elevation, and zoned Agricultural, making the site similar in climate and land use as the majority of the service area.

3.2. Watershed Context

The bank is located near the confluence of Garret and Rock creeks and contains a channelized tributary of Garret Creek. Garret Creek contributes to Rock Creek north of the bank, which flows into the Pudding River, a navigable water, south of Aurora. Onsite creeks are low gradient (<1%), which is typical for streams in the lower Pudding River Basin.

The western half of the Molalla-Pudding Basin is low elevation, agricultural land that also includes the largest population centers; the eastern half includes higher elevation areas dominated by forestry practices. Approximately 87% of the basin is privately owned. The headwaters of the Molalla River include western Cascade Mountains, and summer flows are supported by snowmelt; the Pudding River originates from the Waldo Hills, and receives no summer flow support from snowmelt (Northwest Power and Conservation Council 2004).

Throughout the basin, land alterations have decreased water quality and quantity in streams. Wetland area has been reduced and stream flows have been reduced by irrigation withdrawals, channel simplification, and increased impervious surfaces. Floodplain areas have been developed or converted, affecting peak-flow storage and low-flow timing (Northwest Power and Conservation Council 2004). Implementing the bank plan directly addresses the functions affected by these land conversions. Restoration efforts include restoring farmed wetlands and riparian pasture areas that have been drained and cleared. The restoration of these areas directly addresses these key habitat and aquatic functional losses. The restoration of these habitats, and the resulting functional benefits, are a priority to restoring water quality in streams to support native fish (Oregon Department of Fish and Wildlife 2007).

3.3. Restoration Potential and Long-Term Sustainability

The bank provides high restoration potential and mitigation activities are highly likely to succeed. Wetland hydrology and native vegetation will be restored within existing hydric soils, and streams will be relocated into wetland floodplains. The bank will likely be successful at restoring wetland area and functions for the following reasons:

- Site history is known (site was undeveloped as recently as 1979).
- Reference plant communities are present adjacent to and within the site.
- Bank design incorporates existing ecological process by removing artificial controls of hydrology and vegetation.
- Multiple sources for hydrology are present: springs, overbank flooding, seasonal high water table, precipitation.
- Stream relocation will occur on low-gradient streams in clay rich (cohesive) soils that are less susceptible to erosion.

The bank design focuses on restoring pre-agricultural conditions to the site by removing human-induced disturbances. The constant maintenance required to keep the Bank drained, and the presence of mature forested wetland communities adjacent to the Bank, indicate the Bank design plan will result in a self-sustaining system.

In addition to restoring self-sustaining ecological processes, the bank will be protected by a conservation easement. The conservation easement will prevent incompatible activities from occurring within the site and will guide long-term stewardship. Long-term stewardship will be funded by a site protection endowment, created by credit sales. Long term stewardship is expected to focus primarily on site protection from human disturbance because the site will be self-sustaining.

3.4. Cultural Resources

A professional archeologist has reviewed the bank for cultural resources, including a field survey. No significant cultural resources were identified. The survey results and methods will be described in a separate report that will be submitted with project construction permit application.

Chapter 4. Mitigation Bank Design

4.1. Restoration and Enhancement Overview

Restoration and enhancement actions are expected to generate both wetland and stream mitigation credits. Wetlands will be restored by removing berms, filling ditches, restoring overbank flooding, and disabling drain tiles to restore hydrology. Drain tiles entering the Bank from adjacent fields will outlet into the Bank in a percolator-like device called a "bubble-up." Water cleaning bioswales will be created at the two drain-tile bubble up locations. These bioswales will be low-gradient and densely vegetated with herbaceous wetland plants to slow the flow of water into the site, provide effluent treatment function before the water enters the wetlands (Exhibit B).

Portions of the stream bank along Rock Creek will be graded back to decrease its slope. Additional grading will restore gentle swales across the site and will create varied microtopography. Habitat areas within the Bank will be seeded and planted with appropriate native species to restore diverse native-dominated communities. A summary of mitigation activities by treatment area is presented in Table 6.

Table 6. Mitigation Area Summary

Treatment Area	Area	Activities	Functions
Creek restoration	1,205 linear feet	Remove or breach berms, restore tributary channel	Hydrologic, water quality, habitat
Wetland restoration	10.68 acres	Disable tile, fill ditches, planting	Hydrologic, water quality, habitat
Cropped wetland enhancement	7.52 acres	Disable tile, fill ditches, planting	Disable tile, fill ditches, planting
Wetland enhancement	0.77 acres	Disable tile, planting	Habitat, hydrologic
Wetland buffer enhancement	0.79 acres	Protection	Habitat, hydrologic, water quality
Upland riparian enhancement	2.80 acres	Preservation, planting	Habitat
Upland buffer enhancement	1.72 acres	Preservation, planting	Buffering, habitat
Upland buffer preservation*	4.57 acres	Preservation	Buffering, habitat
Riparian Buffer	0.70 acres	Remove adjacent berm, protection.	Habitat, buffering

*Does not generate mitigation credit

4.2. Reference Sites

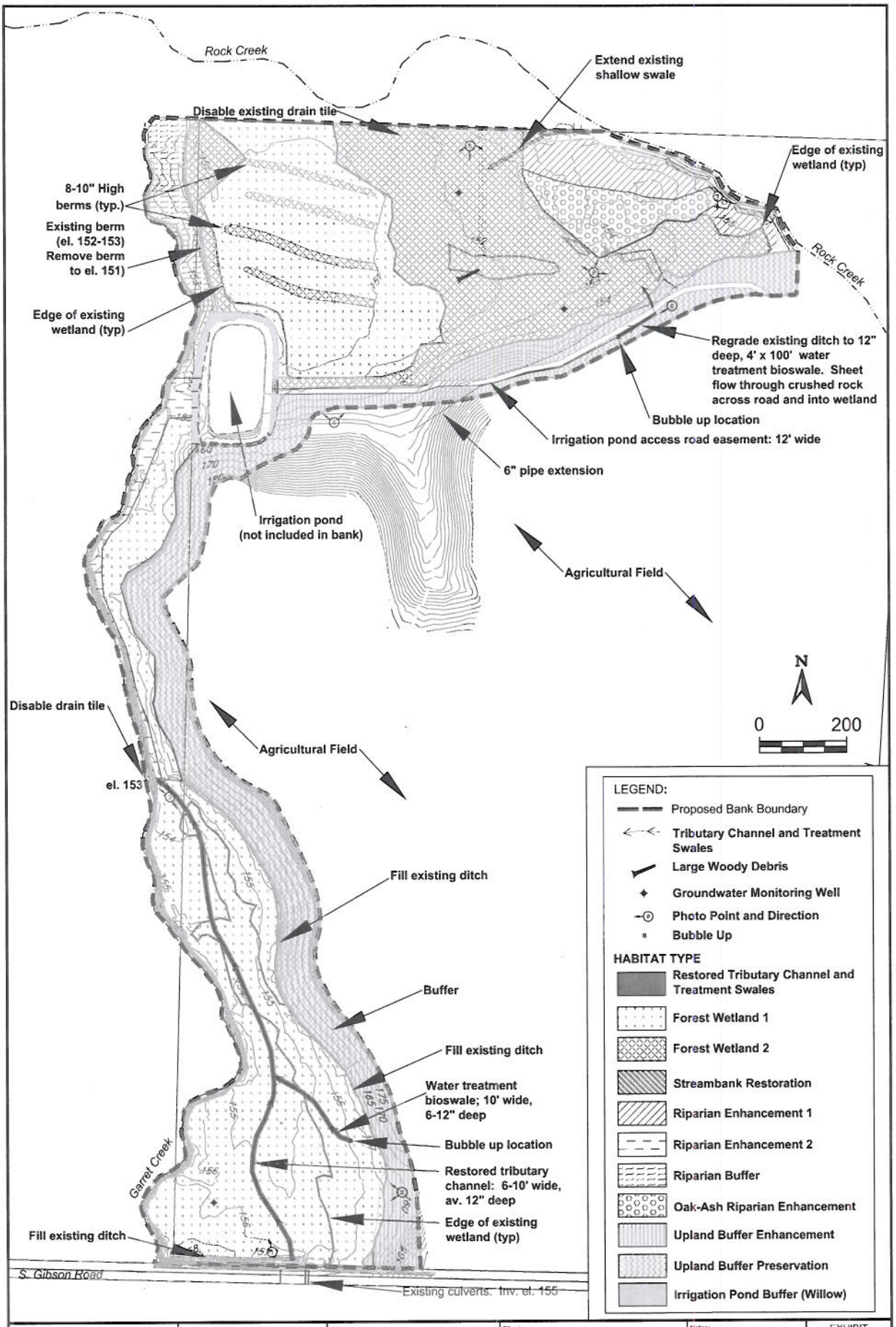
The site grading plan will undo draining and leveling work performed by the land owner, and is based largely on information he provided. The intent of the grading plan is to restore pre-agricultural topography to the site to restore stream and wetland floodplain function.

Additional information used to guide bank grading design include:

- measurements of stream depth and width of the Garret Creek Tributary immediately upstream of the Bank;
- conceptual stream-flow modeling of the Garret Creek Tributary performed by Jones & Stokes (Appendix D); and
- existing conditions observations from fieldwork performed during all seasons.

The site planting plan is based on two informal reference sites, the onsite wetland preservation area and the adjacent wetland/riparian forest north of the Bank. These two areas represent the range of hydrologic conditions that are anticipated post-construction and have been undisturbed for 30 years or longer. The onsite wetland preservation area is the wettest area with the Bank in its existing condition and is similar to the Forested Wetland 1 areas in the planting plan. The forested wetland/riparian area to the north of the Bank appears to be a wetland/upland riparian

mosaic and is similar to the Forested Wetland 2 and Upland Riparian areas in the planting plan. Dominant plant species list for these areas, as well as the existing bank site, are provided in Appendix A.



ICF Jones & Stokes an ICF International Company 317 SW Alder Street, Suite 900 Portland, OR 97204	**Habitat Types**	Project: **Garret Creek Wetland Mitigation Bank**	Client: **Elton Kemnitz**	Notes: Author: Apr 10, 2008 – 1:57pm	EXHIBIT **B** PROJECT NO. 00256.07

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4.3. Bank Design Detail

The design for the Bank is shown on Exhibit B and is described below. The bank will encompass an irrigation pond and associated access road that are not included within the bank. The terms of pond access and use will be described in the site's restrictive covenant and conservation easement.

4.3.1. Restore and Enhance Wetlands in Existing Cropland

Disable Drain Tiles—10,000 linear feet of existing drain tiles will be disabled in the northwest and southern portions of the Bank, restoring wetland area, natural wetland hydroperiods, and base flow support functions. The mainline tile that runs north-south across the northwestern cropland will be plugged near the existing outlet. The mainline tile will also be cut as it enters the site from adjacent agricultural fields, and be routed through a 518 feet of pipe extension into a bubble-up outlet. From the bubble-up, the water will flow through 100 feet of treatment swale at approximately 1% slope. The swale will be seeded with emergent wetland species. Water will then sheet flow into the wetlands in the northern portion of the Bank, lengthening the wetland hydroperiod and allowing the wetlands to provide wider range of functions. The swale discharge will cross the irrigation pond access road as sheet flow. This portion of the access road will be re-enforced with crushed rock to prevent erosion. The main drain tile that runs through the southern cropland will also be plugged near the existing outlet. Tile entering the southern cropland from adjacent fields will be cut and a second bubble-up will be installed there. Water from this tile will bubble up and then flow through a shallow 250-foot-long swale at approximately 1% slope, into the restored stream channel. The treatment swale will be seeded with emergent wetland species and will clean the agricultural run-off before the water enters the stream channel (Exhibit B).

Fill Ditches—800 linear feet of ditch will be filled along the toe of hill slope along the eastern side of the southern cropland. This water will then be allowed to flow into the restored stream channel and adjacent wetlands areas via overland and subsurface flow. Ditches will be filled by regrading existing spoil deposits along the ditches, and from material excavated to restore the Garret Creek Tributary channel. (Exhibit B).

Grade Floodplain Topography—The existing cropland areas will be graded to mimic historic floodplain topography. Spoils from the Garret Creek berm in the Northwest cropland will be deposited as low ridges, approximately 8" in height. The mounds will diversify planting niches in that area. The remaining floodplain wetlands will be lightly graded to allow small pools and wetter areas to form during higher water levels (Exhibit B).

Extend Existing Swale from Rock Creek—An existing swale at the northern edge of the northern cropland will be extended into the Bank to increase flows into the proposed wetlands during high flows in Rock Creek. The swale is a remnant Rock Creek channel segment that is inundated during flood events. The swale extension will be shallow (average 6 inches) and will allow water to sheet flow out of the swale, into the wetlands, during flood events.

Plant Native Vegetation—Native plant communities that historically dominated the existing pasture and croplands will be restored. Native trees and shrubs will be planted and native herbaceous species will be seeded to restore a diverse native-dominated community. Species selection is based on adjacent undeveloped wetland floodplain. Plant communities are shown on Exhibit B plant lists are presented in Tables 7 through 14.

4.3.2. Restore and Enhance Wetlands

Disable Drain Tiles – The drain tile within the existing northeast pasture area will be disabled by plugging the tile outlet in the northwest cropland. Disabling the drain tile in this area will lengthen the duration of seasonal saturation, but not increase the area of wetland.

Remove impoundment – An informal roadway impounds water from springs discharging into the Wetland Buffer area. The roadway is highly compacted from farm equipment use, converting most of the road to upland. The soil compaction prohibits groundwater movement and limits plant growth. This roadway will be ripped and disked to restore wetland hydrology and to allow natural groundwater movement between the Wetland Buffer area and adjacent riparian enhancement areas.

Restore Native Vegetation – The northeast pasture area will be planted at 6' on center with native trees and shrubs to re-establish native scrub-shrub and forest communities. The Wetland Buffer Area includes a native canopy and a mix of native and non-native understory. Weeds will be removed from the understory and native trees and shrubs will be established in formerly weed-dominated areas.

4.3.3. Restore Creek Functions

Remove Berm Along Garret Creek—The berm along the northwestern edge of the Bank will be removed, increasing flood frequency and duration in the current northwestern cropland. Berm spoils will be graded across the shallow depression in the northwest cropland to increase planting hydrologic regimes. The berm spoils will not convert wetlands to uplands.

Restore Garret Creek Tributary—A new stream channel will be graded to flow north across the southern cropland from Gibson Road to the existing ditch outlet. The

Garret Creek tributary will be restored to historic conditions by excavating a new, meandering channel through the southern cropland and discharging to Garret Creek via the existing ditch outlet. The stream has been designed to frequently overflow its banks, increasing flood frequency, duration, and extent, improving water quality, and providing hydrology to support wetlands in the southern portion of the Bank. Restoring the tributary stream will provide 1,205 linear feet of new stream within the Bank. Spoils generated by restoring the Garret Creek tributary will be used to backfill the existing ditch that runs along the eastern edge of the southern cropland, at the toe of the hillslope.

4.3.4. Enhance Riparian Areas

Enhance Riparian Upland—Upland pasture along Rock Creek and degraded riparian areas along Garret Creek will be enhanced by planting native trees and shrubs, seeding with native grasses and forbs, and controlling invasive species. Re-establishing native plants will improve habitat and buffering functions. Uplands along Rock Creek will provide riparian functions and will be periodically inundated during high flow events. The existing Oregon white oak and Oregon ash grove adjacent to the northeast pasture and vegetated buffer areas will be preserved and enhanced with additional plantings. This area provides habitat to wildlife species, a source for native plant volunteers, and buffering from adjacent land uses.

The riparian enhancement areas along Garret Creek, which include small wetlands, will be enhanced by removing weeds and underplanting with native trees and shrubs. The adjacent informal roadway, which impedes groundwater movement to the riparian enhancement area, will be ripped and disked to reduce soil compaction. Restoring groundwater movement will increase hydroperiod in the wetland portions of the riparian enhancement area and baseflow support.

4.3.5. Enhance Upland Buffers

The Bank will be buffered from adjacent farming by a 50- to150- foot-wide vegetated hillslope. The majority of the buffer is currently vegetated with a mixture of native trees and nonnative (mainly blackberry) upland species. The remaining portion of the buffer is currently an agricultural field. Areas by Himalayan blackberry or croplands will be enhanced by planting native trees and shrubs and controlling weeds.

