DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR POTENTIAL ISSUANCE OF AN INDUSTRIAL REGIONAL GENERAL PERMIT CITY OF THE DALLES, WASCO COUNTY, OREGON

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TSI Project No. 2014-0323

July 2015

This project is funded by Oregon general fund dollars through the Department of Land Conservation and Development. The contents of this document do not necessarily reflect the views or policies of the State of Oregon. Additional funders include the Oregon Investment Board, Infrastructure Financing Authority (Port Planning and Marketing Fund), Division of State Lands, City of The Dalles and Port of The Dalles.

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Table of Contents Page

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / 503-274-2100 / Fax: 503-274-2101

List of Appendices

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / 503-274-2100 / Fax: 503-274-2101

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Executive Summary

On behalf of the Port of the Dalles, the following report provides development and mitigation scenarios for six participating Industrial Regional General Permit (IRGP) properties located in the north portion of The Dalles, Wasco County, Oregon. Materials provided in this report, in conjunction with the Terra Science, Inc. (TSI) August 2014 *Wetland Delineation Report Prepared for Potential Issuance of an Industrial Regional General Permit* and March 2015 *Final Oregon Rapid Wetland Assessment Protocol (ORWAP) Report for the Port of The Dalles Regional Wetland Planning Project*, are intended to serve as a planning tools for the development of a potential programmatic IRGP as part of a collaborative effort with the U.S. Army Corps of Engineers (USACE) and the Oregon Department of State Lands (DSL).

Goals of the IRGP process specifically addressed within this report include:

Goal 1. Identification of suitable development footprints within the participating sites which minimize impacts to high quality and unique wetland types while addressing City of The Dalles Development Ordinances and Technical Advisory Committee (TAC) defined criteria.

Goal 2. Identification of potential onsite and regional compensatory mitigation scenarios which may satisfactorily offset potential wetland impacts within the participating sites.

Cursory development footprints within participating sites are assessed using general setback regulations identified in the *City of the Dalles, Oregon Land Use and Development Ordinance.* Upon identification of City defined setbacks, landowners and City of The Dalles identified known easements and legal constraints within each site. Constraints range from Bonneville Power Administration power-line easements to Chenoweth Creek riparian corridor setbacks to the pending Wal-Mart development footprint within Site 4. Upon delineation of known site constraints, remaining lands were evaluated for development feasibility using seven development criteria identified by the Technical Advisory Committee (TAC).

Consultant teams then assessed existing aquatic resources within cursorily defined development areas. Specific TAC identified assessment parameters for consideration of "Preservation" status include representative ORWAP scores, habitat connectivity, existing vegetation condition, designation of "Wetlands of Conservation Concern," floodplain designations and capability of an area to provide potential compensatory mitigation.

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Evaluation of the TAC Development and Preservation Matrices for existing aquatic resources then occurred to make site specific recommendations. Cursory recommendation materials were forwarded to and reviewed by the TAC for their deliberation to designate development and avoidance areas. Site recommendations presented in this report reflect TAC's final designations as delineated during their July 09, 2015 deliberation.

Closing sections of the report provide synopsis of compensatory mitigation regulations and necessary IRGP components required to comply with Oregon's Removal / Fill Law and Federal Section 404 of the Clean Water Act. In total, six potential mitigation opportunities ranging from floodplain restoration along Chenoweth Creek to Modoc Basalt / Columbia Plateau Vernal Pool complex restoration are explored. Cursory mitigation overviews provide mitigation types (enhancement, restoration, creation and preservation), target communities and construction specifications. Lastly, potential options to implement identified mitigation opportunities are reviewed. Options include establishment of an IRGP specific mitigation bank, DSL and / or Port sponsored Fee-In-Lieu project or individual Permittee responsible mitigation.

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I. Introduction and Purpose

On behalf of the Port of the Dalles (POTD), Terra Science, Inc. (TSI) has prepared the following report to assist in identifying potential development and mitigation scenarios for six participating Industrial Regional General Permit (IRGP) sites in the northern portion of the City of The Dalles, Wasco County, Oregon. Materials provided in this report, in conjunction with TSI's August 2014 *Wetland Delineation Report Prepared for Potential Issuance of an Industrial Regional General Permit* and March 2015 *Final Oregon Rapid Wetland Assessment Protocol (ORWAP) Report for the Port of The Dalles Regional Wetland Planning Project*, are intended to serve as a planning tools for the development of a potential IRGP as part of a collaborative effort with the U.S. Army Corps of Engineers (USACE) and the Oregon Department of State Lands (DSL).

More specifically, this report serves to support development and mitigation planning efforts for six sites for which parcel landowners have agreed to voluntarily participate in the proposed IRGP process. The selection of these six sites was a collaborative approach between the Port of The Dalles, the City of The Dalles, project Technical Advisory Committee (TAC) and regional land owners. Collectively, these entities believe that a programmatic and collaborative approach would allow local development interests and regulatory agencies to make strategic decisions about protecting the most important aquatic resources on these large industrial lots while maintaining a viable inventory of buildable industrial land. Goals of the IRGP process specifically addressed within this report include:

> Goal 1. Identification of suitable development footprints within the participating sites which minimize impacts to high quality and unique wetland types while addressing City of The Dalles Development Ordinances and TAC defined criteria.
>
> Goal 2. Identification of potential onsite and regional compensatory mitigation scenarios which may satisfactorily offset potential wetland impacts within the participating sites.

One component of project review (including IRGP projects) proposing impacts to USACE / DSL regulated aquatic features includes the analysis of existing wetland capabilities potentially lost through development versus those capabilities potentially gained through compensatory mitigation. Such analysis is required to determine if proposed mitigation measures are sufficient to offset development impacts to ensure the Federal goal and State policy of "no net loss" of wetland acreages and functions is adequately addressed. While this report does not satisfy technical requirements of a USACE / DSL recognized compensatory mitigation plan, findings herein provide detailed analysis of regional development ordinances and existing conditions to assist in the framing of potential IRGP regulation language.

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II. Participating Site Overview

As indicated, six participating sites were identified via a collaborative approach between the POTD, City of The Dalles, project TAC and regional land owners (Figures 1 through 3). While coverage of the pending IRGP does not cover all remaining undeveloped lands, the process has analyzed approximately seventy percent of the remaining undeveloped parcels in the north portion of The Dalles[1]. Existing jurisdictional resources for participating parcels are identified in TSI's August 2014 delineation report while existing wetland functions and values are outlined within TSI's March 2015 ORWAP report. The following provides a brief summary of participating parcels while detailed physical attribute descriptions of each site can be found in TSI's August 2014 delineation report.

Site 1. Northwest Aluminum Company

Site 1 consists of Tax lot 900 and portion of Oregon Department of Transportation (ODOT) Lot 7 on Wasco County map Township 02 North, Range 13 East, Section 20 and Tax lot 100 on Township 02 North, Range 13 East, Section 29A. Areas south of Chenoweth Creek are zoned Recreational Commercial (CR) and lie within The Dalles Urban Growth Boundary (UGB). Areas north of Chenoweth Creek lie beyond the current UGB but are proposed for UGB inclusion under The Dalles 2013 Expansion Proposal. Despite lying beyond the current UGB, lands north of Chenoweth Creek have been assessed at the request of DSL for the purposes of this IRGP process. Existing conditions and jurisdictional resources contained within the 51.13± acre Site 1 are described in Appendix A.

Site 2. Northwest Aluminum Company

Site 2 is bound by the Union Pacific railroad right-of-way and then Interstate I-84 to the west, Oregon Department of Fish and Wildlife (ODFW) Crates Point Wildlife Area to the north, Port of The Dalles owned lands (Site 3) to the east and River Road to the south. The 42.73± acre site consists of Tax lot 600 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 21 and Tax lot 701 on Township 02 North, Range 13 East, Section 28. The parcel is also considered to have a (self imposed) 25-foot setback from delineated wetlands associated with Taylor lake for the purposes of the IRGP process. The entire site is zoned Industrial (I) and is located within The Dalles UGB. Existing conditions and jurisdictional resources contained within Site 2 are described in Appendix B.

[1] Per aerial review of Wasco County Interactive GIS Map.

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Site 3. Port of The Dalles Columbia Gorge Industrial Center

Site 3 is bound by Chenoweth Creek to the south, Taylor Lake dirt access road then NAC owned lands (Site 2) to the west, Taylor Lake and the ODFW Crates Point Wildlife Area to the north and the Columbia River to the east. The 83.44± acre study area consists of Tax lots 700 and 800 on Wasco County Assessor's map Township 02N, Range 13E, Section 21, Willamette Meridian. Consisting of a separate tax parcel, the Bonneville Power Administration (BPA) Chenoweth Substation located in the south-central portion of the site has been omitted from the IRGP process. The parcel is considered to have a (self imposed) 25-foot setback from Taylor Lake wetlands for the purposes of the IRGP process. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

Port contractors are pending completion of the Columbia Gorge Industrial Center re-development project. Encompassing a majority of Site 3, Phase I and the northeast portion of Phase II have been completed. The pending development will provide (up to) 32 shovel-ready industrial lots of varying size and shape available in late 2015. Existing conditions and jurisdictional resources contained within Site 3 are described in Appendix C.

Site 4. WM3, Inc.

Site 4 is bound by the Union Pacific railroad right-of-way and then Interstate I-84 to the west, River Road to the north and northeast, and the former Northwest Aluminum mill site to the southeast and south. The larger 67.0± acre site consists of Tax lot 702 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 28. Wal-Mart Stores, Inc. is pending construction of a retail store and associated infrastructure on approximately 56% of Tax lot 702; said development has received authorization via issuance of DSL Permit 43798-RF and USACE NWP 2008-445. As such, and in coordination with the TAC, this assessment only pertains to six participating sub-parcels (totaling 29.6± acres) which lie beyond the authorized Wal-Mart development footprint. The entire site is zoned Commercial Light Industrial (CLI) and is located within The Dalles UGB. Existing conditions and jurisdictional resources contained within participating portions of Site 4 are described in Appendix D.

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Site 5. Northwest Aluminum Company Former Mill Site

Site 5 is bound by Union Pacific railroad right-of-way then Interstate I-84 to the west, currently vacant lands (Site 4) to the north, River Road and light industrial lands to the east and vacant land containing a former golf course and landfill to the south. The 91.52± acre Site 5 consists of Tax lot 700 on Wasco County Assessor's map Township 02 North, Range 13 East, Section 28. The entire site is zoned Industrial (I) and is located within The Dalles UGB. Existing conditions and jurisdictional resources contained within Site 5 are described in Appendix E.

Site 6. Northern Oregon Correctional Facility

Site 6 is bound by UP railroad right-of-way to the west, Webber Street and vacant lands to the south, River Road to the east and Fort Dalles Rodeo grounds to the north. The 17.5± acre Site 6 consists of Tax lot 500 on Wasco County Assessor's map Township 02N, Range 13E, Section 33, Willamette Meridian. Much of the site is developed (housing Northern Oregon Correctional (NORCOR) facilities), industrial warehouses and recently constructed fill terraces) while remaining areas contain (remnant) and impounded scabland depressions and adjacent rock outcrops. The entire site is zoned Industrial (I) and is located within The Dalles UGB.