Once enhanced, upland buffers will provide habitat functions and screening from adjacent agriculture. Uplands surrounding the bank are mostly developed for agriculture residences, or roads. Providing upland habitats and screening adjacent to wetland and riparian areas, increases the functions and diversity of the bank overall.

4.3.6. Preserve Upland Buffers

Existing forested buffer area provides a screening and water quality treatment functions, protecting the bank from disturbance and runoff from agricultural activities south and east of the bank, The upland buffer preservation areas include mature trees and a mix of native and non-native understory that deter trespass onto the bank dense vegetative cover that intercepts surface runoff. Trees within the buffer area would likely be used for firewood if not protected as part of the bank.

The buffer's location adjacent to wetland and riparian areas also gives it increased value as habitat. The buffer provides refuge to wildlife during flood events, dense woody cover, and food sources.

4.3.7. Install Habitat Features

Following site grading, an Oregon white oak that fell in fall 2007 will be placed in at least one location at the bank, additional root wads and large tree trunks may be placed throughout the site if they become available. These will be placed to at relatively high elevation to remain stable during flood events and are expected to provide a source of organic material and to increase diversity of habitat structure.

4.3.8. Establish Native Vegetation Communities

The goal of the planting plan is to establish multi-tiered native vegetation communities throughout the site. As previously stated, trees and shrubs used in this plan are based on two reference communities within, and adjacent to, the Bank. Other species that are known to occur in the vicinity of the site have been added to the planting palette to increase diversity. Prior to planting, existing grass in the southern cropland and pasture areas will be mowed and a 36" diameter area around each plant will be sprayed to control grasses and weeds.

Trees will be planted 10 feet on center and shrubs will be planted 6 feet on center in wetland restoration, cropped wetland enhancement, wetland enhancement, upland riparian enhancement, and upland buffer enhancement areas. Trees and shrubs will be selectively located in wetland buffer and upland riparian enhancement areas where native vegetation exists, averaging 400 plantss per acre. Grasses and forbs will be seeded in all areas where soil is disturbed.

Plants will be obtained from three sources (in order of preference):

- cuttings taken from the bank site or adjoining properties;
- donor material obtained from within a 10-mile radius of the bank site; or
- stock and seeds purchased from commercial nurseries but originating in the Willamette Valley ecoregion.

In the case of purchased stock and seed, only local stock will be used to ensure that material is acclimated to local conditions, thereby increasing likelihood of planting success. Final plant lists will be contingent upon plant availability.

Proposed plant communities area shown on Exhibit B, and plant lists for each community are shown in Tables 7 through 14.

Table 7. Irrigation Pond Buffer (Willow)

Scientific	Common	Size	Indicator Status
Shrubs			
Salix scouleriana	Scouler's willow	Live stakes; 24–36"; 1" caliper	FAC
Salix sitchensis	Sitka willow	Live stakes; 24–36"; 1" caliper	FACW

Table 8. Restored Tributary Channel and Treatment Swales

Scientific Name	Common Name	Comment	Indicator Status
Grasses, Herbs, and Tubers			
Bechmania syzigachne	American slough grass	Seed	OBL
Deschampsia cespitosa	Tufted hairgrass	Seed	FACW
Deschampsia elongate	Slender hair grass	Seed	FACW-
Eleohcaris acicularis	Needle Spike-rush	Seed	OBL
Hordeum brachyantherum	Meadow barley	Seed	FACW
Juncus ensifolius	Sword-leaf rush	Seed	FACW
Ranunculus occidentalis	Western buttercup	Seed	FAC
Sagittaria latifolia	Wapato	Tubers—clusters of 20	OBL
Scirpus acutus	Hardstem bulrush	Tubers—clusters of 20	OBL

Table 9. Oak-Ash Riparian Enhancement Area

Scientific	Common	Size	Indicator Status
Trees			
Quercus garryana	Oregon White Oak	12"-18"; Bare root	NI
Oemelearia cerasiformes	Indian Plum	12"-18" Bare root	FACU
Tubers			
Camassia quamash	Common camas		

Table 10. Forest Wetland 1

Scientific	Common	Size	Indicator Status
Trees			
Fraxinus latifolia	Oregon ash	12–18"; bare root	FACW
Populus balsamifera ssp. trichocarpa	Black cottonwood	12–18"; bare root	FAC
Shrubs			
Cornus stolinifera	Red osier dogwood	12–18"; bare root	FACW
Rosa pisocarpa	Cluster rose	12–18"; bare root	FAC
Physocarpus capitatus	Ninebark	12-18"; bare root	FACW-
Salix sitchensis	Sitka willow	12–18"; bare root	FACW
Herbs and Grasses			
Bechmania syzigachne	American slough grass	Seed	OBL
Deschampsia cespitosa	Tufted hairgrass	Seed	FACW
Deschampsia elongate	Slender hair grass	Seed	FACW-
Eleohcaris acicularis	Needle Spike-rush	Seed	OBL
Hordeum brachyantherum	Meadow barley	Seed	FACW
Juncus ensifolius	Sword-leaf rush	Seed	FACW
Ranunculus occidentalis	Western buttercup	Seed	FAC

Table 11. Forest Wetland 2 and Riparian Enhancement 2

Scientific	Common	Size	Indicator Status
Trees			
Fraxinus latifolia	Oregon ash	12–18"; bare root	FACW
Populus balsamifera ssp. trichocarpa	Black cottonwood	12–18"; bare root	FAC
Shrubs			
Rosa Nutkana	Nootka rose	12–18"; bare root	FAC
Salix scouleriana	Scouler's willow	Live stakes; 24–36"; 1" caliper	FACW
Physocarpus capitatus	Ninebark	12–18"; bare root	FACW-
Herbs and Grasses			
Bechmania syzigachne	American slough grass	Seed	OBL
Deschampsia cespitosa	Tufted hairgrass	Seed	FACW
Deschampsia elongate	Slender hair grass	Seed	FACW-
Hordeum brachyantherum	Meadow barley	Seed	FACW
Juncus ensifolius	Sword-leaf rush	Seed	FACW
Ranunculus occidentalis	Western buttercup	Seed	FAC

Table 12. Upland Riparian Enhancement

Scientific	Common	Size	Indicator Status
Trees			
Acer circinatum	Vine maple	12–18"; bare root	FAC-
Acer macrophyllum	Big-leaf maple	12–18"; bare root	FAC
Fraxinus latifolia	Oregon ash	12–18"; bare root	FACW
Populus balsamifera ssp. trichocarpa	Black cottonwood	12–18"; bare root	FAC
Shrubs			
Philadelphus lewisii	Mock orange	12–18"; bare root	
Sambucus racemosa	Red elderberry	12–18"; bare root	FACU
Ribes brachteosum	Stink currant	12–18"; bare root	FAC
Rosa nutkana	Nootka rose	12–18"; bare root	FAC
Rubus spectabilis	Salmonberry	12–18"; bare root	FAC+
Herbs and Grasses			
Bechmania syzigachne	American slough grass	Seed	OBL
Danthonia californica	California oatgrass	Seed	FACU
Delphinium nuttallii	Upland larkspur	Seed	FACU
Deschampsia cespitosa	Tufted hairgrass	Seed	FACW
Elymus glaucus	Blue wildrye	Seed	FACU
Festuca roemeri	Roemer's fescue	Seed	FACU
Glyceria elata	Fowl mannagrass	Seed	FACW+
Juncus ensifolius	Sword-leaf rush	Seed	FACW
Poa secunda	Pine bluegrass	Seed	FACU
Ranunculus occidentalis	Western buttercup	Seed	FAC

Table 13. Upland Buffer

Scientific	Common	Size	Indicator Status
Trees			
Acer circinatum	Vine maple	12–18"; bare root	FAC-
Acer macrophyllum	Big-leaf maple	12–18"; bare root	FAC
Prunus virginiana	Choke cherry	12–18"; bare root	FACU
Pseudotsuga menziesii	Douglas-fir	12–18"; bare root	FACU
Populus balsamifera ssp. trichocarpa	Black cottonwood	12–18"; bare root	FAC
Quercus garryana	Oregon white oak	12–18"; bare root	NI
Shrubs			
Philadelphus lewisii	Mock orange	12–18"; bare root	
Rosa nutkana	Nootka rose	12–18"; bare root	FAC
Symphorocarpos albus	Snowberry	12–18"; bare root	FACU
Herbs and Grasses			
Asclepias speciosa	Showy milkweed	Seed	FAC+
Achillea millefolium	Yarrow	Seed	FACU
Bromus vulgaris	Columbia brome	Seed	UPL
Danthonia californica	California oatgrass	Seed	FACU
Elymus glaucus	Blue wildrye	Seed	FACU
Festuca roemeri	Roemer's fescue	Seed	FACU
Koeleria kristata	Junegrass	Seed	
Lupinus albicaulis	Sickle-keeled lupine	Seed	
Poa secunda	Pine bluegrass	Seed	FACU
Ranunculus occidentalis	Western buttercup	Seed	FAC

4.3.9. Construction

Construction of the Bank will begin during summer of 2008, assuming signature of the Mitigation Bank Instrument (MBI) prior to July 2008. Construction activities will occur as follows:

- July/August 2008—Surface feature grading, such as filling ditches, creating tributary stream channel, treatment swales, stream bank restoration, berm removal, microtopography, upper field drain tile bubble up.
- August/September/October 2008—Grass seeding.
- November 2008-February 2009—Woody plant installation.

- Spring/Summer 2009—Water management using drain tiles and irrigation, and weed control. Tiles will be used to optimize growing conditions for installed plants during spring. Irrigation will be installed in spring as needed. Weeds will be controlled as needed.
- Summer 2009—Bank monitoring and management begins.

4.4. Anticipated Wetland Classification

Construction of the Bank will restore the site's historic hydrogeomorphic and vegetative conditions. As previously mentioned, most wetland area within the Bank has been altered by agriculture to reduce flooding frequency and drain wetlands. The existing wetland hydrogeomorphic classification was determined to be slope/flat and the Cowardin classification to be mostly palustrine emergent. After site construction, overbank flooding will be restored to the Bank, restoring wetlands to Riverine hydrogeomorphic class. The Bank will be planted with tree and shrub species, initiating re-establishment of native forest cover. The Bank will develop into a palustrine forested wetland.

4.5. Wetland Functional Lift

The anticipated functional lift provided by the bank construction was estimated by performing functions assessment on the existing site, and then estimating the future function score of the 5-year post construction condition. The *Hydrogeomorphic—based Assessment of Oregon Wetland and Riparian Sites—Judgmental Method* (Adamus and Field 2001) was used to assess the existing and 5-year post construction condition of onsite wetlands. The existing condition assessment site included all onsite wetlands and drained wetlands that will be restored. The assessment site therefore includes existing native plant communities that will be preserved, positively contributing to the function score. Functions assessment data sheets are provided in Appendix E.

Table 14. Wetland Functional Lift

Function	Existing Site Conditions	Anticipated 5-Year Score	Function Gain (+) or Loss (-)
Water Storage and Delay	0.40	0.85	+0.45
Sediment Stabilization and Phosphorus Retention	0.42	0.76	+0.34
Nitrogen Removal	0.22	0.53	+0.31
Primary Production	0.34	0.70	+0.36
Thermoregulation	0.20	0.65	+0.45
Resident Fish Support	NA	NA	NA
Anadromous Fish Support	0.40	0.64	+0.24
Invertebrate Habitat Support	0.29	0.60	+0.31
Amphibian and Turtle Habitat	0..39	0.66	+0.27
Breeding Waterbird Support	0..43	0.64	+0.21
Wintering and Migrating Waterbird Support	0..58	0.74	+0.16
Songbird Habitat	0..48	0.80	+0.32
Support of Characteristic Vegetation	0..47	0.77	+0.30

The scores show an overall increase in function scores in all assessed functions. In addition to function scores provided by the HGM method, further evidence that implementing the mitigation bank plan will provide substantial function lift are:

- The site will be restored to the appropriate HGM class for its landscape position.
- All scores in the post-construction condition are greater than average (>0.50)
- The existing agricultural land use is common in the site vicinity and service area. The restored riverine wetland class is relatively rare.

4.6. Stream Functional Lift

The bank design includes restoration of Rock Creek stream banks and a tributary stream channel to Garret Creek. Restoring these features will provide increased stream function by increasing stream area and condition over existing conditions. Restoration areas are currently ecologically degraded and have the potential to improve hydrologic, water quality and habitat functions, once they are restored. Inherent in the restoration of these areas is improved stream/floodplain connectivity.

4.6.1. Garret Creek Tributary

The Garret Creek tributary enters the site via two 6-foot culverts under Gibson Road at the south end of the site and flows to Garret Creek in a straight roadside ditch. A

new tributary channel will be graded to flow north across the entire length of the southern cropland, discharging to Garret Creek via the existing southern cropland ditch outlet (the remainder of the ditch will be filled as part of wetland restoration and cropped wetland enhancement). The restored channel will be planted and seeded with native species to increase habitat value. The channel will provide increased area and complexity over existing site conditions. The existing roadside ditch will be filled to within 6 inches of the surrounding ground surface.

4.7. Bank Goals, Objectives, and Performance Standards

The bank design, construction, monitoring, and management are driven by bank goals, objectives, and performance standards. The bank goal outlines what systems and parameters will be affected by implementing bank design; bank objectives identify specific site attributes that will be altered to improve site functions and achieve bank goals; performance standards establish benchmarks for monitoring and to determine site success. Mitigation treatment areas are depicted in Figure 5.

Goal —To restore 10.68 acres of wetland and enhance 7.52 acres of cropped wetland to Riverine forested wetland class, to enhance 0.77 acres of wetland and 2.80 acres of upland riparian habitat, provide protection to the Bank by providing sediment trapping and screening through establishing or preserving vegetation, and to restore stream area within the Bank.

Objective 1—Restore wetland hydrology by disabling drain tiles, filling ditches, removing berms, disking compact soils and restoring overbank flooding to wetland areas.

Performance Standard 1.1—The southern ditch will be filled to within 6" of surrounding grade.

Performance Standard 1.2—The tile outlets to Garret and Rock Creeks will not discharge water.

Performance Standard 1.3—Wetland restoration areas will be delineated in year 4, or two full growing seasons after irrigation has ceased. Wetland data plots will be paired with upland plots where restoration areas abut uplands. Groundwater well data will be used to support these plots; approximate well locations are identified on Exhibit B.

Performance Standard 1.4 - Vegetation recorded within wetland areas during vegetation monitoring sampling will show a moisture tolerance index of 3.0 or less in years 1, 2, 3, and 5.

Objective 2—Establish native palustrine wetland forest vegetation through planting.

Performance Standard 2.1—Native woody species within wetland restoration and enhancement, and stream restoration areas will average 786 living plants per acre (a 65% survival rate) in planted areas[1] at the end of Year 1, 2, and 3.

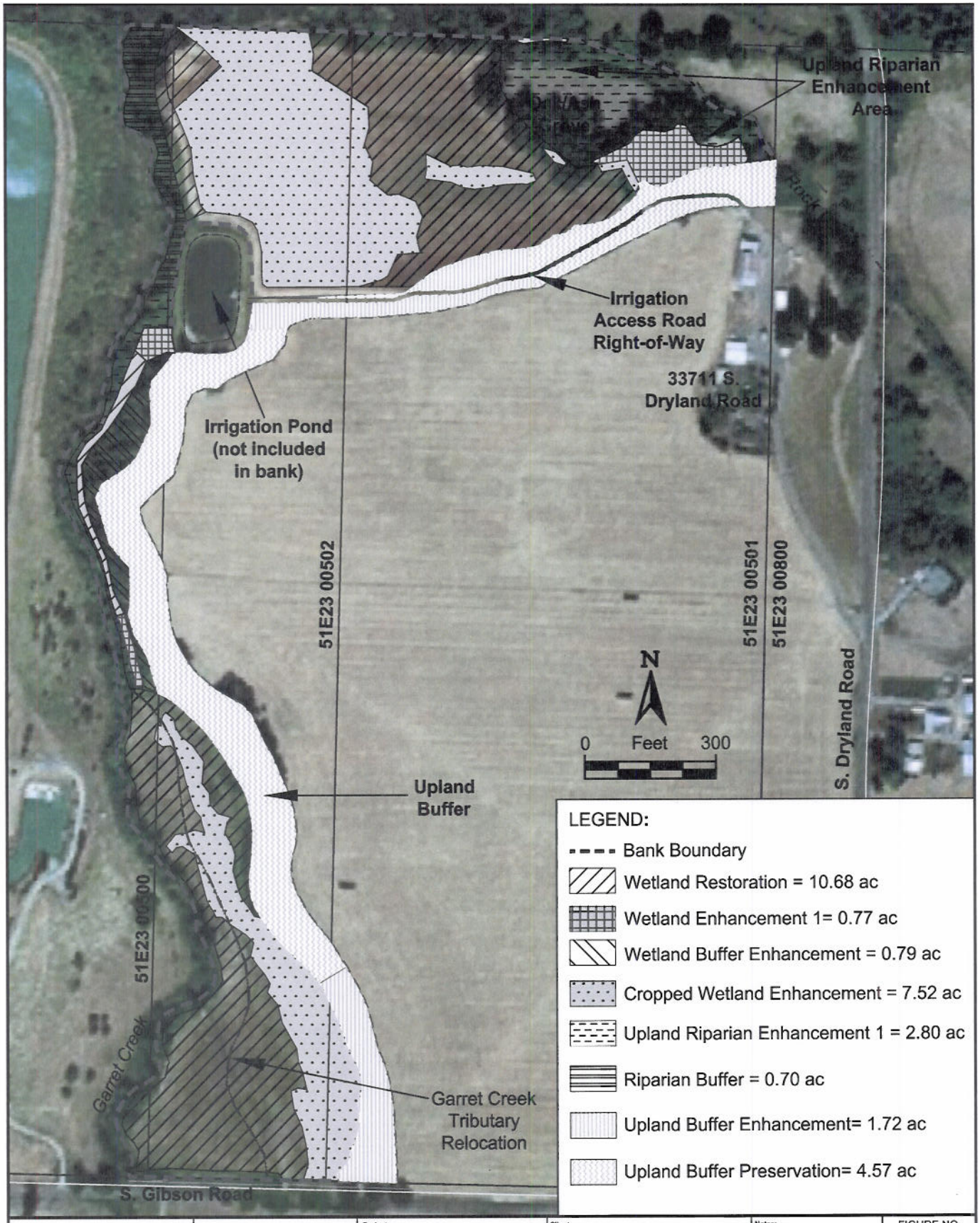
Performance Standard 2.2— Native woody species within the wetland restoration and enhancement, and stream restoration areas will have an aerial cover of 50% in Year 5.

Performance Standard 2.3—Woody plants or woody species cover will be comprised of 90% native species in years 1, 3, and 5 of monitoring.

Performance Standard 2.4 - Phalaris arundinacea, Polygonum cuspidatum, Rubus armenicanus, Craetagus laevigata, Helix hedera, Solanum dulcamara, Polygonum cuspidatum, Lythrum salicaria, and any other Oregon Department of Agriculture-listed noxious weed will collectively cover less than 30% of the combined wetland restoration, wetland enhancement, wetland buffer enhancement, cropped wetland enhancement, riparian buffer, upland riparian enhancement and upland buffer enhancement areas.

Performance Standard 2.5 - At least 4 native woody species will provide 5% or more living plants or aerial cover in each of the wetland restoration, wetland enhancement and tributary enhancement areas in years 1, 2, 3, and 5.

[1] Wetland enhancement areas east of the "informal roadway" include existing wetland forest that will be underplanted in appropriate areas. Areas not underplanted will not be included in plants density or aerial cover estimates.



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Mitigation Treatment Areas	Project: Garret Creek Wetland Mitigation Bank	Client: Elton Kemnitz	Notes: Author: Apr 10, 2008 – 12:29pm	FIGURE NO. 5 PROJECT NO. 00256.07

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Objective 3—To enhance 1.72 acres of upland buffer.

Performance Standard 3.1— The upland buffer enhancement areas will include 650 living native woody plants per acres (65% survival rate) at the end of Year 1, 2, and 3.

Performance Standard 3.2—Native woody species within the enhanced upland buffer areas will have an aerial cover of 35% in Year 5.

Performance Standard 3.3—Woody plants or woody species cover within the enhanced upland buffer areas will be comprised of 80% native species in each year of monitoring (Years 1, 2, 3, and 5).

Objective 4—Restore the Garret Creek Tributary stream channel.

Performance Standard 4.1—The restored Garret Creek tributary channel will be graded to within 6-12 feet in width and 6 -30 inches in depth, as depicted on site plan, Exhibit B.

Performance Standard 4.2 – The restored Garret Creek tributary channel will flow seasonally in years of average or greater precipitation.

Performance Standard 4.3 – The restored Garret Creek tributary channel will have less than 100 square feet of scour area in each year of monitoring from years 2-5.

Monitoring Summary

2008	*Site Construction, Grading in July/August, Planting in Fall/Winter*
2009 (Year 1)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3, 4.1, 4.2*
2010 (Year 2)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3, 4.1, 4.2, 4.3*
2011 (Year 3)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3, 4.1, 4.2, 4.3*
2012 (Year 4)	*Performance Standards1.1. 1.2. 1.3,4.1, 4.2, 4.3*
2013 (Year 5)	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.2, 2.3, 2.4, 2.5, 3.2, 3.3, 4.1, 4.2, 4.3*

4.8. Maintenance and Adaptive Management Plan

Adaptive management will be implemented when unforeseen events threaten the achievement of bank goals such as vandalism, or abnormal plant mortality. Herbivory that prevents achievement of performance standards, such as for woody cover, will also initiate adaptive management. Beaver use of the site will not require adaptive management once performance standards are met, unless beaver activity threatens infrastructure surrounding the Bank.

The bank site will undergo flooding multiple times per year as a result of site restoration and enhancement. The bank design is based on restoring pre-agricultural conditions to the extent possible, and will be a self-sustaining system. Undeveloped floodplain areas in the vicinity of the Bank show no recent signs of degradation or threats to achieving the mitigation goals of the site. As a result of regular flooding, the site will experience minor sediment deposition and isolated erosion which are considered normal floodplain functions, and will not require adaptive management.

The bank site is designed to require only limited maintenance. Plantings will be irrigated as needed during establishment (likely for about 4 years). The irrigation system will be maintained on the same schedule as those associated with the adjacent agricultural operations. Weed control will likely be the top maintenance issue and will be implemented on an as needed basis to ensure compliance with the success criteria. Any potential problems (e.g., erosion or other water quality issues) will be remedied in a timely manner by the landowner.

Plant damage from deer, beaver, nutria, or other wildlife will be addressed, as needed. Grass surrounding the plants will be mowed to reduce cover for wildlife. Individual plant protectors can't be used because surface flooding would remove them. Animals may be trapped, planting areas may be fenced, or other methods implemented dependent on the nature of the wildlife impacts.

If adaptive management is initiated, Garret Creek Mitigation Bank, LLC, will consult with the Mitigation Bank Review Team (MBRT) on how best to address the unforeseen circumstance. New performance standards, management techniques, or monitoring approaches may be implemented. Amendments to performance standards shall be subject to MBRT review and approval.

4.9. Monitoring Methods

4.9.1. Grading and Hydrology

The grading and hydrology of the bank site will be assessed visually during each monitoring visit and any problems will be documented.

- As-Built Conditions—The site will be inspected after site construction to assess as-built conditions. Graded feature limits will be recorded using GPS and spot-measured to assure the grading plan was implemented. The accuracy of the as-built conditions will be reported; some variation from the plan is expected.
- Site Development—Photographs will document physical wetland condition and plant community development. Photographs will be taken from permanent photo stations each monitoring year to facilitate consistent year-to-year comparisons.
- Soil Erosion and Sedimentation—The bank will be inspected for evidence of soil erosion and sedimentation, particularly at the bubble-up locations. Erosion or sedimentation will be reported and assessed for whether it threatens site goals.
- Wetland Hydrology—The presence of saturation and inundation will be monitored in groundwater monitoring wells in wetland restoration areas and documented annually. Wetland delineation will also verify wetland conditions in Year 4. Wetland delineation will be performed during spring in a year of near-normal precipitation pattern. Indicators of hydrology presented in the Wetland Delineation Manual—Mountains, Valleys, and Coast Regional Supplement will also be noted in monitoring reports throughout the monitoring period. Tile discharge locations will be observed to verify that tiles are no longer discharging water.
- Stream Restoration – Stream restoration will be monitored by demonstrating the designed channel was created within reasonable specifications by measuring channel width and depth. Stream flow will be photo-documented and reported in annual monitoring reports.

4.9.2. Vegetation and Wildlife

- Vegetation development—Vegetation development will be monitored using random transects to measure woody plant species survival, plants density, and aerial cover to address performance standards. Baselines will be established along the boundary of the wetland and buffer areas. Transects will be established along the baselines extending into both wetlands and upland buffers to establish sampling areas. Transects will be located every 150 feet along the baseline and oriented east-west or north-south to extend into planting areas. Transect distribution will be regular, from a random starting point. Samples will be calculated to assure that a confidence interval of 80%, with a confidence interval width of ±20% has been satisfied. Additional samples, if needed, will be randomly located between transects. Transect locations will be shifted as needed to incorporate underplanting areas to include those communities. Sampling will be performed as described in *Measuring & Monitoring Plant Populations* (Elzinga et al. 1998).
    - *Plant density* (Performance Standards 2.1, 2.3, 2.5, 3.1, 3.3) will be measured with 30 - 1m x 20m rectangular quadrats, distributed randomly along transect

lines. All woody plants will be identified to species and counted within the quadrat. The number of individual plants recorded within each quadrat will provide an estimate of plants per area. The number of plants within the samples will then be used to estimate plants per acre. This approach will be used to estimate total number of woody plants, number of each species of woody plants, and number of native plants per acre. (Elzinga et al 1998, pp 170-172).

- *Aerial cover* (Performance standards 2.2, 2.4, 2.5, 3.2, 3.3) for woody species and invasive cover will measured using line-intercept along the full transect length. The length of intercept for each sample and total length of transects will be used to calculate the aerial cover for species. (Elzinga et al 1998, pp 181)
- *Vegetation Moisture Tolerance Index* (Performance Standard 1.4) will be measured in 30 – 1 meter square quadrats located randomly within Plants Density quadrats in wetland areas. Vegetation moisture tolerance index will be calculated as described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Mountains, Valleys, and Coasts*.

- Beaver Activity—Any beaver activity will be monitored to ensure that site goals and performance standards can be achieved. Beaver activity will be described in monitoring reports.
- Wildlife Activity—Other wildlife activity will be reported qualitatively, with particular attention to state or federally listed species.

4.9.3. Monitoring Schedule

Site monitoring will begin with As-built and plant survival survey, conducted during summer of 2009. Each subsequent year, monitoring will be conducted to directly address performance standards and to qualitatively document site development. A detailed narrative summarizing the condition of the bank and all regular maintenance activities will be included in annual reports for years 1-5. Particular attention will be given to monitoring the status of the wetland species (FAC, FACW, and OBL) to insure that they are becoming stable at the levels necessary to meet the hydrophytic vegetation criteria of the 1987 Wetland Delineation Manual. Monitoring data will be provided to the MBRT prior to annual site visits to aid in site inspection. Yearly photographs will be taken from established photo points providing representative perspectives of the mitigation area. These photo points will be set, surveyed, and shown on the as-built survey. Photos from each photo point will be included in each annual report. A ledger of credits generated and sold by the Bank will be included in the monitoring reports.

The MBRT will review the bank annually each year, beginning the first year after construction is complete. This will allow time for the annual monitoring report (due

each November) to be prepared and disseminated prior to the MBRT meeting. Any remediation measures that might become necessary will be reviewed with the MBRT and will be summarized at the annual review meeting.

4.9.4. Weed Management Plan

Weeds will be controlled in restoration and enhancement areas. During site construction, weeds that are not removed by excavation will be mowed and/or sprayed with an approved herbicide. Mowed and sprayed areas will then be planted or seeded with native species capable of rapidly colonizing the site and thriving in the post-construction site conditions. Weeds will be controlled within wetland or buffer preservation if they threaten site goals or the sites ability to meet performance measures.

4.10. Bank Stewardship

The Bank will be actively managed throughout the bank monitoring period to assure performance standards are met. Site management will include weed control, replanting vegetation, or any other activities needed to achieve the performance standards in the Mitigation Bank Instrument.

During bank operation, a portion of the revenue generated by credit sales will be set aside to establish an endowment that will fund long-term bank management and protection. The endowment amount will be negotiated with the other terms of the conservation easement. After all credits are sold and monitoring requirements are met, the Bank and endowment will be transferred to an appropriate entity for perpetual stewardship. The perpetual steward will be identified during bank monitoring and agreed upon by the MBRT. Potential stewards include land trusts or other entities that can demonstrate long-term management capabilities. Some initial contacts with the Wetlands Conservancy have been made, but no agreements are in place at this time.

4.11. Itemized Project Costs

The costs for the Bank were developed based on estimated costs for construction activities in RSMeans Site Work and Landscape Cost Data (RSMeans 2007) and previous project experience; consulting cost estimates were provided by Jones & Stokes. Cost estimates for the mitigation bank are provided as Appendix F.

The Garret Creek Mitigation Bank, LLC, is the owner of most of the bank property. The portion of Bank that is not under ownership of the bank sponsor is protected by deed restriction, and will be included in the long-term conservation easement that

will be placed on the Bank when the site is released to its long-term steward. The bank property is currently valued at approximately $2,500 per acre ($74,550 total) based on its capacity as farmland. Funds necessary to assure other aspects of bank development, such as construction, maintenance, monitoring, and remedial measures will be provided by Garret Creek Mitigation Bank, LLC, or from lines of credit at Key Bank.

4.12. Accounting Procedures

The Bank will generate 15.49 wetland mitigation credits and 220 stream mitigation credits. Exhibit D outlines bank mitigation ratios and credit release schedule. Credit sales will be recorded using Exhibit G—Statement of Sale of Credit for the Garret Creek Mitigation Bank.

Chapter 5. References

Adamus, P.R. and D. Field. 2001. *Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetlands and Riparian Sites. I. Willamette Valley Ecoregion, Riverine Impounding and Slope/Flat Subclasses. Volume IA: Assessment Methods.* Oregon Department of State Lands, Salem, OR.

Burns, Scott. 2006. Morphology and Genesis of Soils Section 1 Class Notes. Portland State University unpublished class notes provided by author. Portland, OR.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service PUBL. FWS/OBS-79/31. 103 pp.

Elzinga et al. 1998. *Measuring and Monitoring Plant Populations*. Bureau of Land Management. BLM Technical Reference 1730-1.

Jones & Stokes. 2007. *Garret Creek Mitigation Bank Wetland Delineation Report.* Portland OR.

Kemnitz, Elton. Property owner. Kemnitz Farms, Molalla, OR. May 14–17, 2007. Three emails.

Natural Resource Conservation Service 2007. Web soil survey. Available: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed: April 16, 2007.

RSMeans 2007. RSMeans Site Work and Landscape Cost Data 26th Edition. RSMeans Publishers and Consultants. Kingston MA.

Soil Conservation Service. 1982. Soil Survey of Clackamas County, Oregon.

StreamNet 2007. Fish distribution data query.
Available: <http://query.streamnet.org/request.cfm?cmd=BuildQuery&NewQuery=BuildCriteria&Required=RockCreek>. Accessed: June 6, 2007.

Oregon Department of State Lands. Just the facts about compensatory mitigation for wetland impacts.
Available: <http://statelands.dsl.state.or.us/DSL/WETLAND/docs/fact6.pdf>. Accessed: August 15, 2007.

Oregon Department of Fish and Wildlife. Oregon native fish status report. Available: <http://chinook.dfw.state.or.us/fish/esa/upper-willamette/docs/Chapter%206%20Limiting%20Factors%20and%20Threats.pdf>. Accessed: December 6, 2007.

Pudding River Watershed Council. Pudding River Watershed Assessment.
Available: <http://www.wou.edu/las/natsci_math/geology/pudding/>.
Accessed: January 16, 2008.

Northwest Power and Conservation Council. 2004. *Draft Willamette Subbasin Plan*.
Available: <http://www.nwcouncil.org/fw/subbasinplanning/willamette/plan/EntirePlan.pdf>. Accessed: February 4, 2008.

Molalla, Pudding, French Prairie, North Santiam Subbasins Agricultural Water Quality Area Management Plan. Molalla, Pudding, French Prairie, North Santiam Subbasins Local Advisory Committee.
Available: <http://www.oregon.gov/ODA/NRD/docs/pdf/plans/molall_04_fnlpln.pdf>. Accessed: February 5, 2008.