Approximately 85% of Site 6 has been developed. Portion of the property currently houses the NORCOR facility and has been omitted from this assessment. Lands in the southern portion have recently been filled for future development purposes in accordance with DSL Permit 45855-RF[2]. DSL has indicated that the identified user for the recently constructed fill pad is no longer operating in the region. As such, this development terrace has been included as part of the IRGP assessment process[3]. Further, potential users may extend into the currently vacant warehouse spaces in the southern portion of the parcel. Existing conditions and jurisdictional resources contained within Site 6 are described in Appendix F.

[2] USACE AJD NWP 2010-105 determined wetlands associated with this impact were non-jurisdictional.
[3] Kirk Jarvie, April 20, 2015 personal communication.

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III. Delineation of Potential Development Footprints

TSI considered the delineation of feasible development footprints within each participating site as the crucial first step to identify where potential aquatic resources are most likely to occur. Cursory assessment involved identification of legal site constraints and setbacks to understand potential development footprints. Secondary site assessment then scrutinized the cursorily defined footprints using TAC criteria for consideration of a development designation matrix.

Cursory Development Ordinance and Easement Constraint Identification

Cursory development footprints within each participating site were assessed using general setback regulations identified in the *City of the Dalles, Oregon Land Use and Development Ordinance.* Pertinent setback constraints affecting the participating parcels include:

Section 5.070: Commercial / Light Industrial District (CLI)
Section 5.080: Recreational Commercial District (CR)
Section 5.090: Industrial District (I)
Section 5.130: Stream Corridor District
Section 8.030: Flood Control Provisions

It should be noted that cursory ordinance assessment considered select regulations and should not be considered an exhaustive analysis of development feasibility. As many ordinances are development and / or site specific, regulations associated with Access Management, Driveway and Entrance Standards, Parking Standards, Land Divisions and Improvements Required with Development were not specifically investigated or considered for this process.

Similarly, Oregon Spatial Data Library reflects Federal Emergency Management (FEMA) 100-year flood boundaries as identified on the Flood Insurance Rate Map. Based on the configuration of TSI's delineation mapping superimposed atop FEMA maps, the FEMA boundaries do not match the existing condition of the site and are considered obsolete. While not part of this stage of the IRGP process, site specific delineation of the 100-year floodplain is imperative to identify potential flood hazards and subsequent development constraints.

Despite the unknown 100-year flood configuration, development assessment utilized a fifty-foot setback from Chenoweth Creek Ordinary High Water (bankful stage) boundary as delineated by TSI (in accordance with City Ordinance Section 5.130.030). Pending site specific 100-year flood calculations, the fifty foot setback is the main creek constraint utilized for this assessment. As a majority of IRGP project wetlands lie well beyond the topographic confines of Chenoweth Creek, lack of current FEMA flood maps is not considered to be a critical setback for defining potentially developable areas.

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Upon identification of City defined setbacks, POTD, City of The Dalles and respective landowners identified known easements and legal constraints within each site. Known easements reflect (various) Oregon Department of Transportation (ODOT), BPA power-line, Union Pacific rail-line easements and a Martin Marrietta access road easement. Lastly, other land reservations reflect the National Scenic Act protection of basalt cliffs within Site 1 to the pending Wal-Mart development in Site 4 to the existing NORCOR facility within Site 6.

Appendices A through F outline known site constraints while Table 1 reflects the setback / easement constraints utilized to calculate potential development footprints.

Table 1. Cursory development constraints and remaining development space.

Site	Total Parcel Acreage	Ordinance Setbacks	Easements / Partitions	Other Reservations	Remaining Developable Space
Site 1	51.13 acres	CK, FP	ODOT	NSA	32.6± acres*
Site 2	42.73 acres	CK, FP	UP	TL	39.2± acres
Site 3	83.44 acres	CRFT, CK, FP	BPA	TL	56.0± acres
Site 4	29.6 acres	None	UP, BPA, ODOT	Wal-Mart	27.0± acres
Site 5	91.52 acres	None	UP, BPA, MM	None	75.2± acres
Site 6	17.5 acres	None	None	NORCOR	7.6± acres
Total Developable Space					**237.6± acres**

Ordinance Setback:

CK:	Chenoweth Creek 50-foot setback
CRFT:	Columbia River Front Trail 30-foot setback
FP:	Flood Provisioning (pending delineation of current 100-year floodplain)

Known Easements:

UP:	Union Pacific rail line easement
BPA:	Bonneville Power Administration power-line easement
MM:	Martin Marrietta access road easement
ODOT:	Oregon Department of Transportation

Other Reservations:

NSA:	Approximate National Scenic Act constraints
TL:	Project incorporates self-imposed 25-foot setback from Taylor Lake wetlands
Wal-Mart:	Excludes authorized Wal-Mart development footprint
NORCOR:	Excludes existing NORCOR development footprint

*: While Site 1 lands north of Chenoweth Creek do not lie within the current City UGB, DSL requested these lands to be considered for analysis of the IRGP development project.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Incorporation of TAC Identified Development Criteria

During initial planning of the IRGP process, the TAC identified seven specific criterion required for a specific parcel to be considered as developable. Specifically, parcels should:

1. Maximize net contiguous developable acreage on the site. Generally, the minimum threshold for net contiguous developable area of 10 acres with larger areas is preferred.

2. Maximize rectangular development areas.

3. Preserve efficient highway access with preference for direct highway access.

4. Preserve multiple access points, where available, to separate truck traffic from employee vehicles.

5. Preserve rail access on sites with such capabilities.

6. Preserve natural buffer features where they occur to separate industrial activity from adjacent sensitive receptors.

7. Minimize site development costs, when applicable.

When the cursory calculated 237.6± acres of developable parcel space is assessed using TAC development criterion, developable space is further reduced. For example, Site 1 areas south of Chenoweth Creek are all but excluded from the process as it only meets two of the seven TAC considerations. This particular area lies within an ODOT easement, lacks target parcel size, is oddly shaped, lacks potential for multiple access points and does not preserve rail access. In this situation, this area may not qualify for the potential IRGP but should maintain the flexibility for future usages. *It is imperative that this IRGP process reserve the right for potential users to propose impacts as necessary to execute a viable development project.*

Table 2 provides a brief synopsis of development feasibility within each participating site when assessed using TAC defined development criteria while Appendices A through F provide site specific Development Matrices.

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Table 2. Site feasibility synopsis considering TAC development criteria

TAC Development Criteria	Site 1*	Site 2	Site 3	Site 4	Site 5	Site 6
Does the site provide large, net contiguous 10-acre parcels?	Yes	Yes	Yes	No	Yes	No
Could the site maximize rectangular parcels?	Yes	Yes	Yes	Potentially	Yes	No
Could the site preserve direct highway access?	Yes	Yes	Yes	Yes	Yes	Yes
Would the site preserve multiple access points?	Yes	Potentially	Yes	Yes	Yes	Potentiall y
Could the site preserve rail access?	N/A	Yes	N/A	Potentially	Yes	No
Could development preserve natural buffer features to separate industrial activity from sensitive resources?	Yes	Yes	Yes	Yes	Yes	Yes
Would the development minimize development costs?	Yes	Potentially	Yes	Partially	Yes	Yes

*: While Site 1 lands north of Chenoweth Creek do not lie within the current City UGB, DSL has requested these lands to be considered for analysis of the IRGP development project.

IV. Project Considerations of Existing Aquatic Resources

Upon completion of cursory developable space analysis, consultant teams assessed existing aquatic resources within the remaining development areas. Specific TAC identified assessment parameters for consideration of "Preservation" status include:

1. Do the representative ORWAP scores rank as having a "High" level of functions and values?

2. How do the representative ORWAP calculations score for level of wetland stressors, condition and sensitivity?

3. Does the wetland provide connectivity between, or buffering to, other important habitats (either on- or off-site)?

4. Does the wetland support a predominance of a native wetland plant community as documented by delineation data?

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5. What is the wetland vegetation class as documented by the delineation data and field reconnaissance?

6. Does the wetland qualify as a designated Wetland of Conservation Concern?

7. Does the wetland lie within a protected area (conservation easement, deed restriction, etc.)?

8. Does the wetland or associated area provide a unique opportunity for compensatory mitigation?

9. Is the wetland located within a designated floodplain?

10. Is the wetland within, adjacent or otherwise connected to a designated "Conservation Opportunity Area"?

To assess functional attributes of project wetlands, representative ORWAP scores were compared to the median scores of the 221 reference wetlands originally sampled by Paul Adamas for production ORWAP Version 2.0.2. In accordance with DSL regulations at the time of report production, representative grouped services scores and condition are considered as "High" if their score is one or more points above the median score of ORWAP's 221 reference sites; scores of three or more points above the median are considered as "Very High." Only those grouped services having both high function and high value are considered for this analysis[4].

Site specific wetland information regarding existing vegetation communities was derived from delineation data sheets and site reconnaissance notes. The matrix also involved the assessment of various regulatory designations (Oregon Department of Fish and Wildlife Conservation Opportunity Area mapping, for example) and field observations of current and historical disturbances made by the delineation field team.

Lastly, potential Wetlands of Conservation Concern were identified within each participating site. Within the confines of the IRGP assessment area, Wetlands of Conservation Concern include Modoc Basalt / Columbia Plateau Vernal Pools and mature forested wetlands (as determined by DSL). Delineation field data was evaluated using the vernal pool definitions provided by NatureServe Explorer Ecological System Comprehensive Report for Columbia Plateau Vernal Pools, Washington State Department of Natural Resources *Ecological Integrity Assessment: Columbia Plateau Vernal Pool and Modoc Basalt Flow Vernal Pool* and Oregon Wetlands Explorer: Vernal Pools.

[4] Kirk Jarvie, April 21, 2015 correspondence.

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Goals of this analysis include identification of high quality and / or unique resources which should be targeted for avoidance / preservation versus degraded features which could house development and / or provide compensatory mitigation opportunities. As presented in Appendices A through F, several wetland areas are automatically excluded from project "Development" potential due to their location within a parcel which does not meet technical development criteria outlined by the TAC.

It should be noted, however, that areas removed from IRGP development status do not necessarily warrant "Preservation" status. For example, while Slope Complex Wetlands within the southern portion of Site 1 do not satisfy TAC parcel size requirements, the existing condition does not warrant preservation. In this situation, this wetland may not qualify for an expedited IRGP review process but future users must maintain the flexibility to allow for future usages. Stated differently, it is imperative that this IRGP process reserve the right for potential users to propose impacts as necessary to execute a viable development project.

Upon evaluation of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. Recommendations are based on ORWAP rankings, existing wetland conditions, landscape positioning, development constraints and potential compensatory mitigation opportunities. Cursory recommendation materials were reviewed by the TAC during a July 09, 2015 deliberation to designate development and avoidance areas. Table 3 provides an acreage overview of TAC defined designations while Appendices A through F outline site specific assessment rationale.

Table 3. TAC deliberated resource development feasibility.