Appendix A

Existing Plant List

Garret Creek Mitigation Bank
Plant List

Reference site (Dry) to north of bank-

Soils were generally 10 YR 3/2 with few, fine mottles

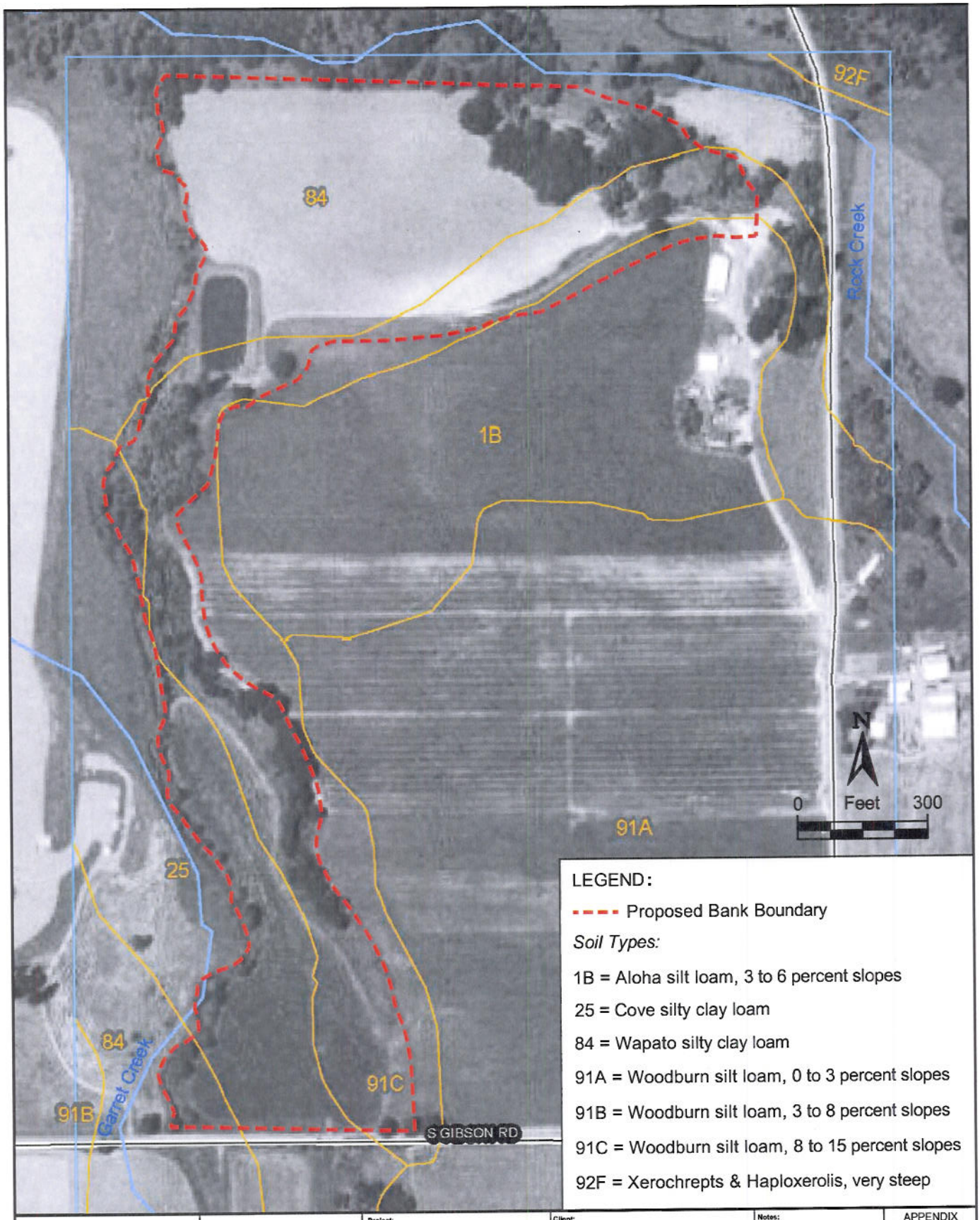
Ash, Oak overstory + Doug Fir eastern area, adjacent to our NE Rip Pasture
Malus Fusca
Symphoricarpos albus
Willow (shrub)
Rosa-pisocarpa
Rosa nutkana
Rubus ursinus
Rubus armenicanas
Oemeleria cerasiformes
Phalaris arundinacea
Juncs effusus
Dachtylus glomerata
Mahonia aquifolium
Carex spp
Festuca arundinacea
Gallium apparene
Geum sp.

On-site Forested Wetland – Reference site (Wet)
Fraxinus latifolia
Salix sitchensis
Rosa pisocarpa
Rosa nutkana
Carex Obnupta
Phalaris arundinacea
Spirea douglasii
Rubus laciniatus
Malus fusca
Symphoricarpos ablus
Rubus armenicanas

Additional on-site species
Poa palustris
Alopercurus pratensis
Holcus lanatus
Taraxacum officianale
Glyceria occidentalis
Crategus douglasii
Daucus carrota
Poa trivialis
Lonicera involucrate
Cirsium arvense
Trifolium repens
Rumex crispus
Vicia sp.
Festuca rubra
Poa annua
Plantago major
Hypocharis radicata
Capsella bursa-pastoris
Rorippa curvisiliqua
Gnaphalium paluste
Stellaria calycantha
Lolim parenne
Ranunculus repens
Lotus corniculatus
Quercus garryanna
Camassia quamash
Vicia sativa
Myosotis discolor
Gallium apparene
Agrostis stolonifera
Lamiun purpureum
Lolium multiflorum
Sonchus asper
Rumex obtusifolius
Cardimine oligosperma
Juncus bufonius
Rumex acetosella
Epilobium ciliatum
Alopercurus geniculatus

Appendix B

Soils Map



LEGEND:

Proposed Bank Boundary

Soil Types:

1B = Aloha silt loam, 3 to 6 percent slopes

25 = Cove silty clay loam

84 = Wapato silty clay loam

91A = Woodburn silt loam, 0 to 3 percent slopes

91B = Woodburn silt loam, 3 to 8 percent slopes

91C = Woodburn silt loam, 8 to 15 percent slopes

92F = Xerochrepts & Haploxerolis, very steep

Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	**Soils Map**	Project: **Garrett Creek Mitigation Bank Instrument**	Client: **Elton Kemnitz**	Notes: Author: Feb 14, 2008 – 11:58am	APPENDIX B PROJECT NO. 00256.07

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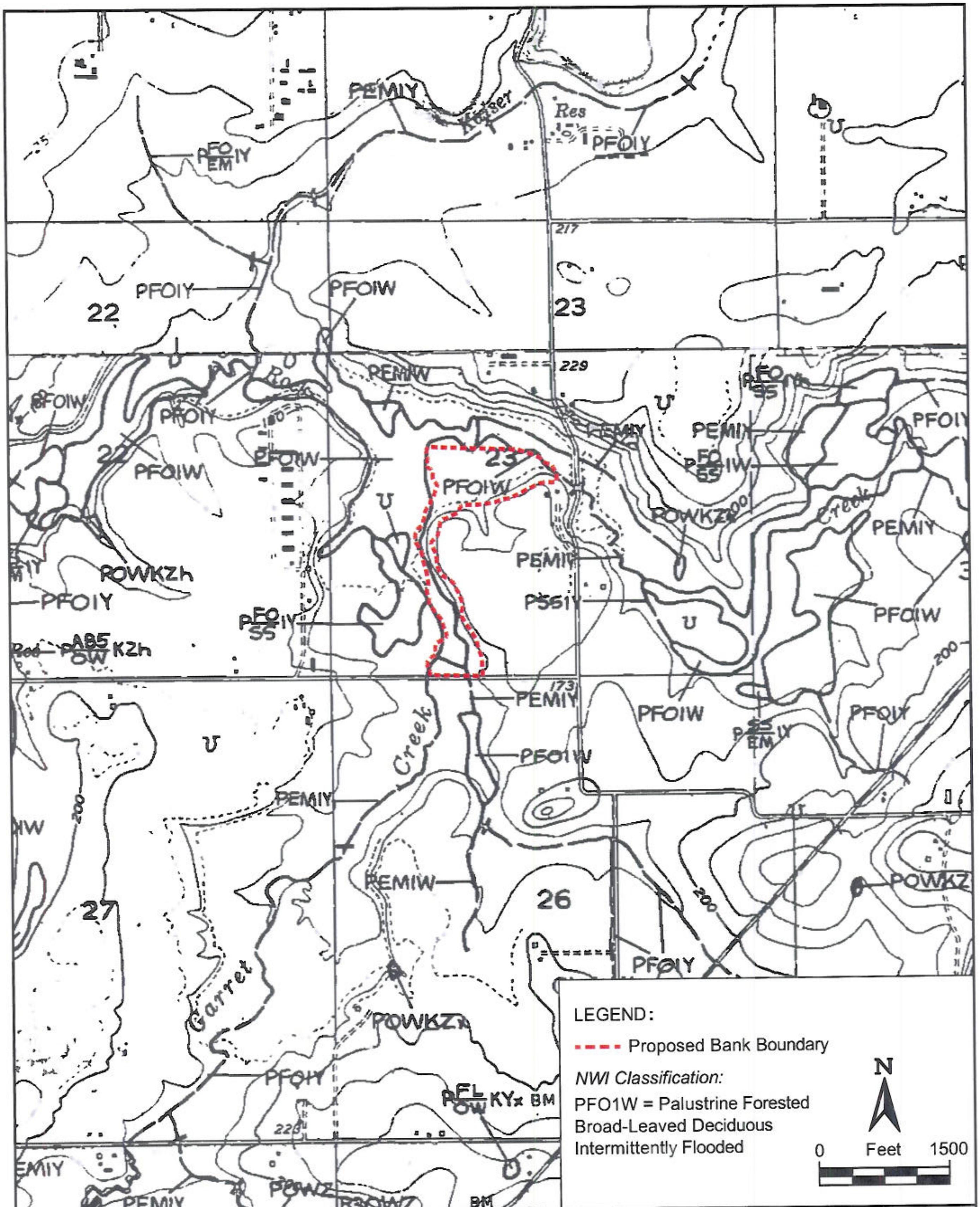
Appendix C

National Wetland Inventory Map



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	National Wetlands Inventory Map	Project: Garret Creek Mitigation Bank Instrument	Client: Elton Kemnitz	Notes: Author: Feb 14, 2008 – 12:02pm	APPENDIX C PROJECT NO. 00256.07

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Appendix D

Garret Creek Tributary Surface Hydrology Memorandum

Jones & Stokes

Technical Memorandum

Date: February 14, 2008

To: Mitigation Bank Review Team

From: David Gorman, P.E.

cc: Elton Kemnitz

Subject: Garrett Creek Mitigation Bank South Bank Surface Water Hydrology

Garrett Creek Mitigation Bank South Bank Surface Water Hydrology

Introduction and Approach

Garrett Creek generally flows along the western boundary of the proposed Garrett Creek Wetland Mitigation Bank in Clackamas County, Oregon. The southern end of the proposed bank site is within the Garrett Creek floodplain and receives surface water from a northerly flowing unnamed tributary to Garrett Creek. Surface water enters the site through three culverts under Gibson Road.

Prior to agricultural modifications to the site, surface water from the unnamed tributary is assumed to have flowed across the site in a shallow swale or channel and discharged to Garrett Creek approximately 700 feet north of Gibson Road. Grading of the site to improve agricultural conditions and the construction of a ditch along the north side of Gibson Road to convey surface water from the tributary directly to Garrett Creek have significantly modified the historical surface water interaction with the site. Prior to the modifications, very frequent flooding of the site from the tributary was likely and was a primary influence on wetland hydrology in the southwest corner of the site. The rerouting of flows into the ditch reduced or eliminated the historic winter and spring flooding of the site creating conditions that no longer supported wetland hydrology.

The restoration and enhancement design for the southern portion of the site will include minor grading modifications to construct a small channel in the vicinity of the historic channel and to partially fill the constructed ditch along Gibson road. Both modifications are expected to restore

wetland hydrology to the southwestern corner of the site. A hyrologic/hydraulic model of the drainage basin that contributes surface water to the site was prepared to aid in the design process. The purpose of the model is to determine the peak surface water flow conditions at the site under different return interval storms and to quantify the extent of flooding that is likely for the selected channel design. The HydroCad model was used complete the modeling work. It is based on the Natural Resource Conservation Service (NRCS) methodology and curve numbers.

Model Input

The drainage basin contributing surface water to the site was delineated and includes 1110 acres. The drainage basin boundary is depicted in Figure 1. Due to the scale of the USGS base mapping and topography, there is some uncertainty about whether the entire drainage basin is discharged to the site or if some portion of it drains to Garrett Creek south of Gibson Road. USGS mapping indicates that the confluence of the unnamed tributary and Garrett Creek is south of Gibson Road. However, field investigations and the Clackamas County Soil Survey (USDA Soil Conservation Service, Soil Survey of Clackamas County Area, Oregon, 1985) indicate that the tributary does drain onto the site. For the purpose of this study, it was assumed that the full drainage basin drained to the site.

Precipitation for various return interval storms was obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 2, Volume X isopluvials. The return intervals and associated precipitation for the vicinity of the site are as follows:

Table 1. Return Intervals and Associated 24-Hour Precipitation

Return Interval (Years)	Precipitation (Inches)
Water Quality	0.83
2	2.5
5	3.0
10	3.5
25	4.0
50	4.5
100	5.0

Soil types within the drainage basin were determined from the Soil Survey. The drainage basin boundary was approximated on the Soil Survey map of the area of interest to assess the predominant soil types. Most of the soil in the drainage basin consists of soils that fall into the hydrologic soil groups "C" and "D". Based on visual observations of the soil mapping, the drainage basin soils are approximately 50% hydrologic soil group "C" and 50% hydrologic soil group "D".

The time of concentration in the model was based on the following hydraulic conditions in the watershed. Hydraulic conditions are listed in order from the headwaters of the basin to the site, and are estimated from Figure 1.

Table 2. Time Of Concentration Input

Type Of Flow	Flow Distance (Feet)	Flow Slope
Sheet Flow	300	0.067
Overland Flow	1500	0.053
VEE Shaped Channel	6000	0.060
Trapezoidal Shaped Channel	7200	0.011

Land use was determined from the aerial photograph in the Soil Survey. An estimate of the acreage of each land use within each hydrologic soil group was made to determine the most representative curve number to use in the model. Land use and hydrologic soil group were used to assign a curve number based on the NRCS curve number table. Land use type, hydrologic soil group, acreage, and curve numbers used in the model are listed below in Table 3. All acreages were approximated.

Table 3. Landuse Type, Hydrologic Soil Group, Acreage, and Runoff Curve Numbers

Land Use	Hydrologic Soil Group	Acreage	Curve Number
Forested	C	111	73
Forested	D	111	79
Pasture	C	333	74
Pasture	D	333	80
Cultivated	C	111	88
Cultivated	D	111	91
Total		1110	79

A channel design for the southern portion of the site was determined based on observations of upstream channels and historical accounts from the existing landowner. The channel design was selected to reroute some of the surface water from the drainage basin that historically flowed onto the site but has been routed to Garrett Creek more directly through the ditch along the north side of Gibson Road. Hydraulic performance of the channel design was determined using the hydraulic routing capabilities of the model to assure that flooding of the land adjacent to the channel would occur during most storm events. Modeling was not conducted to design a channel that had a capacity to carry a significant portion of the runoff from the drainage basin. Channel reach lengths and slopes used in the model are presented in Table 4 below. Channel cross section

dimensions for all reaches include a VEE shaped channel with a 10-foot top width, 1-foot depth, and 5H:1V side slopes.