Recommendation	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	TOTAL
Basalt Vernal Pool Development	-	-	-	2.19 acres	-	-	2.19 acres
Non Vernal Pool Development	0.02-acre*	1.0 acre	0.05-acre	0.29-acre			1.36 acre
Develop / Mitigation Opportunity	1.65 acre	-	-	-	-	-	1.65 acre
Avoid / Mitigation Opportunity	1.6 acre	1.29-acre	5.08 acres	1.13 acre	0.95-acre	-	10.05 acres
Avoidance	0.22-acre	1.16 acre	2.92 acres	-	-	0.8-acre	5.1 acres
TOTAL	**3.49 acres**	**3.45 acres**	**8.05 acres**	**3.61 acres**	**0.95-acre**	**0.8-acre**	**20.35 acres**

*Non-jurisdictional Excavated Ditch impacts would not require DSL / USACE authorization or compensatory mitigation to offset impacts.

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V. State and Federal Compensatory Mitigation Overview

USACE and U.S. Environmental Protection Agency (EPA) regulations authorize USACE to require compensatory mitigation for unavoidable impacts to Federally regulated wetlands and waters. Similarly, DSL, through its Removal / Fill Law, seeks to offset losses of the wetland functions and values of the water resources of the State of Oregon. USACE and DSL regulations require project impacts analysis to consider the following:

1) Avoidance of the impact altogether;
2) Minimization of the impact;
3) Rectification of the impact at project completion; and
4) Compensation for the unavoidable losses.

Federal and State policies require individual project designs to be the "least environmental damaging practicable alternative that is not contrary to the public interest." Specifically, non-water dependent projects proposing jurisdictional impacts are presumed to have practicable alternative designs which avoid and / or minimize impacts to wetlands and other jurisdictional aquatic features.

The IRGP process has, in effect, addressed agency impact analysis steps 1 through 3. Specifically, identification of participating parcels, analysis / ranking of existing resources and the July 09, 2015 TAC designation of developable and avoidance opportunities has evaluated avoidance, minimization and identified rectification (mitigation) areas to address potential IRGP impacts. As such, the remainder of this report provides narrative to identify measures necessary to compensate for TAC development designations and associated impacts.

DSL statutes[5] require that compensatory mitigation must meet five principal objectives:

1) Replace functions and values lost at the impact site;
2) Provide local replacement for locally important functions and values;
3) Enhance, restore, create or preserve wetlands that are self-sustaining and which minimize long-term maintenance needs;
4) Ensure mitigation site in ecologically sustainable locations; and
5) Minimize temporal loss of wetlands and their functions and values.

USACE regulations require compensatory mitigation to achieve a goal of no net loss of wetland functions and values. As quantifying the function / value parameter is often difficult to measure, USACE has generally accepted mitigation acreages as a surrogate.

[5] OAR 141-085-0680(2)(a-e).

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NOTE: USACE has not issued their Jurisdictional Determination (JD) documents for Sites 1, 2 or 5 at the time of report production. Despite the lack of said JDs, it is apparent that (nearly) all identified wetlands and waters would fall under federal jurisdiction. That is, similar wetlands contained within Sites 3, 4 and 6 have been determined to have a federal nexus. As such, it is assumed that (nearly) all identified TAC impacts would need to address both state and federal compensatory mitigation requirements.

To satisfy mitigation objectives, DSL (and USACE) prefer compensatory mitigation to occur via purchase of wetland credits into an established wetland mitigation bank or purchase into an approved fee-in-lieu mitigation program. Said purchases are typically approved at a 1:1 acreage ratio (one credit purchased to offset one acre of impact). As The Dalles vicinity does not have an approved bank or USACE recognized Fee-In-Lieu (FIL) mitigation program, jurisdictional impacts must be replaced via on-the-ground mitigation.

DSL reviews on-the-ground compensatory mitigation proposals using a ratio system ranging from wetland preservation of locally significant / unique wetlands to creation of wetlands within areas historically supporting upland. Wetland restoration (restoring historically filled / drained wetlands) is assessed at a 1:1 ratio, creation acreages are assessed at a 1.5:1 ratio (1.5 acres of wetland creation to offset one acre of wetland impact) while wetland enhancement (improvement of existing wetland features) is assessed at a 3:1 ratio. There is generally a range of credits potentially generated via preservation of a high quality and / or rare type of wetland. Based on the recent Wal-Mart permit decision[6], preservation of Modoc Plateau vernal pool type wetlands should be assessed at a 4:1 ratio. Similarly, as the vernal pool preservation areas are supported by, hydrologically and functionally dependent upon adjacent upland areas, protection of said components should provide credits at a 10:1 ratio (OAR 141-085-0690(4)(E)). While USACE does not officially recognize DSL designated acreage ratios, State requirements are typically utilized for planning purposes.

VI. Potential Compensatory Mitigation Strategies

As evidenced during recent permitting exercises associated with the Wal-Mart and Dakine[7] projects, finding suitable compensatory mitigation to replace Modoc Plateau vernal pool wetlands remains the largest constraint for local development proposals. That is, The Dalles vicinity does not currently have an approved mitigation bank or current FIL program for the locally present and unique vernal pool wetland type. As such, identification of potential on- and offsite compensatory mitigation opportunities is the crux of this IRGP process.

[6] DSL Permit 43798-RF and Corps NWP 2008-445.
[7] DSL Permit 45855-RF.

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Identified Offsite Mitigation Opportunities

In effort to maximize potential developable space with The Dalles UGB, identification of suitable mitigation opportunities beyond the IRGP footprint is considered optimal. This effort included review of aerial photographs, discussions with DSL staff and Port outreach to regional landowners. Two parcels are identified as containing Modoc vernal pool mitigation opportunities which satisfy DSL's principal objectives and which could potentially be utilized to generate regional credits.

Offsite Mitigation Opportunity 1. City of The Dalles Dallesport Property

Consisting of two parcels, this 253.4± acre property is located just east of The Dalles Municipal Airport in Dallesport, Klickitat County, Washington. Zoned as Airport Development, the western parcel is slated for future development while the eastern parcel is zoned as Open Space. Situated in an area containing basalt outcrops / vernal pools, this area provides potential wetland / upland preservation, restoration and enhancement opportunities. The major constraint of this property, however, is the location in Washington. While USACE rules may allow for flexibility to authorize intrastate mitigation, it is anticipated that DSL administrative rules would result in significant regulatory constraints. Further, should earthwork be proposed at this location, Washington Department of Ecology regulations and interactions would also be triggered. The coupling of DSL's regulatory issues and the added complexity of a third regulatory agency makes this opportunity unfeasible as an IRGP solution.

Offsite Mitigation Opportunity 2. The Dalles Bluffs Property

Consisting of two parcels (Tax lots 100 on both T. 02 North, R. 13 East, Section 31 and 32), this mitigation opportunity lies atop The Dalles Bluffs landform approximately one mile west of the IRGP footprint. While the landform generally contains intact basalt vernal pools, this parcel also provides opportunities for enhancement and restoration. The parcel abuts federally protected lands and lies within the Columbia Gorge National Scenic Area. While the parcel satisfies numerous mitigation requirements (watershed location, target wetland type, similar habitats), DSL indicates protection provided by the Scenic Act removes this parcel as suitable mitigation. Specifically, NSA protection greatly reduces the potential risk for modification / destruction of existing wetlands; as such, preservation credit would be difficult to obtain[8]. When coupled with the relatively small amount of potential enhancement / restoration, the lack of readily obtainable preservation credits significantly encumbers use of this parcel for mitigation.

[8] OAR 141-085-0690(10) .

It should be noted that omission of identified offsite mitigation opportunities should not automatically disqualify these areas as future mitigation areas. While not specifically budgeted for the purposes of this IRGP process, additional baseline investigations (delineation and ORWAP calculations, for example), mitigation proposals, agency review and negotiations could be initiated to negotiate potential credit rationale at these locations.

Identified Onsite Mitigation Opportunities

As identified offsite opportunities are considered to have multiple regulatory constraints which make such proposals unfeasible for this IRGP process, TSI investigated mitigation scenarios within the participating IRGP parcels. This process identified three potential 'typical[9]' opportunities and three distinct Modoc vernal pool mitigation scenarios. The following paragraphs provide brief synopsis of identified mitigation opportunities.

Typical Mitigation Opportunity 1: Site 1 Riparian Corridor Expansion

As outlined on Figure 6,1, Typical Mitigation Opportunity 1 would involve enhancement and expansion of the Chenoweth Creek corridor. Analysis indicates this area could provide a unique opportunity to provide water / wetland / upland preservation, enhancement and restoration credits. Aerial photography and site reconnaissance suggests fill material was historically placed within floodplain areas north of the creek. Removal of said material, in combination with enhancement of existing upland / wetland areas could yield mitigation credits.

While riverine hydrogeomorphic class mitigation could be considered 'out-of-kind' for regulatory purposes, DSL and USACE indicated this as a preferred option for non-vernal pool impacts in the IRGP footprint[10]. Potential mitigation would significantly increase the spatial footprint of the existing floodplain, increase potential Essential Salmonid Habitat (ESH) and aid in water quality to the DEQ listed 303(d) stream. Functional lifts would also be anticipated for Hydrologic Function, Water Quality Group, Fish Support Group, Aquatic Support Group and Ecological Condition. As deliberated by the TAC, functional lifts provided by Chenoweth Creek mitigation would be considered sufficient evidence to allow for non-vernal pool type impacts throughout the IRGP footprint.

Mitigation would require significant excavation to remove fill material, obtain target grades and provide micro-topography characteristic of the historic floodplain. Upon completion of earthwork, native seed mixtures, plugs, shrubs and trees would need to be installed to control erosion and begin establishment of target riparian communities and habitats. In addition to

[9] 'Typical' impacts and mitigation refer to non-vernal pool type wetlands.
[10] Per the July 09, 2015 TAC deliberation.

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installation, mitigation should propose eradication of invasive species (especially *Rubus armeniacus*) and replacement with native species. It would be anticipated that potential riparian mitigation would ultimately evolve into forested and scrub-shrub communities.

To support their IRGP analysis DSL requested preliminary site assessment for mitigation credit potential[11]. As such, the following is provided as an analysis tool only and should not be considered as sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum mitigation availability.

Table 4.1. Cursory Credit Approximation of Typical Mitigation Opportunity 1.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Chenoweth Creek Wetland / Waters Preservation	10:1	1.0± acre	0.15± ac.-credit
Upland Riparian Preservation	10:1	1.1± acre	0.1± ac.-credit
Wetland Restoration	1:1	1.0± acre	1.0± ac.-credit
Wetland Creation	1.5:1	0.75± acre	0.5± ac.-credit
Wetland Enhancement	3:1	0.5± acre	0.17± ac.-credit
Approximate Total		**4.5± acres**	**1.92± ac.-credits**

Typical Mitigation Opportunity 2: Site 1 Central Depression Expansion

As outlined on Figure 6.2, Typical Mitigation Opportunity 2 could include the improvement and expansion of the highly degraded Central Depression feature within Site 1. As documented by the delineation, the wetland and surrounding uplands are dominated by invasive *Dipsacus fullonum* and contain little to no native vegetation coverage. Opportunity 2 could yield enhancement, creation and upland preservation mitigation credits suitable to offset non-vernal pool type impacts.

Mitigation would require excavation to increase and expand current wetland hydrology. That is, the saturation driven wetland (and surrounding uplands) could be selectively excavated to provide varying levels of inundation. While this feature lacks direct surface connectivity to Chenoweth Creek, mitigation would significantly increase functions and values associated with Hydrologic Function and Water Quality Groups. Functional lifts would also be anticipated for Carbon Sequestration, Terrestrial Support Group, and Ecological Condition.

[11] Jarvie July16, 2015 email.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Mitigation would require extensive site preparation to begin eradication of the existing invasive plant community. Select excavation and grading would be required to obtain target hydrology levels and habitat zones followed by native plant establishment. Target communities could include herbaceous communities containing patches of scrub-shrub species surrounded by upland trees and shrubs.

The following credit approximation is provided as a cursory analysis tool only; identified acreages and credits are not sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Table 4.2. Cursory Credit Approximation of Typical Mitigation Opportunity 2.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Wetland Creation	1.5:1	6.0± acre	4.0± ac.-credit
Wetland Enhancement	3:1	1.65± acre	0.55± ac.-credit
Approximate Total		**7.65± acres**	**4.55± ac.-credits**

Typical Mitigation Opportunity 3: Site 3 Riparian Corridor Expansion

Similar to the Typical Mitigation Opportunity 1, this approach could enhance and restore the Chenoweth Creek floodplain along the southern border of Site 3 (see Figure 6.3). While not assessed for the IRGP process, restoration and enhancement potential lies immediately south of participating Site 3. Aerial photography review, delineation results and site reconnaissance indicates significant amounts of fill material were historically placed within the Chenoweth Creek riparian and floodplain area. Removal of this material, in combination with enhancement of existing upland / wetland areas could yield mitigation credits suitable to offset non-vernal pool related impacts.

As previously indicated, DSL and USACE indicate riparian mitigation is a preferred option for non-vernal pool impacts in the IRGP footprint. Potential mitigation would significantly increase the spatial footprint of the existing floodplain, increase ESH habitat and aid in water quality to the DEQ listed 303(d) stream. Functional lifts would also be anticipated for Hydrologic Function, Water Quality Group, Fish Support Group, Aquatic Support Group and Ecological Condition.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Mitigation would require significant excavation to remove fill material and obtain target grades and to provide micro-topography characteristic of the historic floodplain. Upon completion of earthwork, native seed mixtures, plugs, shrubs and trees would need to be installed to control erosion and begin establishment of target riparian communities and habitats. In addition to materials installation, mitigation should propose eradication of invasive species (especially *Rubus armeniacus*) and replacement with native species. It is anticipated that riparian mitigation would ultimately evolve into forested and scrub-shrub communities.

The following credit approximation is provided as a cursory analysis tool only; identified acreages and credits are not sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Table 4.3. Cursory Credit Approximation of Typical Mitigation Opportunity 3.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Wetland Restoration	1:1	1.0± acres	1.0± ac.-credit
Wetland Enhancement	3:1	2.0± acres	0.68± ac.-credit
Approximate Total		**3.0± acres**	**1.68± ac.-credits**

Modoc Basalt Vernal Pool Mitigation Opportunity 1: Site 2 Complex

The northern portion of Site 2 houses the highest functioning and highest quality vernal pool complex within the IRGP footprint. As outlined on Figure 7.1, pools range from in-tact areas within very rugged basalt outcrops to areas experiencing historic and ongoing disturbances in the northern extents. Vernal Pool Opportunity 1 could provide wetland / upland preservation credits, enhancement and potential vernal pool wetland creation opportunities.

Review of the recent Wal-Mart permit decision indicates wetland preservation would provide credit at a 4:1 ratio while creation and restoration would be assessed at typical ratios. As upland areas are critical to sustaining the integrity of these pools, credit should be obtained for adjacent uplands in a future mitigation footprint.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Preservation pools would serve as reference areas for other mitigation actions. That is, enhancement, restoration and / or creation actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. For preservation, minimal vegetation management would be required to maintain existing communities. Enhancement, restoration and / or creation areas would require select grading and vegetation re-establishment to obtain target habitats. Functional lifts are anticipated for Hydrologic Function, Water Quality Group, Aquatic Support Group, Terrestrial Support Group.

The following credit approximation is provided as a cursory analysis tool only; identified acreages and credits are not sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Table 5.1. Cursory Credit Approximation of Vernal Pool Mitigation Opportunity 1.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Wetland Enhancement	3:1	0.5± acre	0.17± ac.-credit
Wetland Creation*	1.5:1	0.75± acre	0.33± ac.-credit
Wetland Preservation	4:1	0.7± acre	0.18± ac.-credit
Upland Preservation	10:1	17.75± acres	1.8± ac.-credit
Approximate Total		**19.7± acres**	**2.48± ac.-credits**

*: Site analysis could determine that areas of creation may qualify for restoration. Specifically, inter-basalt areas currently supporting upland vegetation may have historic hydric soils, resulting in potential restoration credits. Similarly, cursory preservation areas may be considered to be degraded sufficiently to qualify for enhancement credits.

Modoc Basalt Vernal Pool Mitigation Opportunity 2: Site 3 Complex

Located along the western boundary of Site 3 (Figure 7.2), Vernal Pool Mitigation Opportunity 2 could utilize existing wetlands and adjacent areas to provide a combination of preservation, enhancement and restoration credits. Aerial photography and delineation results document historic fill, excavation and land manipulation encroachments within a relatively in-tact basalt valley. It is anticipated that mitigation would restore, expand and preserve the historically present wetland complex to provide vernal pool type credits.

Mitigation would require select excavation, material placement and contouring to achieve target grades and hydrological conditions. As the mitigation features are hydrologically dependent upon adjacent basalt uplands, mitigation credit for upland preservation should also be granted.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Preservation wetlands would serve as reference areas for potential mitigation actions. That is, enhancement and restoration actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. Mitigation vegetation goals would be establishment of native herbaceous communities with scrub-shrub inclusions along the bases of basalt outcrops. Basalt vernal pool mitigation would create, restore and increase functional lifts for Hydrologic Function, Water Quality Group, Terrestrial Support Group and Ecological Condition.

The following credit approximation is provided as a cursory analysis tool only; identified acreages and credits are not sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Table 5.2. Cursory Credit Approximation of Vernal Pool Mitigation Opportunity 2.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Wetland Enhancement	3:1	2.8± acres	0.93± ac.-credit
Wetland Restoration	1:1	0.75± acres	0.75± ac.-credit
Wetland Creation*	1.5:1	0.25± acre	0.17± ac.-credit
Upland Preservation	10:1	10.5± acres	1.1± ac.-credit
Approximate Total		**14.3± acres**	**2.95± ac.-credits**

*: Site analysis could determine that areas of creation may qualify for restoration. Specifically, inter-basalt areas within the BPA easement currently supporting upland vegetation may have historic hydric soils, resulting in potential restoration credits. Similarly, cursory preservation areas may be considered to be degraded sufficiently to qualify for enhancement credits.

Modoc Basalt Vernal Pool Mitigation Opportunity 3: Site 4 & 5 Complex

As outlined on Figure 7.3, Vernal Pool Mitigation Opportunity 3 could include a combination of wetland / upland preservation, restoration and enhancement. While preservation areas remain relatively undisturbed, the remainder of this opportunity footprint has experienced significant grading disturbances. Specifically, delineation and ORWAP results document historical disturbances which result in highly degraded and disturbed wetland areas ranging from impounded scabland depressions to excavated ditches.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Mitigation would require select excavation, material placement and contouring to achieve target grades and hydrological conditions. As the mitigation features are hydrologically dependent upon adjacent basalt uplands, mitigation credit for upland preservation should also be granted. Mitigation would be suitable for offsetting vernal pool type impacts.

Onsite preservation pools would serve as reference areas for potential mitigation actions. That is, enhancement and restoration actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. Mitigation vegetation goals would be establishment of native herbaceous communities with scrub-shrub inclusions along the bases of basalt outcrops. Basalt vernal pool mitigation would create, restore and increase functional lifts for Hydrologic Function, Water Quality Group, Terrestrial Support Group and Ecological Condition.

The following credit approximation is provided as a cursory analysis tool only; identified acreages and credits are not sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Table 5.3. Cursory Credit Approximation of Potential Pool Mitigation Opportunity 3.

Mitigation Type	Anticipated Ratio	Potential Acreage	Potential Credit
Wetland Enhancement	3:1	0.7± acre	0.23± ac.-credit
Wetland Restoration	1:1	0.6± acre	0.5± ac.-credit
Wetland Preservation	4:1	1.0± acre	0.25± ac.-credit
Upland Preservation	10:1	9.2± acres	0.92± ac.-credit
Approximate Total		**11.5± acres**	**1.9± ac.-credits**

VII. Technical Mitigation Plan Requirements

To utilize any one of the identified on-the-ground mitigation opportunities a formal mitigation proposal which meets State and Federal technical standards must be generated. While several pieces of the mitigation puzzle have been put together through the IRGP process (boundary delineations, functional assessments and mitigation siting analysis, for example), neither the IRPG process nor this report constitutes a formal mitigation plan. One of the crucial next steps for this IRGP process is to generate formal mitigation plan(s) requirements providing specifications as to how mitigation would be executed to offset anticipated impacts.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Formal mitigation plans must include narrative and diagrams which identify: ecological goals and objectives, mitigation concepts and anticipated acreages, functional gain / loss analysis, construction specifications (grading plans, re-vegetation procedures, and construction timelines), project performance standards, monitoring methods / schedules, long-term protection and security instruments.

While mitigation plans are typically reviewed by DSL / USACE (and other interested entities) during a (typical) 120 day permit processing period, it is anticipated that final IRGP language would be geared towards an expedited review (if necessary). Based on potential mitigation implementation options (Section VIII), mitigation could be potentially be provided by a private banker, DSL / Port FIL program or through individual Permittee action. Determination of which implementation option suitable for this process ultimately dictates IRGP permit review timelines. That is, should credits become available (via bank or FIL program), permit application review time would be significantly minimized. Conversely, should Permittee responsible plans be proposed, permit review timelines would increase due to additional regulatory review of the applicants mitigation plan.

Once approved for implementation, compensatory mitigation areas are (typically) constructed in conjunction with authorized developments and wetland impacts. For identified mitigation opportunities, summer construction schedules are recommended to avoid compaction and decrease erosion potential. Mitigation construction typically requires a team consisting of the landowner, wetland consultants, project engineers, surveyors and grading contractors. Upon completion of major earthwork and construction to attain target elevations, seed and erosion control mixtures are broadcast to initiate re-establishment of native plant communities. Mitigation is typically deemed successful after a five-year maintenance and monitoring period to document wetland evolution and ensure the mitigation is functioning as proposed.