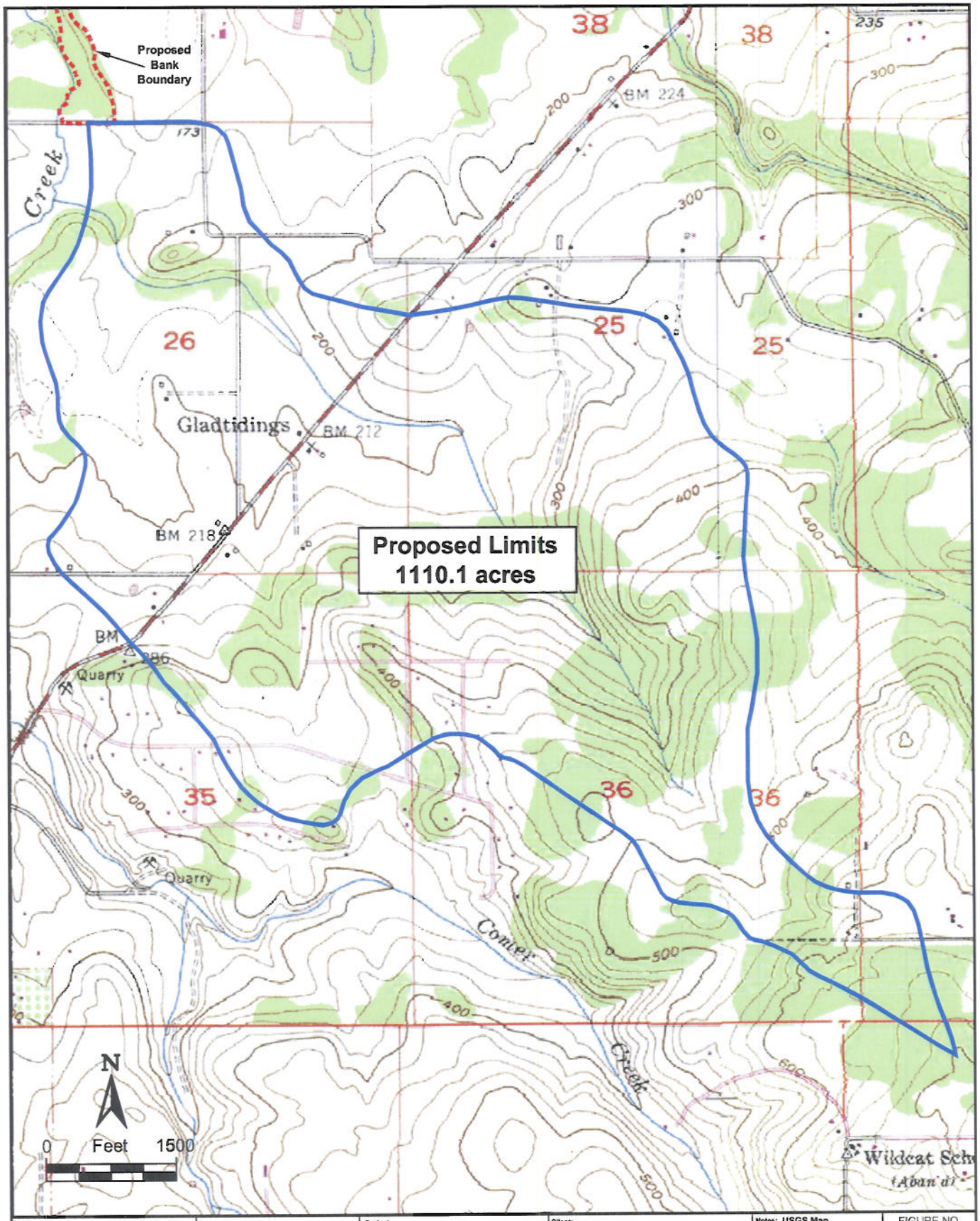
Table 4. Channel Design Parameters And Flow Capacities

Reach Number	Reach Length (Feet)	Reach Slope (Feet/Feet)	Bank-Full Capacity (CFS)
1	272.5	0.0037	4.02
2	573.5	0.0017	2.71
3	360.3	0.0028	3.49

Conclusions

Peak flows for the 2-year storm are expected to be 281 cubic feet per second. Without additional field investigation, it is uncertain what portion of the peak flow will be discharged to the proposed wetland mitigation bank site. The capacity of the culverts under Gibson Road is more than high enough to convey the peak flows from the 2-year event. Reported historic conditions of the channel downstream of the culverts and across the site indicate that there was likely insufficient hydraulic capacity to convey the full peak flows from the drainage basin. Overland flooding was likely to occur upstream and downstream from Gibson Road. Full output from the model for the 2-year 24-hour storm is included as Attachment A.

Design channel flow capacity at the bank-full condition ranges from 2.71 to 4.02 cfs. Flows above these will result in overbank flows onto the adjacent floodplain. All flows contained within the channel will join Garrett Creek at the termination of Reach 3 approximately 1200 feet downstream of the Gibson Road culverts. All flows in excess of the capacity of the channel will spill out onto the floodplain and flow overland to Garrett Creek. Due to the low hydraulic capacity of the design channel, minor rainfall events within the drainage basin are likely to cause flooding of the site and will contribute to the wetland hydrology of the southwest corner of the site. Final grading design for the southern portion of the site should include features to prevent changes to the hydrology of adjacent properties, to bypass some of the higher flows, and to control soil erosion. Grading design may be adjusted as part of the adaptive management plan.



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	Unnamed Tributary Basin Boundary	Project: Garret Creek Wetland Mitigation Bank	Client: Elton Kemnitz	Notes: USGS Map 20 Foot Contours Author: Feb 15, 2008 – 2:40pm	FIGURE NO. 1 PROJECT NO. 00256.07

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Attachment: Model Output

Table of Runoff Curve Numbers (SCS, 1986)

Description of Land Use	Hydrologic Soil Group			
	A	B	C	D
Paved parking lots, roofs, driveways	98	98	98	98
Streets and Roads:				
Paved with curbs and storm sewers	98	98	98	98
Gravel	76	85	89	91
Dirt	72	82	87	89
Cultivated (Agricultural Crop) Land*:				
Without conservation treatment (no terraces)	72	81	88	91
With conservation treatment (terraces, contours)	62	71	78	81
Pasture or Range Land:				
Poor (<50% ground cover or heavily grazed)	68	79	86	89
Good (50-75% ground cover; not heavily grazed)	39	61	74	80
Meadow (grass, no grazing, mowed for hay)	30	58	71	78
Brush (good, >75% ground cover)	30	48	65	73
Woods and Forests:				
Poor (small trees/brush destroyed by over-grazing or burning)	45	66	77	83
Fair (grazing but not burned; some brush)	36	60	73	79
Good (no grazing; brush covers ground)	30	55	70	77
Open Spaces (lawns, parks, golf courses, cemeteries, etc.):				
Fair (grass covers 50-75% of area)	49	69	79	84
Good (grass covers >75% of area)	39	61	74	80
Commercial and Business Districts (85% impervious)	89	92	94	95
Industrial Districts (72% impervious)	81	88	91	93
Residential Areas:				
1/8 Acre lots, about 65% impervious	77	85	90	92
1/4 Acre lots, about 38% impervious	61	75	83	87
1/2 Acre lots, about 25% impervious	54	70	80	85
1 Acre lots, about 20% impervious	51	68	79	84

*From Chow et al. (1988).

Appendix E

Functions Assessment Data Sheets

Assessment Summary Form

(page 1 of 2)

Site Name: Garrett Creek Mitigation Bank County: Clackamas
Assessed by: B Haddaway Date: April 10, 2008
Area of Site: Appx. 20 acres Mapped Soil Series: Cove + Wapato Silty Clay Loam
HGM subclass(es)*: Existing SF [redacted]
* if site contains multiple subclasses, estimate percent of each

Complete column 2 ("score" – Present Time) of the table below. All other columns are *optional*. Do not mathematically combine scores from different functions, or functions and values.

Functions	Function Capacity Score (standardized)				Value Score (standardized)
	Present Time		Time 2 (optional)		
	score	acres	score	acres	
Water Storage & Delay	(p.21) .40	[redacted]	[redacted]		(p. 47)
Sediment Stabilization & Phosphorus Retention	(p. 23) .42	[redacted]			(p.48)
Nitrogen Removal	(p.25) 22	[redacted]			(p.50)
Thermoregulation	(p. 26) .20	[redacted]			(p.51)
Primary Production	(p.28) .34	[redacted]			(p.52)
Resident Fish Habitat Support	(p.29) NA	[redacted]			(p.54)
Anadromous Fish Habitat Support	(p.31) 40	[redacted]			(p.54)
Invertebrate Habitat Support	(p.33) .29	[redacted]			(p.53)
Amphibian & Turtle Habitat	(p.36) .39	[redacted]			(p.55)
Breeding Waterbird Support	(p.38) .43	[redacted]			(p.55)
Wintering & Migratory Waterbird Support	(p.40) .58	[redacted]			(p.56)
Songbird Habitat Support	(p.43) .48	[redacted]			(p.57)
Support of Characteristic Vegetation	(p.46) .47	[redacted]			(p.57)

Existing Conditions

Appendix B. Assessment of Function Capacity: Judgmental Method

Complete the following "qualitative assessments" of function only if you chose not to complete the reference-based assessments" that began on page 20.

Instructions: In each row, indicate with a checkmark if your site looks more like the "highest capacity" condition or the "minimal capacity" condition. Then circle a number on the scoring line below this table, based on your overall impression of the site's capacity to support this function. Alternatively, instead of checkmarks, you can assign a score to each row by placing a number in the center column of each row, e.g., 0 (minimal capacity) -to- 1.0 (highest capacity), and then combine the row scores in a manner of your choosing, perhaps weighting some rows more than others if you believe those indicators to have greater influence on a function. Whether based on mathematical operations or another way of synthesizing, be sure to circle your final score for the function on either or both of the shaded "Judgment Lines" at the bottom. Definitions of many of the terms are provided in Appendix A.

Function Capacity (Judgmental Assessment of): Water Storage and Delay

Highest Functioning	Suggested Score:	Minimal Functioning
___ The proportion of the site that is inundated only seasonally is large. The seasonally-inundated parts are defined by flood marks on trees and shrubs, stunted plants, and/or distinctive assemblages of plant species.	0.3	___ None of the site is inundated only seasonally. The site is always comprised only of permanent water or a high water table without surface water.
___ Most of the surface water in the seasonally-inundated zone remains for a few days after each rain event, but not less or more.	0.5	___ Water added from rain events empties quickly from all of the site, via outlets or percolation. This often is evidenced by: ___ lack of flood marks on trees and shrubs ___ scarcity of wetland plants (few FAC or wetter) ___ little or no mottling of soils throughout the seasonally-inundated zone. ___ site is located on slope ___ site is flat (few or no puddles, etc.) ___ presence of outlet channels

Your Judgments:

Function Capacity score = 0.4 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Existing

Function Capacity (Judgmental Assessment of): **Sediment Stabilization and Phosphorus Retention**

Highest Functioning	Suggested Score:	Minimal Functioning
___ High score was assigned to Water Storage & Delay function (inundation is long, frequent, deep, extensive).	0.4	___ Low score was assigned to Water Storage & Delay function (water levels barely fluctuate).
___ Texture of the predominant substrate in the upper 12 inches of the seasonal zone is mostly clay, silty clay, sandy clay, clay loam, or native organic. See p. 83 for key to soil textures.	1.0	___ Upper 12 inches of the predominant substrate in the seasonal zone is mostly sand or gravel.
___ Herbs, shrubs, and/or vines together always occupy a large percent of the ground cover in the seasonal zone. Very little soil is bare.	0.3	___ All or nearly all of the substrate in the seasonal zone is unvegetated.
___ Shallow pools and puddles are present and well-interspersed with herbaceous vegetation	0.3	___ Shallow pools are absent at all times of the year
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. Extensive evidence of severe scour or erosion may be present within the site. No sediment marks on trees or other plants.
___ Most of the site has complex microtopography (hummocks, puddles, etc.)	0.1	___ The substrate is uniformly flat, with no noticeable microtopography (no hummocks, etc.)

Your Judgments:
Function Capacity score = 0.42, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of): **Nitrogen Removal**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if mottling and/or other features that indicate oxygen deficits in soils/ sediments are found in at least part of the site.		
___ High score was assigned to Water Storage & Delay function (inundation is long, frequent, extensive)	0.4	___ Low score was assigned to Water Storage & Delay function (water levels barely fluctuate)
___ Some surface water or saturation remains year-round or nearly so, and is dispersed around the site such that water flow paths and residence times are long.	0.2	___ No surface water or saturation remains year-round. If seasonal flooding occurs, the surface water is concentrated in one part of the site, e.g., channel or pond, and does not remain for long.
___ Soil microbial processes are fairly mature, as possibly suggested by abundance of dead wood, thick and extensive soil organic layer, and many large-diameter trees	0.2	___ Soil microbial processes are not well-developed, as possibly suggested by lack of dead wood, thick soil organic layer, and/or large-diameter trees

Existing

Highest Functioning	Suggested Score:	Minimal Functioning
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site. None of the site was constructed from upland.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling.
___ Most of the site has complex microtopography (hummocks, puddles, etc.)	0.1	___ Most of the site has no noticeable microtopography (no hummocks, puddles, etc.)
___ Site is burned annually or biennially	0.0	Site has not been burned in recent years

Your Judgments:
Function Capacity score = .22, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of):
Primary Production

Highest Functioning	Suggested Score:	Minimal Functioning
___ All of the site has vascular plants and/or water with algae.	0.3	___ Much of the site is devoid of vascular plants and/or algae.
___ A variety of plant forms is present in about equal proportions (trees, shrubs, and herbs) and is well-distributed throughout the site	0.2	___ Whatever plants are present are mainly of a single form (trees, shrubs, or herbs)
___ Some shallow (<3 ft) surface water remains year-round or nearly so, and in summer is dispersed around the site, e.g., many puddles	0.3	___ The site is entirely dry during much of the year.
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling. Severe erosion may be evident within the site.
___ The site's contributing watershed contains no cropland, paved surface, buildings, or lawns – especially in the parts closest to the site.	0.5	___ The site's contributing watershed is almost entirely cropland, paved surface, buildings, and lawns – especially the parts closest to the site.

Your Judgments:
Function Capacity score = 0.34, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

EXISTING

Function Capacity (Judgmental Assessment of): **Thermoregulation**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: This function should be assessed only for riverine sites at which part of the site is permanently inundated and connected by surface water during summer to other water bodies.		
___ Entire water surface in summer is shaded by a closed tree canopy or by topography.	0.2	___ None of the water is shaded by vegetation or topography, and all of the water is shallower than 2m during summer.
___ Almost the entire site consists of water deeper than 6 ft.	0.2	___ Very little of the site contains permanent water, and it never is deeper than a few inches.

Your Judgments:
Function Capacity score = 0.2, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of): **Resident Fish Habitat Support**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: This function may be assessed only if part of the site is permanently inundated and the subclass is Riverine Impounding.		
___ Permanent water is extensive, and the site is connected only briefly with associated channels	NA	___ Permanent water is very limited
___ Non-native fish species are absent	NA	___ Non-native species dominate the resident fish component, although some natives are present
___ Shallow water area and proportion of the site that is inundated only seasonally is of sufficient extent and quality to support spawning by most species, and supports high densities of aquatic invertebrates	NA	___ If present, shorelines are steep, dropping sharply into water deeper than 6 ft., with little or no seasonal zone being present
___ Cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides year-round shelter from predation is abundant	NA	___ Where water is present seasonally, cover that could shelter fish from predation is scarce or lacking.
___ Water quality (especially dissolved oxygen) is excellent	NA	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits

Your Judgments:
Function Capacity score = NA, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Existing

Function Capacity (Judgmental Assessment of): **Anadromous Fish Habitat Support**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if part of the site is accessible to anadromous fish during seasonal inundation		
___ Floodwaters spill into the site across a broad bank or through a wide (unconstricted) mouth	0.4	___ Floodwaters enter most of the site entirely through a narrow channel, ditch, or pipe.
___ Floodwaters remain in the site for more than a few days	0.2	___ No surface water remains in the site for more than a few days
___ Non-native fish species are generally absent	0.7	___ Non-native fish species predominate
___ Substrates suitable for spawning or feeding are extensively present	0.4	___ Substrates suitable for spawning or feeding are scarce or absent
___ Cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from currents and predators is abundant, at least in the seasonal zone	0.3	___ Cover that provides shelter from currents and predators is scarce or lacking from all parts of the site
___ Water quality (especially dissolved oxygen) is excellent	0.5	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
___ Summertime temperature maxima do not exceed preferred range of anadromous fish	0.3	___ Summertime temperature maxima exceed limits lethal to anadromous fish

Your Judgments:

Function Capacity score = 0.40 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Function Capacity (Judgmental Assessment of): **Invertebrate Habitat Support**

Highest Functioning	Suggested Score:	Minimal Functioning
___ Surface water is permanent or nearly permanent, AND all of the water is shallower than 2 feet during May-September*	0.2	___ Surface water is present only briefly (RI sites) or not at all (SF sites), OR nearly all of the water remains deeper than 6 ft during May-September
___ Cover (especially aquatic plants, woody debris) that supports algae and provides shelter from currents and predators is abundant in both the seasonal and permanent zone	0.2	___ Cover (aquatic plants, woody debris.) that could support algae and provide shelter from currents and predators is lacking
___ Plant forms and species are highly diverse	0.3	___ Only one plant form is present, and plant species richness is very low
___ Vegetation is well-interspersed with pools	0.0	___ Vegetation and pools (if any) are in 2 separate areas or zones
___ Water quality (especially dissolved oxygen) is excellent	0.2	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits

Existing

Highest Functioning	Suggested Score:	Minimal Functioning
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the site was entirely constructed from upland.
___ Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.	0.7	___ Surrounding landscape contains no wetlands or ponds

* Areas likely to retain water well into the growing season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
___ site is located in flatland terrain (not on slopes)
___ site is large relative to its contributing watershed (>4% of total area)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

Your Judgments:
Function Capacity score = 0.29, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of):
Amphibian & Turtle Habitat

Highest Functioning	Suggested Score:	Minimal Functioning
___ Permanent water is absent, but shallow surface water that contains extensive partly-submerged fine-stemmed herbs[1] is extensive, and recedes very gradually during the months of January – May [2] (i.e., during this period, there are at least 30 days when water levels are stable or have a vertical fluctuation of <2 inches). OR: ___ Permanent water is extensive and contains (a) abundant underwater cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from predation, and (b) partly-submerged fine-stemmed herbs[1]	0.2	___ Site never contains surface water OR ___ Site is entirely surface water, which either (a) never fluctuates vertically (i.e., no seasonal zone is present), or (b) fluctuates too much – more than 2 inches during all 10-day periods, or (c) is devoid of any emergent herbs that are partly-submerged during the springtime, or (d) flows faster than 4 inches/second during the entire springtime, everywhere in the site, or (e) is mostly deeper than 40 inches and is bordered by a shoreline with a very steep slope
___ Bullfrogs and other non-native predators are absent	0.7	___ Bullfrogs and other non-native predators are abundant
___ If surface water everywhere in the site is flowing during springtime, there are at least 30 days when current velocities are slow (<4 inches/second)	NA	___ If surface water everywhere in the site is flowing during springtime, there are never more than 30 days when current velocities are slow (<4 inches/second)
___ There is extensive and varied woody debris in the seasonal zone	0.3	___ There is no woody debris in the seasonal zone

Existing

Highest Functioning	Suggested Score:	Minimal Functioning
___ Either vegetation and pools are well-interspersed during high water level, or any woody vegetation bordering the larger pools is located mostly on their north end.[3] Microtopography is quite varied.	0.1	___ Vegetation and pools are in separate areas of the site during high water level, and any woody vegetation bordering the larger pools is located mostly on their south end. Microtopography is too flat to allow many puddles to form (no hummocks, etc.)
___ Suitable basking sites for turtles and calling sites for frogs are present	0.1	___ There are no basking sites for turtles or calling sites for frogs
___ Land cover in adjoining uplands is a mix of natural grassland and woodland; woodlands have extensive and varied woody debris	0.3	___ Land cover in adjoining uplands largely contains impervious surface, bare ground, lawns, and row crops
___ Shorelines are gently sloping	0.5	___ Shorelines, if present, are mostly steep
___ Busy roads are distant from the site	0.8	___ Busy roads adjoin the site
___ Many other wetlands (excluding flowing water) are present nearby	0.8	___ There are no other wetlands (excluding flowing water) nearby
___ Water quality is excellent	0.3	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the entire site was constructed from upland.
___ Soils and submerged sediments contain a moderately thick organic layer (leaf litter, peat, decomposed organics, etc.)	0.2	___ Soils and submerged sediments contain no organic layer, and are mostly hard-packed clay; or organic layer is so thick that water is chronically anoxic.

[1] Emergent herbs with stem diameter of <3 mm (measured 2 inches below springtime water surface); this includes nearly all perennial herbs except cattail.

[2] Areas likely to retain water well into the growing season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
___ site is located in flatland terrain (not on slopes)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

During the January-May period, 30 days of stable water levels are required for some aquatic amphibian eggs to mature, and during this time fluctuations of greater than 2 inches are lethal (Richter 1997).

[3] Vegetation located north of pools is less likely to block sunlight important to developing aquatic amphibians (Richter 1997).

Your Judgments:

Function Capacity score = 0.39 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Enriching

Function Capacity (Judgmental Assessment of):
Breeding Waterbird Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ The site contains many acres of permanent or nearly permanent surface water, or a large permanent wetland (excluding streams) is located nearby AND ___ Water depths are predominantly shallow (2 to 24 inches) in April-August*	0.6	___ Surface water is present for only a few weeks during April-June, OR ___ Nearly all of the water remains deeper than 6 ft during May-September AND ___ No permanent wetlands are located nearby.
___ Most of the shoreline is not steep	NA	___ Most of the shoreline is steep
___ Larger pools of water are bordered by a wide, dense band of tall herbs and/or shrubs in April-August.	0.1	___ Larger pools, if present, are bordered by only a narrow band of sparse vegetation
___ About equal proportions of water and vegetation are present, and are well-interspersed during the April – August period	0.2	___ Vegetation and pools (if any) are in 2 separate areas or zones, not interspersed
___ Water levels do not abruptly rise a foot or more during April-June	0.7	___ Water levels are prone to quickly rise at least 1 foot during April-June
___ A large variety of herbs is present; the site is actively managed to control the spread of non-native or invasive species	0.3	___ Vegetation cover is mostly comprised of one or a few non-native or highly invasive native species
___ Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, and water	0.4	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ Busy roads are distant from the site	0.9	___ Busy roads border the site
___ Water quality is excellent	0.3	___ Water is heavily contaminated with pollutants
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.	0.4	___ Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
___ Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.	0.8	___ Surrounding landscape contains no wetlands or ponds
___ Nest boxes, nest platforms, and other artificial structures intended to assist waterbird nesting are extensive and are regularly maintained.	0.1	___ No nest boxes, nest platforms, or other artificial structures intended to assist waterbird nesting are present, or they aren't well-maintained.
___ Part of the site is visited infrequently in April-June by humans on foot	0.2	___ None of the site is visited frequently by humans on foot during April-June

* Areas likely to retain water well into the waterbird breeding season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
___ site is located in flatland terrain (not on slopes)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

Your Judgments:

Function Capacity score = .43 , or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Exist.)

Function Capacity (Judgmental Assessment of):
Wintering & Migratory Waterbird Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ The site contains extensive surface water during all or most of the fall-winter-spring period	0.4	___ The site contains very little surface water during all or most of the fall-winter-spring period
___ Water depths in most of the site during most of the fall-winter-spring period are shallow (<24 inches)	0.8	___ If forested, water depths during the fall-winter-spring period are always shallower than 24 inches in all of the site (shallower depths are permissible then in unforested wetlands).
___ A large portion of the site is inundated only seasonally	0.6	___ Of the water that is present, nearly all is present year-round.
___ The acreage of various depth categories is about equal during peak annual inundation	0.6	___ A single water depth category predominates.
___ Microtopographic variation (hummocks, puddles, etc.) is extensive	0.4	___ The substrate is very flat, essentially prohibiting the formation of puddles.
___ None of the site is visited frequently by humans on foot during September-April.	0.5	___ Water is heavily contaminated with pollutants
___ A large variety of herbs is present. The site is actively managed to control the spread of non-native or invasive species	0.5	___ Vegetation cover (except in farmed wetlands) is mostly comprised of one or a few non-native or highly invasive native species
___ Water quality is excellent	0.6	___ Virtually all of the site is visited frequently by humans on foot during April-June
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.	0.4	___ Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
___ Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, agricultural lands, and water	0.6	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ Surrounding landscape contains large acreage of hydric soil, wetlands, and water, including some with a different water regime than the assessed site.	0.8	___ Surrounding landscape contains no wetlands, ponds, or hydric soil.

Your Judgments:

Function Capacity score = 0.58 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Exists

Function Capacity (Judgmental Assessment of):
Songbird Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ Some part of the site contains surface water during all (or nearly all) of the year.	0.4	___ Surface water is never present at any time of the year.
___ The site contains a large acreage of closed-canopy forest, native shrubland, wet prairie, and/or emergent wetland.	0.3	___ Acreage of these is very small.
___ If the site is mostly native shrubland and/or forest, then (a) large-diameter trees are numerous, (b) snags of various sizes are abundant, (c) under-canopy shrub cover is extensive, and (d) a large variety of trees, shrubs and vines is present.	NA	___ If the site is mostly shrubland and/or forest, then (a) trees are very small, (b) snags are absent, (c) under-canopy shrub cover is lacking, and (d) the variety of trees, shrubs, and vines is small, and comprised almost entirely of non-native species.
___ If the site is mostly wet prairie and/or emergent wetland, then (a) a large variety of herbs is present, (b) the site is actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are concentrated in one or a few parts of the site.	0.3	___ If the site is mostly prairie and/or emergent wetland, then (a) the variety of herbs is small, (b) the site is not actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are scattered widely throughout the site.
___ Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water	0.5	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ None of the site is visited frequently by humans on foot	0.5	___ Every part of the site is visited frequently by humans on foot
___ Busy roads are distant from the site	0.9	___ Busy roads adjoin the site.

Your Judgments:
Function Capacity score = 0.48 , or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of):
Support of Characteristic Vegetation

Highest Functioning	Suggested Score:	Minimal Functioning
___ Trees, shrubs, and herbs are all present, and are well-interspersed throughout the site	0.4	___ Only one plant form (tree, shrub, herb) is present
___ If trees are present, many are very old and large, with abundant evidence of regeneration	0.6	___ If trees are present, all are young
___ If shrubs are present, all of the significantly present shrub species are natives	0.5	___ If shrubs are present, they are comprised of just one species, and it is non-native
___ If herbs are present, all of the significantly present herb species are natives	0.3	___ If herbs are present, they are comprised of just one species, and it is non-native
___ Microtopographic relief is great (hummocks, puddles, etc.)	0.3	___ The substrate is very flat, essentially prohibiting the formation of puddles.
___ Springtime surface water levels drop very slowly (< 2 vertical inches per 30 days, average)	0.3	___ Springtime water levels fluctuate or drop rapidly (>2 inches per 10 days, average)

- low cover by shrubs

Existing

Highest Functioning	Suggested Score:	Minimal Functioning
___ None of the site is visited frequently by humans on foot	0.5	___ Every part of the site is visited frequently by humans on foot
___ Busy roads are distant from the site	0.8	___ Busy roads adjoin the site.
___ Land cover in the contributing watershed is predominantly "natural"	0.6	___ Land cover in the contributing watershed largely contains impervious surface, bare ground, lawns, and row crops.
___ Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water	0.4	___ Land cover in surrounding buffer largely contains impervious surface, bare ground, lawns, and row crops.

Your Judgments:
Function Capacity score = 0.47, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Now, summarize your function capacity assessments by recording them on the Assessment Summary Form (p. 59). Be sure to indicate that you used the Judgmental Method.

Post 5-Year Estimate

Assessment Summary Form

(page 1 of 2)

Site Name: Garrett Cr. Mitigation Bank County: Clackamas
Assessed by: B. Hollowell Date: 4-10-08
Area of Site: Approx 20 acres Mapped Soil Series: Cove + Delena
HGM subclass(es)*: Rose Construction - Riverine Flowthrough
* if site contains multiple subclasses, estimate percent of each

Complete column 2 ("score" – Present Time) of the table below. All other columns are *optional*. Do not mathematically combine scores from different functions, or functions and values.

Functions	Function Capacity Score (standardized)				Value Score (standardized)
	Present Time		Time 2 (optional)		
	score	acres	score	acres	
Water Storage & Delay	(p.21)	[redacted]		0.85	(p. 47)
Sediment Stabilization & Phosphorus Retention	(p. 23)	[redacted]		0.76	(p.48)
Nitrogen Removal	(p.25)	[redacted]		0.53	(p.50)
Thermoregulation	(p. 26)	[redacted]		0.65	(p.51)
Primary Production	(p.28)	[redacted]		0.70	(p.52)
Resident Fish Habitat Support	(p.29)	[redacted]		NA	(p.54)
Anadromous Fish Habitat Support	(p.31)	[redacted]		0.64	(p.54)
Invertebrate Habitat Support	(p.33)	[redacted]		0.60	(p.53)
Amphibian & Turtle Habitat	(p.36)	[redacted]		0.66	(p.55)
Breeding Waterbird Support	(p.38)	[redacted]		0.64	(p.55)
Wintering & Migratory Waterbird Support	(p.40)	[redacted]		0.75	(p.56)
Songbird Habitat Support	(p.43)	[redacted]		0.80	(p.57)
Support of Characteristic Vegetation	(p.46)	[redacted]		0.77	(p.57)

Post 5-year est

Appendix B. Assessment of Function Capacity: Judgmental Method

Complete the following "qualitative assessments" of function only if you chose not to complete the reference-based assessments" that began on page 20.

Instructions: In each row, indicate with a checkmark if your site looks more like the "highest capacity" condition or the "minimal capacity" condition. Then circle a number on the scoring line below this table, based on your overall impression of the site's capacity to support this function. Alternatively, instead of checkmarks, you can assign a score to each row by placing a number in the center column of each row, e.g., 0 (minimal capacity) -to- 1.0 (highest capacity), and then combine the row scores in a manner of your choosing, perhaps weighting some rows more than others if you believe those indicators to have greater influence on a function. Whether based on mathematical operations or another way of synthesizing, be sure to circle your final score for the function on either or both of the shaded "Judgment Lines" at the bottom. Definitions of many of the terms are provided in Appendix A.

Function Capacity (Judgmental Assessment of): Water Storage and Delay

Highest Functioning	Suggested Score:	Minimal Functioning
___ The proportion of the site that is inundated only seasonally is large. The seasonally-inundated parts are defined by flood marks on trees and shrubs, stunted plants, and/or distinctive assemblages of plant species.	0.9	___ None of the site is inundated only seasonally. The site is always comprised only of permanent water or a high water table without surface water.
___ Most of the surface water in the seasonally-inundated zone remains for a few days after each rain event, but not less or more.	0.8	___ Water added from rain events empties quickly from all of the site, via outlets or percolation. This often is evidenced by: ___ lack of flood marks on trees and shrubs ___ scarcity of wetland plants (few FAC or wetter) ___ little or no mottling of soils throughout the seasonally-inundated zone. ___ site is located on slope ___ site is flat (few or no puddles, etc.) ___ presence of outlet channels

Your Judgments:

Function Capacity score = 0.85, or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Post 5-year est.

Function Capacity (Judgmental Assessment of): **Sediment Stabilization and Phosphorus Retention**

Highest Functioning	Suggested Score:	Minimal Functioning
___ High score was assigned to Water Storage & Delay function (inundation is long, frequent, deep, extensive).	0.85	___ Low score was assigned to Water Storage & Delay function (water levels barely fluctuate).
___ Texture of the predominant substrate in the upper 12 inches of the seasonal zone is mostly clay, silty clay, sandy clay, clay loam, or native organic. See p. 83 for key to soil textures.	1.0	___ Upper 12 inches of the predominant substrate in the seasonal zone is mostly sand or gravel.
___ Herbs, shrubs, and/or vines together always occupy a large percent of the ground cover in the seasonal zone. Very little soil is bare.	1.0	___ All or nearly all of the substrate in the seasonal zone is unvegetated.
___ Shallow pools and puddles are present and well-interspersed with herbaceous vegetation	0.8	___ Shallow pools are absent at all times of the year
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, plowing, disking, leveling. Extensive evidence of severe scour or erosion may be present within the site. No sediment marks on trees or other plants.
___ Most of the site has complex microtopography (hummocks, puddles, etc.)	0.5	___ The substrate is uniformly flat, with no noticeable microtopography (no hummocks, etc.)

Your Judgments:
Function Capacity score = 0.76, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of): **Nitrogen Removal**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if mottling and/or other features that indicate oxygen deficits in soils/ sediments are found in at least part of the site.		
___ High score was assigned to Water Storage & Delay function (inundation is long, frequent, extensive)	0.85	___ Low score was assigned to Water Storage & Delay function (water levels barely fluctuate)
___ Some surface water or saturation remains year-round or nearly so, and is dispersed around the site such that water flow paths and residence times are long.	0.8	___ No surface water or saturation remains year-round. If seasonal flooding occurs, the surface water is concentrated in one part of the site, e.g., channel or pond, and does not remain for long.
___ Soil microbial processes are fairly mature, as possibly suggested by abundance of dead wood, thick and extensive soil organic layer, and many large-diameter trees	0.6	___ Soil microbial processes are not well-developed, as possibly suggested by lack of dead wood, thick soil organic layer, and/or large-diameter trees

Post 5-year est.