Agencies require plans to identify financial and long-term security instruments to ensure the mitigation is properly executed and protected. Typically, on-the-ground mitigation requires the user / Permittee to secure a bonding / financial instrument prior to permit issuance. Upon completion of identified mitigation monitoring reports and documentation of attaining performance standards, financial instruments are reduced over a (typical) five-year monitoring period. To ensure long-term protection beyond the monitoring period, agencies require the mitigation to be protected via an executed deed restriction and / or conservation easement restricting future usage of the site. Lastly, recent regulatory amendments require that a long-term steward / landowner and endowment fund be identified to maintain projects in perpetuity.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

VIII. Mitigation Implementation Options

Preliminary interagency discussion suggests implementation of identified mitigation scenarios has three feasible options. That is, implementation of an identified mitigation opportunity to obtain credits could occur via:

1) Establishment of an IRGP specific mitigation bank;
2) DSL Fee-In-Lieu (FIL) program expansion for local project sponsorship; and
3) Individual Permittee responsible mitigation.

Establishment of an IRGP Specific Mitigation Bank

As identified, this option would be the simplest solution for future users to offset impacts. Due to the small impact acreages identified by the TAC and subsequently small mitigation footprints required to offset said impacts, it is unlikely that bank establishment would be a financially feasible option. Specifically, potential costs for a banker to coordinate land purchase, negotiate the Mitigation Instrument review process, implement construction and to provide long-term maintenance and monitoring would result in high credit costs. As exorbitant credit cost could ultimately make a future project economically unfeasible for future users, this option is not considered to be a viable solution.

Final IRGP language, however, should allow flexibility for future credit purchase to occur should an appropriate bank option become available during the life of the IRGP.

DSL Fee-In-Lieu (FIL) Program Expansion for Local Project Sponsorship

While providing a different credit avenue than a mitigation bank, DSL's FIL program allows for the sale of mitigation credit within an approved service area. Banks must construct a mitigation area prior to credit sales whereas approved FIL projects allow for credits to be sold prior to mitigation construction. Should a FIL project be approved in The Dalles, this approach would allow future IRGP developers to pay into DSL's Wetland Mitigation Bank Revolving Fund with no further mitigation obligations. DSL, in turn, could channel FIL payments into one (or several) of the identified on-the-ground compensatory mitigation projects sponsored by the Port or other local entity. The FIL approach is an alternative to (often smaller and independent) individual Permittee responsible mitigation areas as approved projects typically provide adequate space to provide credits for current and future impacts within a specified area.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

The Dalles does not lie in a priority watershed recognized by DSL's current FIL instrument and payment into the revolving fund is not currently a suitable mitigation option for potential IRGP users. As the IRGP process has specifically identified / quantified impacts and suitable mitigation opportunities, it is recommended that DSL and USACE be requested to modify existing FIL Instrument language to authorize identified mitigation opportunities. In addition to pending IRGP projects, immediate local need for state and federally recognized credit has been well documented by recent Wal-Mart and Dakine permitting processes.

The identification of regional need and suitable mitigation sites provides additional information which should reduce regulatory legwork typically required to authorize a FIL proposal. Identified mitigation opportunities would have a high likelihood of success, address multiple objectives and support regional conservation initiatives. While the IRGP process has lined up many of the pieces to this puzzle, ultimate adjustment of the FIL instrument must be coordinated by DSL and USACE. It is recommended that participating landowners and IRGP funding agencies work with DSL to facilitate a local FIL project.

Should initial FIL agency modification discussions prove fruitful, a local entity (Port, for example), would be tasked with compilation of a technical compensatory mitigation plan. Upon approval of a locally sponsored plan, the FIL approach has two immediate and attractive benefits to future IRGP users: prompt availability of credits and known Permittee financial requirements. As identified, credits would become available at a set price[12] upon modification of the FIL instrument and approval of a Port-sponsored mitigation plan. Financially, individual Permittee(s) would have a one-time credit purchase and would not have the long-term and (often) unknown financial responsibility required to construct and monitor a mitigation project.

In general, FIL credits could become available according to the following schedule[13]:

*Up to 15% upon approval of a mitigation plan;

*At least 55% incrementally upon approval of various monitoring reports;

*30% upon approval of a stewardship contract between DSL and a third party entity.

[12] Credit cost to reflect average cost of credits available from all active mitigation banks in Oregon.
[13] Oregon Department of State Lands Statewide Fee-In-Lieu Instrument

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Individual Permittee Responsible Mitigation

Perhaps the least preferred option for DSL and USACE[14], Permittee responsible mitigation would require each individual applicant to provide an independent mitigation plan for their specific project. In this instance, IRGP language would outline specific technical mitigation plan requirements applicants must provide to qualify for this type of permit. Despite the uniform outline and requirements of an IRGP specific mitigation plan, multiple users would inherently provide multiple variations to achieve the same outcome. Carving up identified mitigation opportunities into multiple independent projects lends itself to potential Permittee and regulatory confusion. While not necessarily a regulatory concern, this approach would require independent negotiations and property transfers between different landowners.

As identified mitigation opportunities are within close proximity to one another, continued encroachment and construction into the same complex / system would results in prolonged disturbances. For example, consider the first IRGP user identifies the northwest portion of the Chenoweth Creek corridor to provide non-vernal pool mitigation in 2016. The first user's mitigation project is properly constructed, target hydrology is achieved and monitoring documents successful project evolution. The potential for a secondary user's proposal for riparian expansion east of the first project would likely jeopardize the first user's efforts. Specifically, the secondary effort may alter as-built hydrology, impact existing vegetation and create potential erosion of the first project and larger Chenoweth Creek system. Varying styles and implementation of maintenance schedules may also have negative connotations for adjacent mitigations.

Multiple independent mitigation areas would be driven by the financial resources of the independent Permittee(s). While surety bonding would be required prior to permit issuance, DSL and USACE are not guaranteed independent Permittee(s) would have the financial ability to fulfill their long-term mitigation requirements. As indicated, the inherent variability, financial responsibility and extended environmental encroachments associated with this approach makes it an unattractive solution.

Should the independent Permittee approach be identified as the preferred mitigation solution, future IRGP language should allow for a (first) user to compile a mitigation plan proposal that includes generation of advanced mitigation credits. That is, a (first) user could propose to overbuild a mitigation area (north side of Chenoweth Creek, for example) and designate extra mitigation credits to be utilized by another IRGP user with similar impacts[15]. Advanced mitigation would reduce potential confusion regarding 'carving up' identified mitigation areas, minimize construction encroachments, minimize inherently different management styles, provide more uniform and better performing landforms.

[14] USACE 33 CFR Part 332.3(b)(3) and DSL's Removal Fill-Guide, Chapter 8.
[15] OAR 141-085-0755.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

IX. Synopsis and Recommendations

The following provides brief synopsis and recommendations for each site considering existing conditions, TAC defined development / preservation criteria, goals identified by the IRGP process and TAC designations derived during the July 09, 2015 deliberation. Lastly, a mitigation summary and recommendations are provided. Recommendations reflect TSI's professional interpretation, judgement of data based conditions and TAC decisions to be utilized by Port, DSL and USACE for final IRGP considerations.

Site 1. Conclusions and Recommendations

Cursory site constraint review of Site 1 indicates that approximately 32.6± acres of land exhibit capabilities for industrial development. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

The Slope Complex wetland south of Chenoweth Creek should be avoided. Areas south of the Chenoweth Creek are significantly constrained by City setbacks and ODOT easement which result in extremely limited development space.

Chenoweth Creek is partially protected via City ordinances, is listed as Essential Salmonid Habitat and is a DEQ listed 303(d) stream; as such, this feature should be avoided / preserved. Creek features and adjacent lands could be utilized for preservation, floodplain restoration and creation opportunities to provide non-Modoc Basalt vernal pool credits.

As a highly degraded feature that does not qualify as Modoc Basalt vernal pool wetland, the Emergent Depression does not warrant protection and could house future development if determined necessary. The degraded condition of this feature, however, offers enhancement and creation opportunities to offset regional impacts to other non-Modoc Basalt vernal pool wetlands.

The remnant scabland depression in the northern portion of the site is partially protected via National Scenic Act constraints. Due to the rather isolated condition of this feature and to minimize the need for vernal pool mitigation, this feature is recommended for avoidance.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Site 2. Conclusions and Recommendations

Cursory site constraint review of Site 2 indicates that approximately 39.2± acres of land exhibit capabilities for industrial development. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

The Slope Complex south of Chenoweth Creek should be utilized for development. The wetland complex has experienced significant hydrologically alterations and lies within a highly visible and attractive development parcel.

Chenoweth Creek is partially protected via City ordinances, is listed as Essential Salmonid Habitat and is a DEQ listed 303(d) stream; as such, this feature should be avoided / preserved. Due to the creeks setting in a canyon through Site 2, the creek does not present readily foreseeable mitigation opportunities.

The grouping of Scabland Depressions (Impounded, Complex, Ditch / Swale and Swale / Depression Type I) should be avoided and utilized for vernal pool mitigation. Consisting of pools ranging from high quality in-tact areas to areas which are hydrologically / structurally degraded, the complex provides a unique opportunity for Modoc Basalt vernal pool mitigation.

Scattered throughout Site 2, excavated features are man-made and degraded features which do not qualify as Wetlands of Conservation Concern. It is recommended these wetlands be utilized for development.

As aquatic resources associated with Taylor Lake have been voluntarily omitted from this IRGP process these wetlands should be avoided.

Site 3. Conclusions and Recommendations

Cursory site constraint review of Site 3 indicates that approximately 56.0± acres of land exhibit capabilities for industrial development. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

The wetland complex (Remnant Scabland Depression, Type I and Ditch / Swale complex) and surrounding lands in the western portion of the site should be utilized for compensatory vernal pool mitigation. While future Taylor Lake Road improvement impacts are anticipated, this complex should be preserved and expanded to provide vernal pool mitigation credits.

Chenoweth Creek is partially protected via City ordinances, is listed as Essential Salmonid Habitat and is a DEQ listed 303(d) stream; as such, this feature should be avoided / preserved. Creek features and adjacent lands to the north should be utilized for preservation, floodplain restoration and creation opportunities to provide non-Modoc Basalt vernal pool credits.

While the highly disturbed and created excavated features do not warrant protection these areas lie in close proximity to degraded wetlands which have high compensatory mitigation potential. As such, it is recommended these wetlands be included in a vernal pool mitigation area.

As aquatic resources associated with Taylor Lake have been voluntarily omitted from this IRGP process these wetlands should be avoided.

Site 4. Conclusions and Recommendations

Cursory site constraint review of Site 4 indicates that the six participating sub-parcels provide approximately 27.0± acres of commercial / light industrial development lands. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

The high quality Remnant Scabland Depression, Type I features in the northeast portion of the site should be avoided and utilized for vernal pool mitigation credits. While future road improvements would dissect two of these features, they are anticipated to remain some of the highest quality features in the IRGP footprint.

The Ditch / Swale Complex wetlands do not qualify as a Modoc Basalt Vernal Pool, exhibit marginal wetland condition and should be utilized for development.

The Scabland Swale / Depression Complex, Type II features are scheduled to be completely surrounded by roads and lie within the highest valued development space, these areas should be utilized for development.

4710 S.W. Kelly Avenue, Suite 100 / Portland, Oregon 97239 / Phone: 503-274-2100 / Fax: 503-274-2101

Excavated features do not qualify as Wetlands of Conservation Concern and should be utilized for development.