Highest Functioning	Suggested Score:	Minimal Functioning
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site. None of the site was constructed from upland.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling.
___ Most of the site has complex microtopography (hummocks, puddles, etc.)	0.5	___ Most of the site has no noticeable microtopography (no hummocks, puddles, etc.)
___ Site is burned annually or biennially	0.0	___ Site has not been burned in recent years

Your Judgments:

Function Capacity score = .53 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Function Capacity (Judgmental Assessment of):
Primary Production

Highest Functioning	Suggested Score:	Minimal Functioning
___ All of the site has vascular plants and/or water with algae.	1.0	___ Much of the site is devoid of vascular plants and/or algae.
___ A variety of plant forms is present in about equal proportions (trees, shrubs, and herbs) and is well-distributed throughout the site	1.0	___ Whatever plants are present are mainly of a single form (trees, shrubs, or herbs)
___ Some shallow (<3 ft) surface water remains year-round or nearly so, and in summer is dispersed around the site, e.g., many puddles	0.6	___ The site is entirely dry during much of the year.
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling. Severe erosion may be evident within the site.
___ The site's contributing watershed contains no cropland, paved surface, buildings, or lawns – especially in the parts closest to the site.	0.5	___ The site's contributing watershed is almost entirely cropland, paved surface, buildings, and lawns – especially the parts closest to the site.

Your Judgments:

Function Capacity score = 0.7 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Post 5-year est

Function Capacity (Judgmental Assessment of): Thermoregulation

Highest Functioning	Suggested Score:	Minimal Functioning
Note: This function should be assessed only for riverine sites at which part of the site is permanently inundated and connected by surface water during summer to other water bodies.		
___ Entire water surface in summer is shaded by a closed tree canopy or by topography.	0.9	___ None of the water is shaded by vegetation or topography, and all of the water is shallower than 2m during summer.
___ Almost the entire site consists of water deeper than 6 ft.	0.4	___ Very little of the site contains permanent water, and it never is deeper than a few inches.

Your Judgments:
Function Capacity score = 0.65, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Function Capacity (Judgmental Assessment of): Resident Fish Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
Note: This function may be assessed only if part of the site is permanently inundated and the subclass is Riverine Impounding.		
___ Permanent water is extensive, and the site is connected only briefly with associated channels	NA	___ Permanent water is very limited
___ Non-native fish species are absent	NA	___ Non-native species dominate the resident fish component, although some natives are present
___ Shallow water area and proportion of the site that is inundated only seasonally is of sufficient extent and quality to support spawning by most species, and supports high densities of aquatic invertebrates	NA	___ If present, shorelines are steep, dropping sharply into water deeper than 6 ft., with little or no seasonal zone being present
___ Cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides year-round shelter from predation is abundant	NA	___ Where water is present seasonally, cover that could shelter fish from predation is scarce or lacking.
___ Water quality (especially dissolved oxygen) is excellent	NA	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits

Your Judgments:
Function Capacity score = NA, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Post 5-year est.

Function Capacity (Judgmental Assessment of): **Anadromous Fish Habitat Support**

Highest Functioning	Suggested Score:	Minimal Functioning
Note: Proceed with assessing this function only if part of the site is accessible to anadromous fish during seasonal inundation		
___ Floodwaters spill into the site across a broad bank or through a wide (unconstricted) mouth	0.9	___ Floodwaters enter most of the site entirely through a narrow channel, ditch, or pipe.
___ Floodwaters remain in the site for more than a few days	0.7	___ No surface water remains in the site for more than a few days
___ Non-native fish species are generally absent	0.7	___ Non-native fish species predominate
___ Substrates suitable for spawning or feeding are extensively present	0.7	___ Substrates suitable for spawning or feeding are scarce or absent
___ Cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from currents and predators is abundant, at least in the seasonal zone	0.7	___ Cover that provides shelter from currents and predators is scarce or lacking from all parts of the site
___ Water quality (especially dissolved oxygen) is excellent	0.5	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
___ Summertime temperature maxima do not exceed preferred range of anadromous fish	0.3	___ Summertime temperature maxima exceed limits lethal to anadromous fish

Your Judgments:

Function Capacity score = 0.64, or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Function Capacity (Judgmental Assessment of): **Invertebrate Habitat Support**

Highest Functioning	Suggested Score:	Minimal Functioning
___ Surface water is permanent or nearly permanent, AND all of the water is shallower than 2 feet during May-September*	0.4	___ Surface water is present only briefly (RI sites) or not at all (SF sites), OR nearly all of the water remains deeper than 6 ft during May-September
___ Cover (especially aquatic plants, woody debris) that supports algae and provides shelter from currents and predators is abundant in both the seasonal and permanent zone	0.7	___ Cover (aquatic plants, woody debris.) that could support algae and provide shelter from currents and predators is lacking
___ Plant forms and species are highly diverse	0.8	___ Only one plant form is present, and plant species richness is very low
___ Vegetation is well-interspersed with pools	0.7	___ Vegetation and pools (if any) are in 2 separate areas or zones
___ Water quality (especially dissolved oxygen) is excellent	0.5	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits

Post 5-year est.

Highest Functioning	Suggested Score:	Minimal Functioning
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.4	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the site was entirely constructed from upland.
___ Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.	0.7	___ Surrounding landscape contains no wetlands or ponds

* Areas likely to retain water well into the growing season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
___ site is located in flatland terrain (not on slopes)
___ site is large relative to its contributing watershed (>4% of total area)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

Your Judgments:

Function Capacity score = 0.6 , or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Function Capacity (Judgmental Assessment of):
Amphibian & Turtle Habitat

Highest Functioning	Suggested Score:	Minimal Functioning
___ Permanent water is absent, but shallow surface water that contains extensive partly-submerged fine-stemmed herbs[1] is extensive, and recedes very gradually during the months of January – May [2] (i.e., during this period, there are at least 30 days when water levels are stable or have a vertical fluctuation of <2 inches). OR: ___ Permanent water is extensive and contains (a) abundant underwater cover (aquatic plants, logs, boulders, overhanging trees, deep water spots, etc.) that provides shelter from predation, and (b) partly-submerged fine-stemmed herbs[1]	0.8	___ Site never contains surface water OR ___ Site is entirely surface water, which either (a) never fluctuates vertically (i.e., no seasonal zone is present), or (b) fluctuates too much – more than 2 inches during all 10-day periods, or (c) is devoid of any emergent herbs that are partly-submerged during the springtime, or (d) flows faster than 4 inches/second during the entire springtime, everywhere in the site, or (e) is mostly deeper than 40 inches and is bordered by a shoreline with a very steep slope
___ Bullfrogs and other non-native predators are absent	0.7	___ Bullfrogs and other non-native predators are abundant
___ If surface water everywhere in the site is flowing during springtime, there are at least 30 days when current velocities are slow (<4 inches/second)	NA	___ If surface water everywhere in the site is flowing during springtime, there are never more than 30 days when current velocities are slow (<4 inches/second)
___ There is extensive and varied woody debris in the seasonal zone	0.7	___ There is no woody debris in the seasonal zone

Post 5-year est.

Highest Functioning	Suggested Score:	Minimal Functioning
___ Either vegetation and pools are well-interspersed during high water level, or any woody vegetation bordering the larger pools is located mostly on their north end.[3] Microtopography is quite varied.	0.7	___ Vegetation and pools are in separate areas of the site during high water level, and any woody vegetation bordering the larger pools is located mostly on their south end. Microtopography is too flat to allow many puddles to form (no hummocks, etc.)
___ Suitable basking sites for turtles and calling sites for frogs are present	0.4	___ There are no basking sites for turtles or calling sites for frogs
___ Land cover in adjoining uplands is a mix of natural grassland and woodland; woodlands have extensive and varied woody debris	0.6	___ Land cover in adjoining uplands largely contains impervious surface, bare ground, lawns, and row crops
___ Shorelines are gently sloping	0.5	___ Shorelines, if present, are mostly steep
___ Busy roads are distant from the site	0.8	___ Busy roads adjoin the site
___ Many other wetlands (excluding flowing water) are present nearby	0.8	___ There are no other wetlands (excluding flowing water) nearby
___ Water quality is excellent	0.5	___ Water is heavily contaminated with pollutants, and/or experiences severe and prolonged oxygen deficits
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling. No evidence of severe erosion within the site.	0.5	___ Substrates throughout the entire site have recently been recontoured or otherwise subjected to compaction, excavation, or leveling, or the entire site was constructed from upland.
___ Soils and submerged sediments contain a moderately thick organic layer (leaf litter, peat, decomposed organics, etc.)	0.7	___ Soils and submerged sediments contain no organic layer, and are mostly hard-packed clay; or organic layer is so thick that water is chronically anoxic.

[1] Emergent herbs with stem diameter of <3 mm (measured 2 inches below springtime water surface); this includes nearly all perennial herbs except cattail.

[2] Areas likely to retain water well into the growing season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone.
___ site is located in flatland terrain (not on slopes)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

During the January-May period, 30 days of stable water levels are required for some aquatic amphibian eggs to mature, and during this time fluctuations of greater than 2 inches are lethal (Richter 1997).

[3] Vegetation located north of pools is less likely to block sunlight important to developing aquatic amphibians (Richter 1997).

Your Judgments:

Function Capacity score = 0.66, or circle one of the following:

1.0 .8 .6 .4 .2 0

Highest Lowest

Post 5-year est.

Function Capacity (Judgmental Assessment of):
Breeding Waterbird Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ The site contains many acres of permanent or nearly permanent surface water, or a large permanent wetland (excluding streams) is located nearby AND ___ Water depths are predominantly shallow (2 to 24 inches) in April-August*	0.8	___ Surface water is present for only a few weeks during April-June, OR ___ Nearly all of the water remains deeper than 6 ft during May-September AND ___ No permanent wetlands are located nearby.
___ Most of the shoreline is not steep	NA	___ Most of the shoreline is steep
___ Larger pools of water are bordered by a wide, dense band of tall herbs and/or shrubs in April-August.	0.5	___ Larger pools, if present, are bordered by only a narrow band of sparse vegetation
___ About equal proportions of water and vegetation are present, and are well-interspersed during the April – August period	0.3	___ Vegetation and pools (if any) are in 2 separate areas or zones, not interspersed
___ Water levels do not abruptly rise a foot or more during April-June	0.7	___ Water levels are prone to quickly rise at least 1 foot during April-June
___ A large variety of herbs is present; the site is actively managed to control the spread of non-native or invasive species	0.8	___ Vegetation cover is mostly comprised of one or a few non-native or highly invasive native species
___ Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, and water	0.8	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ Busy roads are distant from the site	0.9	___ Busy roads border the site
___ Water quality is excellent	0.5	___ Water is heavily contaminated with pollutants
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.	0.4	___ Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
___ Surrounding landscape contains large acreage of wetlands, including some with a different water regime than the assessed site.	0.8	___ Surrounding landscape contains no wetlands or ponds
___ Nest boxes, nest platforms, and other artificial structures intended to assist waterbird nesting are extensive and are regularly maintained.	0.3	___ No nest boxes, nest platforms, or other artificial structures intended to assist waterbird nesting are present, or they aren't well-maintained.
___ Part of the site is visited infrequently in April-June by humans on foot	0.9	___ None of the site is visited frequently by humans on foot during April-June

* Areas likely to retain water well into the waterbird breeding season may have many of these characteristics:

___ prevalence of wetland plants (FAC or wetter, and especially OBL)
___ intensive mottling & gleying of soils throughout most of the seasonally-inundated zone
___ site is located in flatland terrain (not on slopes)
___ extensive microtopographic variation (many hummocks, puddles, etc.)
___ absence of outlet channels, and/or site is managed for water storage.

Your Judgments:

Function Capacity score = .64 , or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Post 5-year est.

Function Capacity (Judgmental Assessment of):
Wintering & Migratory Waterbird Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ The site contains extensive surface water during all or most of the fall-winter-spring period	0.7	___ The site contains very little surface water during all or most of the fall-winter-spring period
___ Water depths in most of the site during most of the fall-winter-spring period are shallow (<24 inches)	0.9	___ If forested, water depths during the fall-winter-spring period are always shallower than 24 inches in all of the site (shallower depths are permissible then in unforested wetlands).
___ A large portion of the site is inundated only seasonally	0.9	___ Of the water that is present, nearly all is present year-round.
___ The acreage of various depth categories is about equal during peak annual inundation	0.7	___ A single water depth category predominates.
___ Microtopographic variation (hummocks, puddles, etc.) is extensive	0.6	___ The substrate is very flat, essentially prohibiting the formation of puddles.
___ None of the site is visited frequently by humans on foot during September-April.	0.9	___ Water is heavily contaminated with pollutants
___ A large variety of herbs is present. The site is actively managed to control the spread of non-native or invasive species	0.8	___ Vegetation cover (except in farmed wetlands) is mostly comprised of one or a few non-native or highly invasive native species
___ Water quality is excellent	0.6	___ Virtually all of the site is visited frequently by humans on foot during April-June
___ Substrates have never been recontoured or otherwise subjected to compaction, excavation, or leveling.	0.4	___ Substrates have recently been recontoured or otherwise subjected to compaction, excavation, or leveling (unless such activities were done in connection with restoring a site to its historical condition)
___ Land cover in surrounding buffer zones is mainly a mix of natural grassland, woodland, agricultural lands, and water	0.8	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ Surrounding landscape contains large acreage of hydric soil, wetlands, and water, including some with a different water regime than the assessed site.	0.8	___ Surrounding landscape contains no wetlands, ponds, or hydric soil.

Your Judgments:
Function Capacity score = .74, or circle one of the following:

1.0	.8	.6	.4	.2	0
Highest					Lowest

Post 5-year est.

Function Capacity (Judgmental Assessment of):
Songbird Habitat Support

Highest Functioning	Suggested Score:	Minimal Functioning
___ Some part of the site contains surface water during all (or nearly all) of the year.	0.9	___ Surface water is never present at any time of the year.
___ The site contains a large acreage of closed-canopy forest, native shrubland, wet prairie, and/or emergent wetland.	0.9	___ Acreage of these is very small.
___ If the site is mostly native shrubland and/or forest, then (a) large-diameter trees are numerous, (b) snags of various sizes are abundant, (c) under-canopy shrub cover is extensive, and (d) a large variety of trees, shrubs and vines is present.	0.7	___ If the site is mostly shrubland and/or forest, then (a) trees are very small, (b) snags are absent, (c) under-canopy shrub cover is lacking, and (d) the variety of trees, shrubs, and vines is small, and comprised almost entirely of non-native species.
___ If the site is mostly wet prairie and/or emergent wetland, then (a) a large variety of herbs is present, (b) the site is actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are concentrated in one or a few parts of the site.	NA	___ If the site is mostly prairie and/or emergent wetland, then (a) the variety of herbs is small, (b) the site is not actively managed to control the spread of non-native or invasive herb species, (c) trees and shrubs, if present, are scattered widely throughout the site.
___ Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water	0.8	___ Land cover in surrounding buffer zones largely contains impervious surface, bare ground, lawns, and row crops.
___ None of the site is visited frequently by humans on foot	0.8	___ Every part of the site is visited frequently by humans on foot
___ Busy roads are distant from the site	0.9	___ Busy roads adjoin the site.

Your Judgments:
Function Capacity score = 0.8 , or circle one of the following:

1.0	.8	.6	.4	.2	0
Highest					Lowest

Function Capacity (Judgmental Assessment of):
Support of Characteristic Vegetation

Highest Functioning	Suggested Score:	Minimal Functioning
___ Trees, shrubs, and herbs are all present, and are well-interspersed throughout the site	1.0	___ Only one plant form (tree, shrub, herb) is present
___ If trees are present, many are very old and large, with abundant evidence of regeneration	0.7	___ If trees are present, all are young
___ If shrubs are present, all of the significantly present shrub species are natives	0.8	___ If shrubs are present, they are comprised of just one species, and it is non-native
___ If herbs are present, all of the significantly present herb species are natives	0.7	___ If herbs are present, they are comprised of just one species, and it is non-native
___ Microtopographic relief is great (hummocks, puddles, etc.)	0.6	___ The substrate is very flat, essentially prohibiting the formation of puddles.
___ Springtime surface water levels drop very slowly (< 2 vertical inches per 30 days, average)	0.8	___ Springtime water levels fluctuate or drop rapidly (>2 inches per 10 days, average)

Post 5-year Est.

Highest Functioning	Suggested Score:	Minimal Functioning
___ None of the site is visited frequently by humans on foot	0.8	___ Every part of the site is visited frequently by humans on foot
___ Busy roads are distant from the site	0.8	___ Busy roads adjoin the site.
___ Land cover in the contributing watershed is predominantly "natural"	0.7	___ Land cover in the contributing watershed largely contains impervious surface, bare ground, lawns, and row crops.
___ Land cover in surrounding buffer zones is predominantly a mix of natural grassland, native shrubland, woodland, wetlands, and water	0.8	___ Land cover in surrounding buffer largely contains impervious surface, bare ground, lawns, and row crops.

Your Judgments:
Function Capacity score = 0.77, or circle one of the following:

1.0 .8 .6 .4 .2 0
Highest Lowest

Now, summarize your function capacity assessments by recording them on the Assessment Summary Form (p. 59). Be sure to indicate that you used the Judgmental Method.

Appendix F

Project Cost Estimate

Exhibit D

Credit Schedule

10/21/08

Amended Exhibit D

Upon signature of the MBI, wetland and stream credits will be available for sale to public or private permit applicants. Credits will be released at the discretion of the Corps and DSL, for projects requiring compensatory mitigation throughout the service area.

The Bank will be capable of generating 15.49 wetland mitigation credits and 220 stream credits. The wetland credits are based on impacts to wetlands on an acreage basis, whereas the stream credits are based on cubic yards of fill (1 credit = 1 cubic yard of fill). Tables 1 and 2 outline credit accrual for the Garret Creek Mitigation Bank.

Table 1. Wetland Mitigation Credit

Mitigation Area	Area (Acres)	Activities	Mitigation Ratio	Credits
Wetland Restoration*	10.68	Disable tile, fill ditches, planting	1:1	10.680
Cropped wetland enhancement *	7.520	Disable tile, fill ditches, planting/weed control	2:1	3.760
Wetland Enhancement	0.77	Disable tile, rip compacted soils, planting/weed control	3:1	0.257
Upland Riparian Enhancement**	2.80	Planting/weed control	6:1	0.467
Upland and Wetland Buffer Enhancement	2.51	Planting/Weed control	10:1	0.251
Riparian buffer	0.70	Weed control	10:1	0.070
Upland Buffer Preservation	4.57	Protection	NA	
Garret and Rock Creeks	0.270	Protection	NA	
	29.82			15.49

*The Garret Creek Tributary will be vegetated and therefore both jurisdictional stream and wetland. This table shows both types of mitigation credits available; debited stream credits should be subtracted from wetland credits at a 1,000: 1 ratio.

Table 2. Stream Mitigation Credit

Mitigation Area	Volume (Cubic Yards)	Activities	Mitigation Ratio	Credits
Southern Cropland (Garret Creek Tributary)*	220.	Grade channel, vegetation	1:1	220
Total				220

*The Garret Creek Tributary will be vegetated and therefore available to use as either stream credit or wetland credit, but not both. Tables 15 and 16 both include the potential credits generated, so any debits for the channel area should be subtracted from both ledgers. The stream

occupies 0.22 acres of wetland restoration area, therefore stream credits should be subtracted from wetland credits at a 1,000: 1 ratio. For example: debiting 100 cy of stream credit will reduce the available wetland credit by 0.1 credits.

Mitigation Credit Release

Wetland and stream credits will be released gradually, beginning with signing of the MBI. Credits will be release as site development milestones are met, and the site monitoring demonstrates success. Tables 3 and 4 outline credit release schedule.

Table 3. Wetland Mitigation Credit Release Schedule

Year	Tasks	Wetland Credits Released	Cumulative Credits Released
1	MBI Signature, Deed Restriction, Grading Work Complete, As-built Submitted	2.34 (~15%)	2.34 (~15%)
1	Site Construction Complete, plantings installed	2.33 (~15%)	4.67 (~30 %)
2	Performance standards *1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3*	2.30 (~15%)	6.97 (~45%)
3	Performance standards *1.1, 1.2, 1.4, 2.1, 2.3, 2.5, 3.1, 3.3*	3.25 (~20%)	10.22 (~66%)
4	*Performance Standards1.1. 1.2. 1.3*	1.54 (~10%)	11.76 (~75 %)
5	*Performance Standards 1.1, 1.2, 1.4, 2.1, 2.2, 2.3, 2.4, 2.5, 3.2, 3.3*	1.54 (~10%)	13.30 (~85 %)
?	Long term management plan approved	2.32 (~15%)	15.49 (~100 %)
Total		15.49	15.49

Table 4 Stream Mitigation Credit Release Schedule

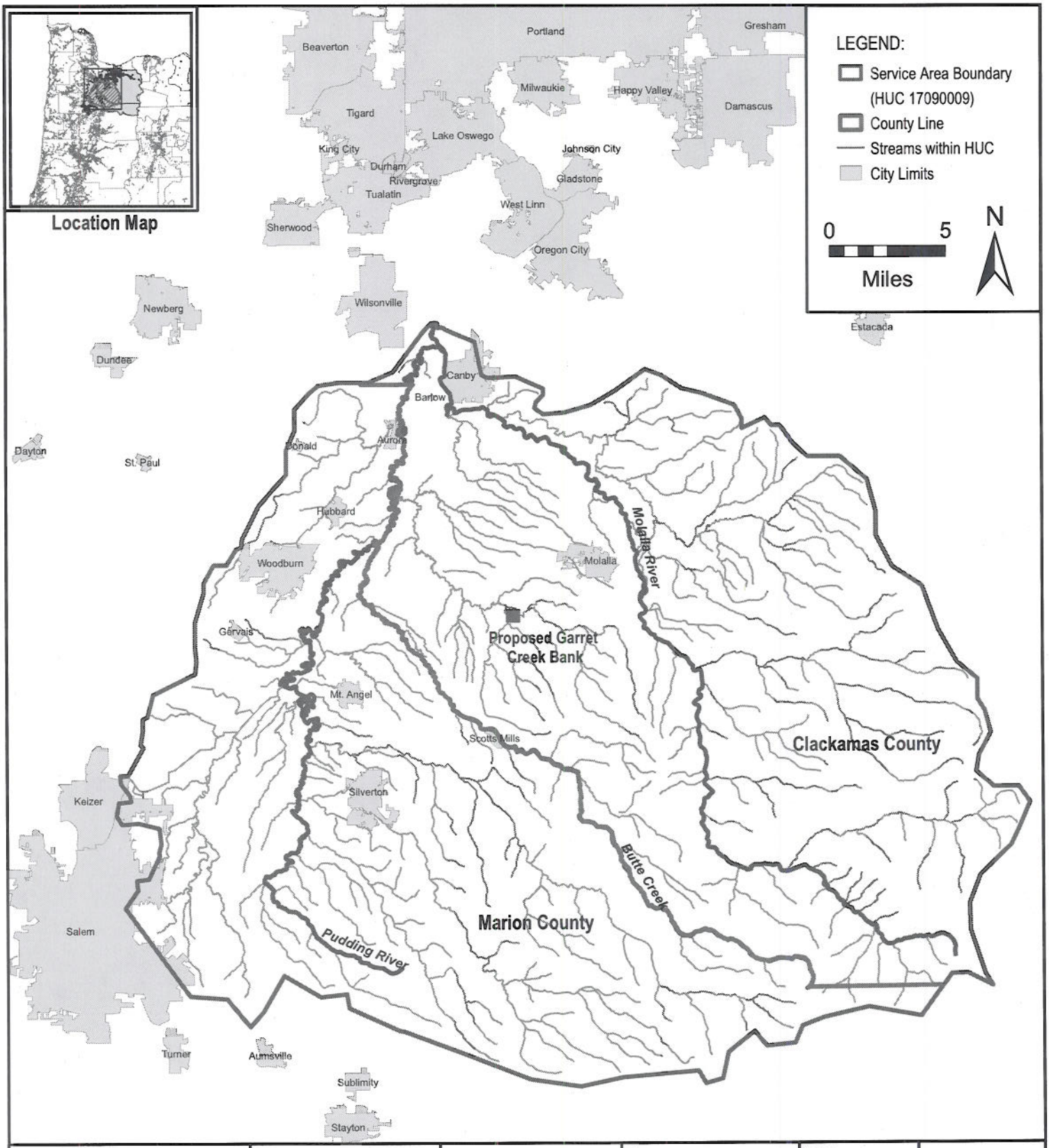
Year	Tasks	Stream Credits Released	Cumulative Credits Released
1	MBI Signature, Deed Restriction, Grading Work Complete, As-built Submitted	33 (~15%)	33 (~15%)
1	Site Construction Complete, plantings installed	33 (~15%)	33 (~30 %)
2	Performance standards *2.1, 2.3, 2.5, 4.1, 4.2, 4.3*	35 (~16%)	101 (~46%)
3	Performance standards *2.1, 2.3, 2.5, 4.1, 4.2, 4.3*	44 (~20%)	145 (~66%)
4	*Performance Standards 1.1. 1.2. 1.3,4.1, 4.2, 4.3*	23 (~10%)	168 (~76 %)
5	*Performance Standards 2.1, 2.2, 2.3, 2.4, 2.5, 4.1, 4.2, 4.3*	23 (~10%)	191 (~85 %)
?	Long term management plan approved	29 (~15%)	220 (~100 %)
Total		220	220

Exhibit E

Service Area Map and Description

Service Area Description

The service area for the bank includes developing areas with similar geomorphic and ecological conditions as the bank site. The entire service area is located within the Molalla-Pudding Basin (Hydrologic Unit Code 17090009) and encompasses 567,543 acres (Exhibit E). The service area is within western Clackamas and eastern Marion counties and includes the towns of Molalla, Canby, Woodburn, Aurora, Mount Angel, Hubbard, Silverton, and eastern Salem.



Jones & Stokes 317 SW Alder Street, Suite 800 Portland, OR 97204	**Garret Creek Mitigation Bank Service Area**	**Project:** **Garret Creek Mitigation Bank Instrument**	**Client:** **Elton Kemnitz**	**Notes:** Map Created Feb 2008	**Exhibit** **E** **PROJECT NO. 00256.07**

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Exhibit F
Restrictive Covenant

AFTER Recording
return To: Elton Kemnitz
33711 S. Dryland Rd.
Molalla, ORE. 97038

4P

Abadie

RECEIVED
OCT 27 2008

RESTRICTIVE COVENANT

Elton and Darla Kemnitz ("Kemnitz"), owner of 22 acres located in Clackamas County, Oregon, of restored, created, and enhanced wetlands, upland buffers and stream areas situated within T5S, R1E, Sec23, Tax Lot 502 as defined by professional land survey conducted and labeled Exhibit A hereto (the "Protected Property"), makes the following declarations as to limitations, restrictions and uses to which the property described herein is now subject and specifies that such declarations shall constitute covenants to run with the land as provided by law and shall be binding on all parties and all persons claiming under them, this declaration of restriction being designed for the purpose of keeping and maintaining portions of the real property described herein in their created wetlands state. The property subject to this Restrictive Covenant has been offered to the U.S. Army Corps of Engineers (ACOE) and Oregon Department of State Lands (DSL) to offset wetland loss or degradation at other locations, primarily in Marion and Clackamas Counties. This arrangement is defined in a Memorandum of Agreement and Wetland Mitigation Banking Instrument dated 8-8-08, allowing the Garrett Creek Wetland Mitigation Bank, LLC to restore and create wetlands and to protect upland buffers and stream areas adjacent thereto, on this property and to sell credits to entities holding specific permits issued by the ACOE and DSL. This Covenant is executed to assure that the Protected Property will continue to fulfill that purpose and that it will be allowed to exist as wetland in perpetuity.

The property described herein shall be subjected to the following:

1. There shall be no destruction, cutting, trimming, mowing, alteration or spraying with biocides of any vegetation in the Protected Property, nor any disturbance of change in the natural habitat of the Protected Property in any manner, except to eliminate non-native invasive species from the site, or conduct other required maintenance.

Clackamas County Official Records
Sherry Hall, County Clerk
2008-073179
$46.00
01257878200800731790040041
10/24/2008 10:12:32 AM
D-OD Cnt=1 Stn=2 JANISKEL
$20.00 $16.00 $10.00

2. There shall be no agricultural, commercial or industrial activity undertaken or allowed in the Protected Property except for limited wetland plant seed harvesting; nor shall any right of passage across or upon the Protected Property be allowed or granted if that right of passage is used in conjunction with agricultural, commercial or industrial activity.

3. No livestock shall be allowed to graze or dwell on the Protected Property.

4. There shall be no filling, excavating, dredging, mining or drilling; no removal of topsoil, sand, gravel, rock, minerals or other materials, nor any dumping of ashes, trash, garbage, or any other material, and no changing of the topography of the land of the Protected Property, once the wetland and the adjacent upland buffers are constructed, without approval from the Mitigation Bank Review Team (this team is composed of members from the DSL and ACOE).

5. There shall be no building of new roads or any other rights of way nor widening of existing roads on the Protected Property.

Expenses relating to preservation of the Protected Property subject to the Covenant shall be allocated to and paid by the Garrett Creek Mitigation Bank LLC, except as provided as terms of the Perpetual Easement Agreement between Elton and Darla Kemnitz and Lake Enterprises, Inc.. These Burdens may be transferred to another entity ("conservation entity") by granting a Conservation Easement or an equivalent agreement, which must allow the conservation entity access to the Protected Property and the right to conduct such activities necessary to maintain the character and function of the wetland, and associated upland buffers and stream area on the Protected Property.

This Restrictive Covenant may be terminated, amended, modified or revoked, entirely or in part, only upon written approval of the District Engineer of the Portland District of the U.S. ACOE and the Director of the Oregon DSL. To be effective, such approval must be witnessed, authenticated, and recorded pursuant to the law of the State of Oregon.

By:

Elton Kemnitz _____ Date: 10-22-08

Elton Kemnitz

Darla Kemnitz _____ Date: 10-22-08

Darla Kemnitz

Dated this 22 day of October, 2008. State of Oregon, County of Clackamas

Personally appeared the above-named Elton and Darla Kemnitz and acknowledged the foregoing instrument to this voluntary act and deed before me this 22 day of October, 2008.

By: _____

OFFICIAL SEAL
KEVIN ALEXANDER
NOTARY PUBLIC-OREGON
COMMISSION NO. 395359
MY COMMISSION EXPIRES AUG. 20, 2009

Aug 20, 2009 Notary Public for Oregon

My Commission expires:

EXHIBIT A

Burdened Property

The westerly 100 acres of the following described tract as cut off by a line drawn parallel with the west line thereof:

Part of the South one-half of Section 23, Township 5 South, Range 1 East of the Willamette Meridian, in Clackamas County, Oregon, described as follows.

BEGINNING at the Southwest corner of said Section 23; thence East on the Section line 2,887.5 feet; thence North 2,640 feet to the one-quarter section line running Easterly and Westerly through said section; thence West on the one-quarter Section line 2,887.5 feet to the West line of said Section 23; thence South following the West line of said section, 2,640 feet to the place of beginning.

EXCEPTING THEREFROM that portion conveyed to Gordon J. Wanner, et ux, by deed recorded December 5, 1984, as Recorder's Fee No. 84-42547, Clackamas County Records, described as follows:

BEGINNING at a point in the south line of said Section 23, which is southeast corner of the tract described in Contract of Sale to Gordon J. Wanner, et ux, recorded April 7, 1980, as Recorder's Fee No. 80-12787, Clackamas County Records; thence North along the East line of said Wanner Tract, 2,640 feet, more or less, to the Northeast corner thereof; thence West along the North line of said Wanner Tract to a point which is 414 feet West of the East line of said Wanner Tract, when measured at right angles thereto; thence South parallel with the East line of said Wanner Tract, 2640 feet, more or less, to the South line of said section; thence East along said South line, 414 feet, more or less, to the point of beginning.

Exhibit G

Statement of Sale of Credit
for
Garret Creek Mitigation Bank

Date
Number of credits sold
Acres of impacts the credits are being sold for
Linear feet of impacts the credits are being sold for
Corps Permit Number
DSL Permit Number
Impact HUC

Garret Creek assumes responsibility for compensatory mitigation requirements for the Corps and DSL Permits referenced above.

A copy of this Statement will be sent to the Corps **and** DSL for all credit sales, regardless of whether both agencies have issued permits.