Site 5. Conclusions and Recommendations

Cursory site constraint review of Site 5 constraints indicates that approximately 75.2± acres of land exhibit capabilities for industrial development. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

In conjunction with wetlands in the northeastern portion of Site 4, wetlands contained within the northern portion of the site should be utilized for vernal pool mitigation. These areas provide a unique opportunity for Modoc Basalt Vernal Pool preservation, enhancement and restoration.

Due to their proximity to other mitigation areas and opportunity to provide restoration credits, excavated features within Site 5 should be utilized for compensatory mitigation.

Site 6. Conclusions and Recommendations

Cursory site constraint review of Site 6 indicates that approximately 7.6± acres of land exhibit capabilities for industrial development. Upon completion of the TAC Development and Preservation Matrices for delineated wetlands, TSI weighed the results to make site specific development recommendations. TAC deliberated on said recommendations and concluded that:

Wetlands located within the oddly configured and relatively small development parcel should be avoided.

Mitigation Conclusions and Recommendations

As potential offsite mitigation investigations (to date) have not identified readily available and / or feasible options, three typical and three Modoc Basalt Vernal Pool mitigation opportunities have been identified within the IRGP footprint. Site 1 could provide non-vernal pool mitigation opportunities along Chenoweth Creek and the Central Depression. Site 2 could provide vernal-pool mitigation opportunities in the northern portion of the site. Site 3 has potential to house non-vernal pool mitigation along Chenoweth Creek and vernal pool mitigation through the western portion of the site. Lastly, the northeastern portions of Sites 4 and 5 provide a unique vernal pool mitigation opportunity.

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Potential mitigation credit approximations provided in this report are to be used solely as an analysis tool and should not be considered as sufficient information to compile a compensatory mitigation proposal. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

Vested interests must coordinate with identified mitigation opportunity landowners to discuss legal obligations, negotiate prices and mitigation rights in effort to utilization of these properties as mitigation. It is recommended for local entities and agencies to lobby DSL and USACE to modify the existing FIL instrument to allow for implementation of one (or more) identified mitigation opportunities. While regulatory modification of the FIL instrument may be potentially difficult, the IRGP process has generated large amounts of technical information which may expedite agency review. Additionally, it is recommended that a local entity be identified as a potential sponsor to coordinate with the regulatory agencies for generation and (ultimate) implementation of a FIL project.

No matter which mitigation solution(s) approach DSL and USACE determine to be feasible, technical compensatory mitigation plan(s) must be generated to outline specifications and methods to implement the identified mitigation(s). Should a FIL project be determined appropriate, a local sponsor would be required to generate a compensatory mitigation plan that addresses technical mitigation plan requirements and FIL project components. Should independent Permittee mitigation be the preferred mitigation option, IRGP language must be prefaced to specifically identify the technical requirements and sideboards necessary to utilize one of the identified mitigation areas. Final plans would require a detailed accounting of mitigation actions, anticipated acreages, construction specifications, long-term outcomes of the mitigation and other regulatory requirements.

X. Report Limitations

Recommendations presented in this report are based on information from the landowners, observations of the project team, limitations of the delineation / ORWAP methodology, known City Ordinances and easements and TAC deliberation results.
The report findings and their significance should not be extrapolated beyond the immediate area of the defined IRGP study. Terra Science, Inc. shall not be liable beyond the fees paid for its services for errors and omissions.

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Potential mitigation areas and approximate credits are provided for DSL cursory planning purposes only and should not be construed as sufficient information to compile a compensatory mitigation proposal. As a cursory analysis, approximated credits do not reflect the minimum nor maximum real mitigation availability.

This report was generated for the express use of the Port of The Dalles, participating landowners, DSL, USACE and participating TAC entities. These parties shall not interpret the report findings or conclusions any differently than stated without prior discussion with Terra Science, Inc.

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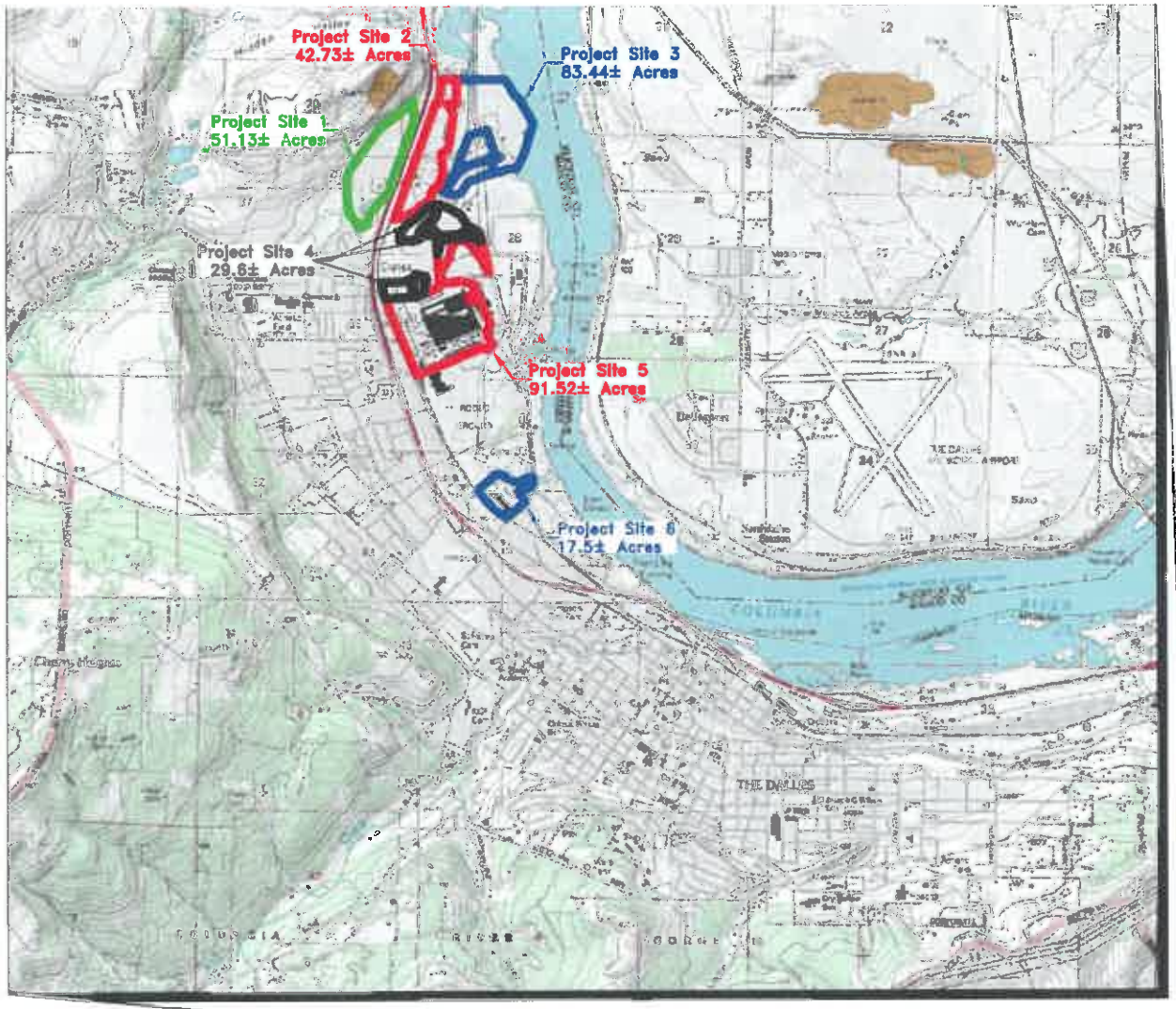

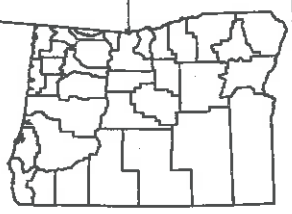

Source: Adapted from U.S. Geological Survey topographic quadrants.

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GRAPHIC SCALE
0 1250 2500
(IN FEET)
1 inch = 2500 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

VICINITY MAP

July 2015

FIGURE 1

Source: Adapted from Wasco County GIS files and Google Earth aerial photograph.

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GRAPHIC SCALE
0 1250 2500
(IN FEET)
1 inch = 2500 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

PARTICIPATING SITE OVERVIEW

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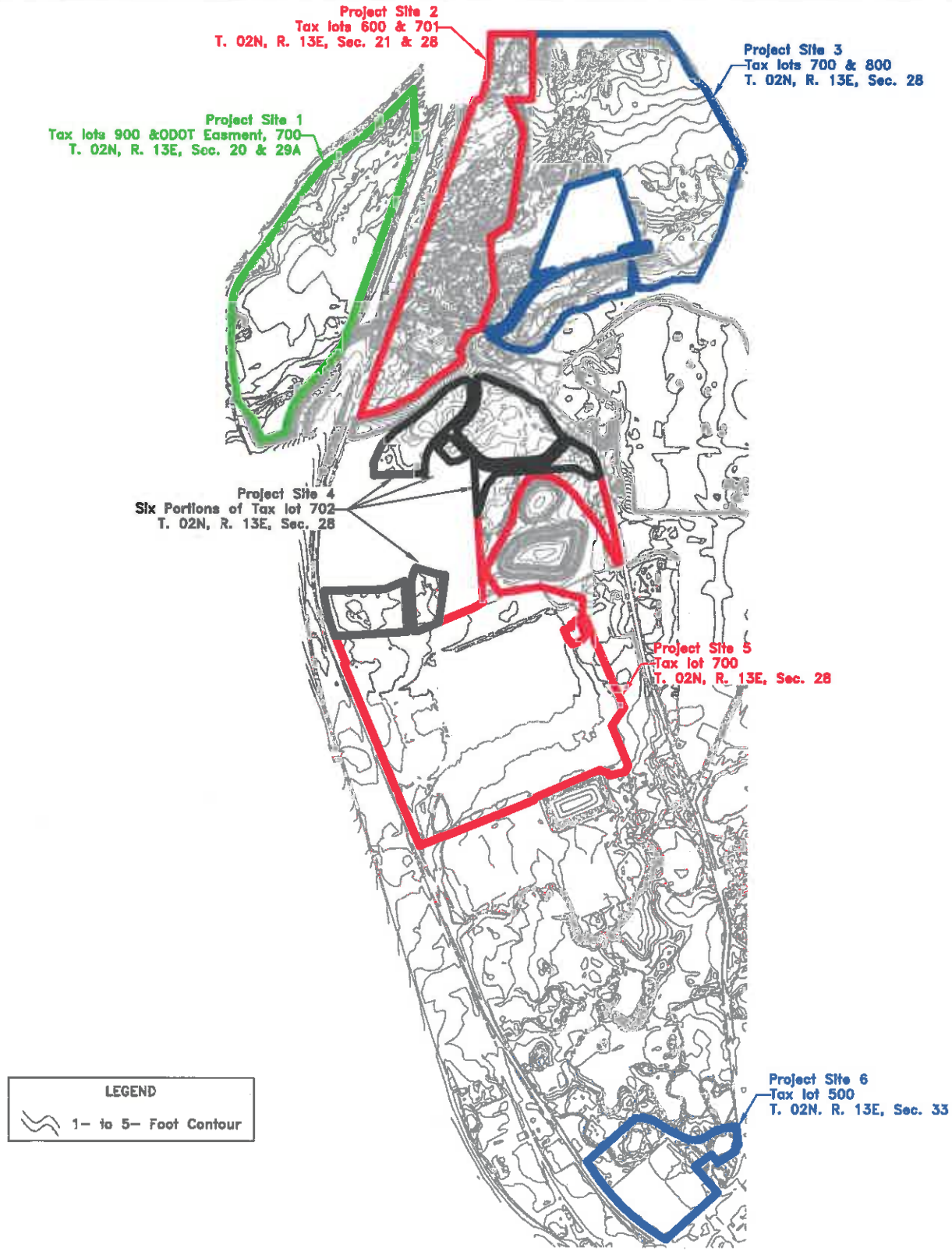
FIGURE 2



Source: Adapted from Wasco County GIS files.

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GRAPHIC SCALE
0 1250 2500
(IN FEET)
1 inch = 2500 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

PARTICIPATING SITE INDEX

July 2015

FIGURE 3

Site 1 Recommendations include:

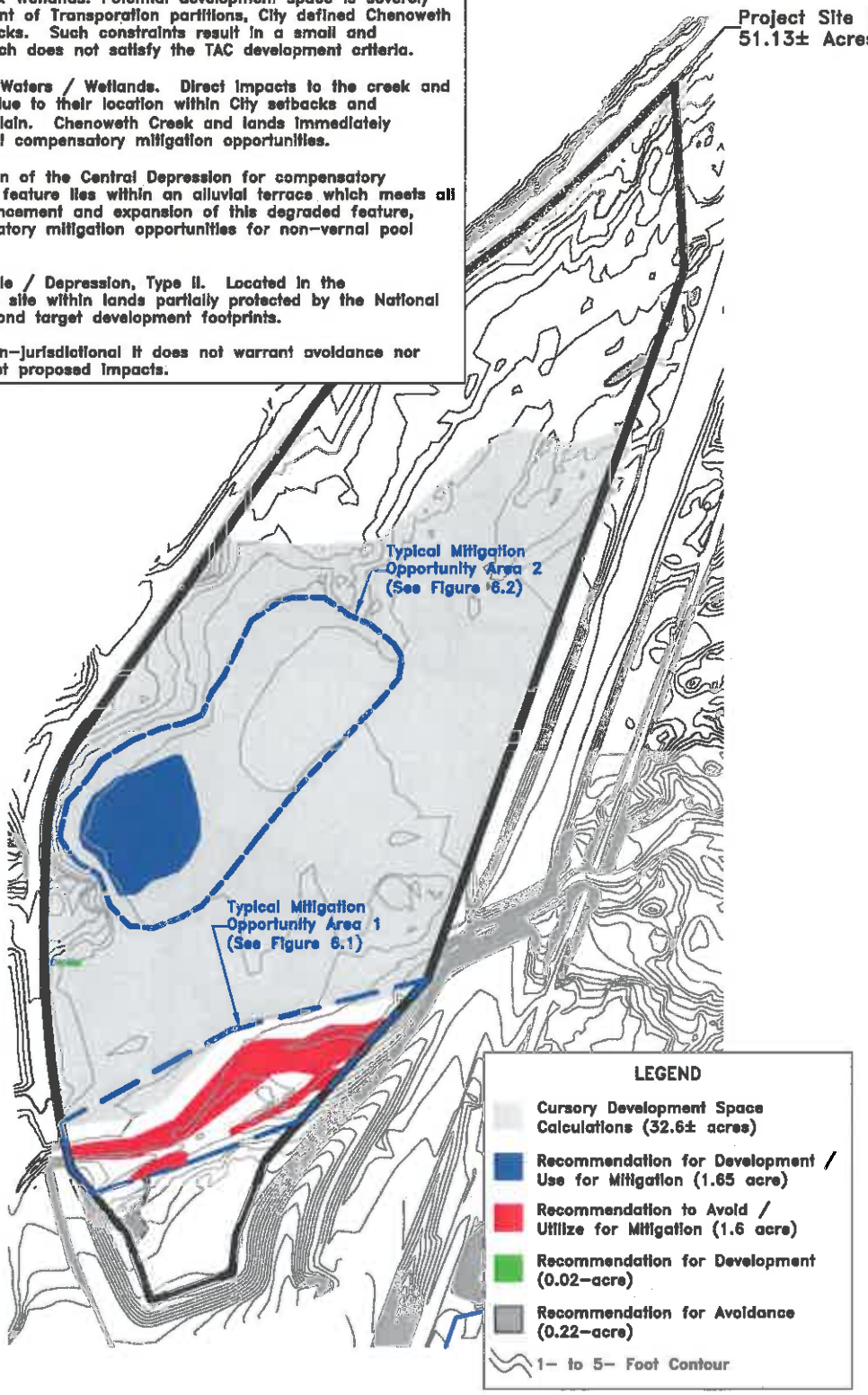
*Avoidance of the Slope Complex Wetlands. Potential development space is severely constrained by Oregon Department of Transporation partitions, City defined Chenoweth Creek and Flood Provision setbacks. Such constraints result in a small and irregularly configured parcel which does not satisfy the TAC development criteria.

*Avoidance of Chenoweth Creek Waters / Wetlands. Direct impacts to the creek and associated wetlands is unlikely due to their location within City setbacks and (pending) FEMA 100-year floodplain. Chenoweth Creek and lands immediately adjacent provide non-vernal pool compensatory mitigation opportunities.

*Development and / or utilization of the Central Depression for compensatory mitigation. This highly degraded feature lies within an alluvial terrace which meets all TAC development criteria. Enhancement and expansion of this degraded feature, however, could provide compensatory mitigation opportunities for non-vernal pool credits.

*Avoidance of the Scabland Swale / Depression, Type II. Located in the northeastern-most corner of the site within lands partially protected by the National Scenic Act, this feature lies beyond target development footprints.

*As the Excavated Feature is non-jurisdictional it does not warrant avoidance nor would require mitigation to offset proposed impacts.



Source: Adapted from Wasco County and TSI georeferenced civil files.

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GRAPHIC SCALE
0 200 400
(IN FEET)
1 inch = 400 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

SITE 1 DEVELOPMENT & MITIGATION RECOMMENDATIONS

July 2015

FIGURE 4.1

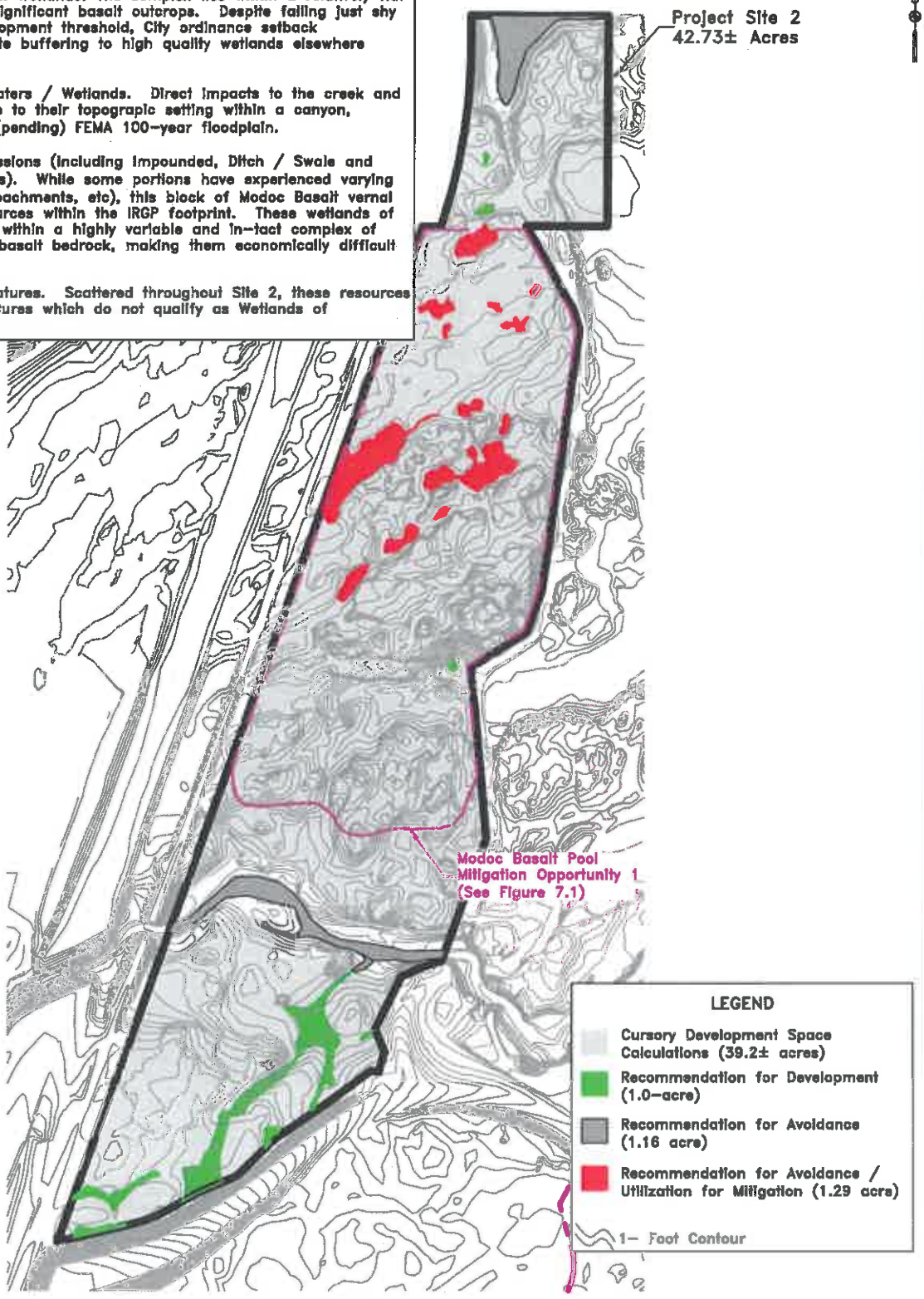
Site 2 Recommendations include:

*Development of the Slope Complex Wetlands. The complex lies within a relatively flat to gently sloping terrace lacking significant basalt outcrops. Despite falling just shy of the TAC defined ten acre development threshold, City ordinance setback considerations would allow adequate buffering to high quality wetlands elsewhere onsite.

*Avoidance of Chenoweth Creek Waters / Wetlands. Direct impacts to the creek and associated wetlands is unlikely due to their topographic setting within a canyon, location within City setbacks and (pending) FEMA 100-year floodplain.

*Avoidance of the Scabland Depressions (including impounded, Ditch / Swale and Swale / Depression Type I features). While some portions have experienced varying disturbances (impoundments, encroachments, etc), this block of Modoc Basalt vernal pools are the highest quality resources within the IRGP footprint. These wetlands of Conservation Concern Wetlands lie within a highly variable and in-tact complex of basalt rock outcrops and shallow basalt bedrock, making them economically difficult to develop.

*Development of the Excavated Features. Scattered throughout Site 2, these resources are man-made and degraded features which do not qualify as Wetlands of Conservation Concern



Source: Adapted from Wasco County and TSI georeferenced civil files.

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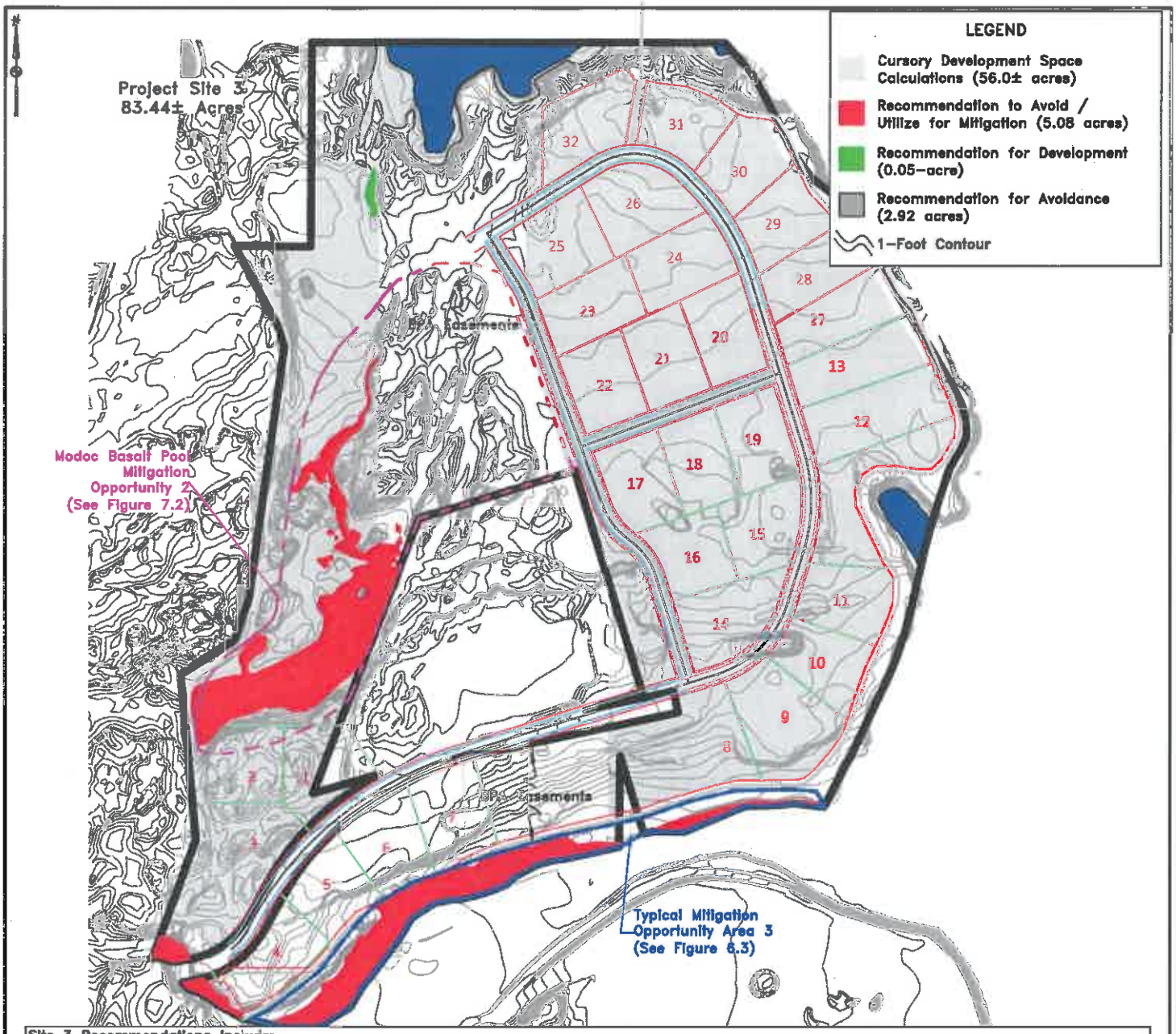
GRAPHIC SCALE
0 200 400
(IN FEET)
1 inch = 400 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

July 2015

SITE 2 DEVELOPMENT & MITIGATION RECOMMENDATIONS

FIGURE 4.2



Site 3 Recommendations Include:

*Utilization of the Remnant Scabland Depression, Type I for compensatory mitigation. The feature has experienced variable historical impoundment and grading disturbances resulting in relatively low ORWAP scores. Future impacts are anticipated for improvements to the Taylor Lake access road and the feature does not warrant avoidance considerations. Enhancement and expansion of this feature provides a unique opportunity for vernal pool compensatory mitigation.

*Utilization of the Ditch / Swale complex for compensatory mitigation. The feature has experienced variable historical impoundment and grading disturbances resulting in relatively low ORWAP scores. Restoration and expansion of this feature provides a unique opportunity for vernal pool compensatory mitigation.

*Avoidance of Chenoweth Creek Waters / Wetlands. Direct impacts to the creek and associated wetlands is unlikely due to their location within City setbacks. Chenoweth Creek and lands immediately adjacent provide non-vernal pool compensatory mitigation opportunities.

*Development and / or utilization of the Excavated Features for compensatory mitigation. Scattered throughout Site 3, these resources are man-made and degraded features which do not qualify as Wetlands of Conservation Concern.

*Avoid and preserve Taylor Lake and Columbia River features.

Source: Adapted from Wasco County, Harper Houf Peterson Righellis, Inc. and TSI georeferenced civil files.

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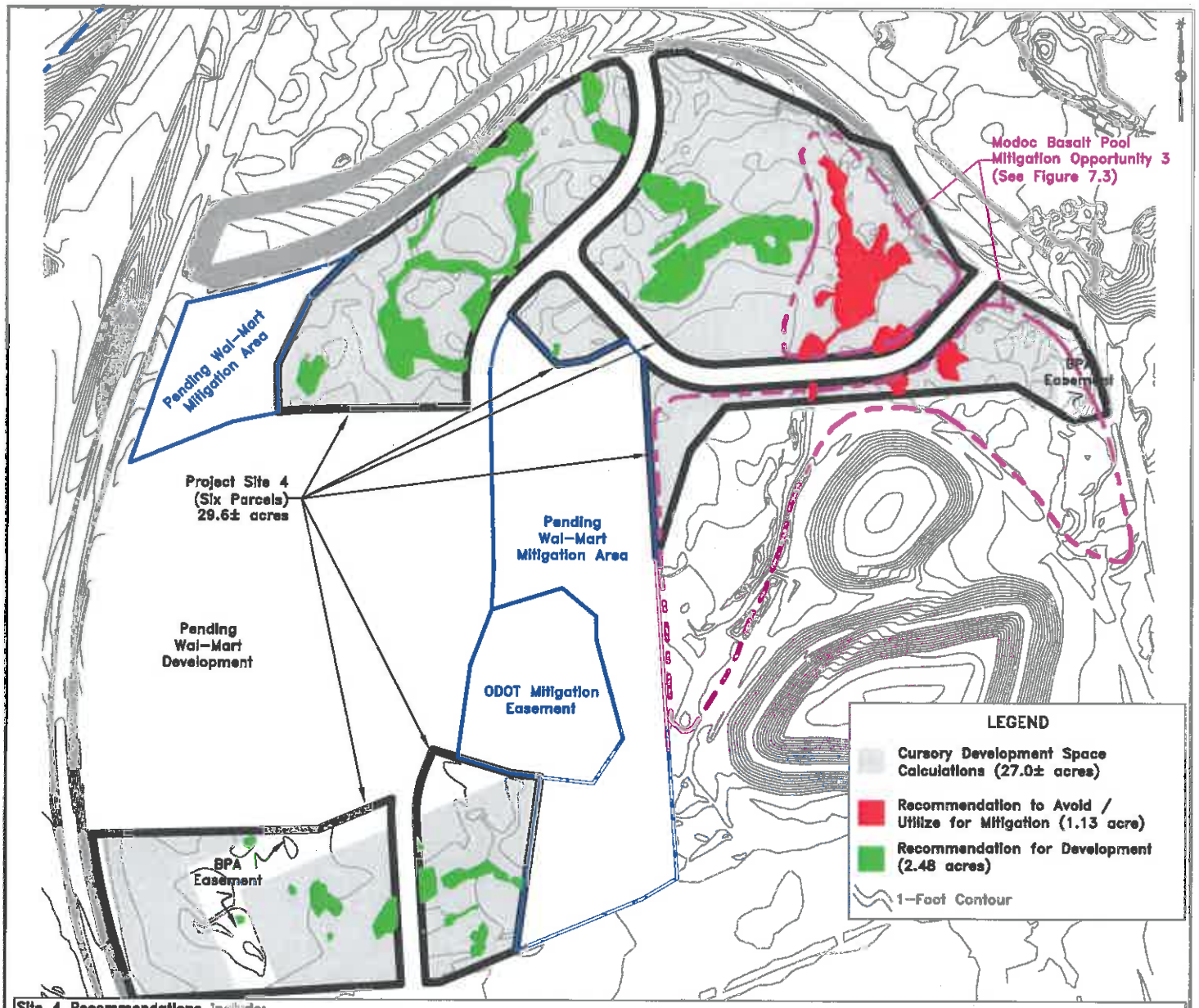
GRAPHIC SCALE
0 200 400
(IN FEET)
1 inch = 400 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

July 2015

SITE 3 DEVELOPMENT & MITIGATION RECOMMENDATIONS

FIGURE 4.3



Site 4 Recommendations include:

*Development of the Remnant Scabland Depression, Type I feature. Variable historical disturbances result in relatively low ORWAP scores. This area is scheduled to be completely surrounded by roads and adjacent development, severing potential corridors and connectivity to other compensatory mitigation areas. Further, it has been determined this feature lies within the highest valued development land remaining in the IRGP footprint.

*Development of the Ditch / Swale Complex. This historically disturbed feature does not qualify as a Modoc Basalt Vernal Pool and reflects marginal wetland conditions.

*Avoidance of and utilization of the Scabland Swale / Depression Complex, Type I as compensatory mitigation. One of the largest remaining Modoc Basalt Vernal Pools within the IRGP footprint calculates having high ORWAP scores. Although this feature is scheduled to be completely surrounded by roads, this complex could provide preservation, enhancement and restoration opportunities.

*Development of the Scabland Swale / Depression Complex, Type II. The higher slope of the Type II complex results in higher amount of swale (as opposed to pool) and higher quantities of non-native species. These Modoc Basalt Vernal Pools should qualify as having moderate development potential if future users identify need for this Commercial / Light Industrial Parcel, especially considering future adjacent usages and location within highly valued development space.

*Development of the Excavated Features. Scattered throughout Site 4, these resources are man-made and degraded features which do not qualify as Wetlands of Conservation Concern.

Source: Adapted from Wasco County, PacLand Engineering and TSI georeferenced civil files.

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

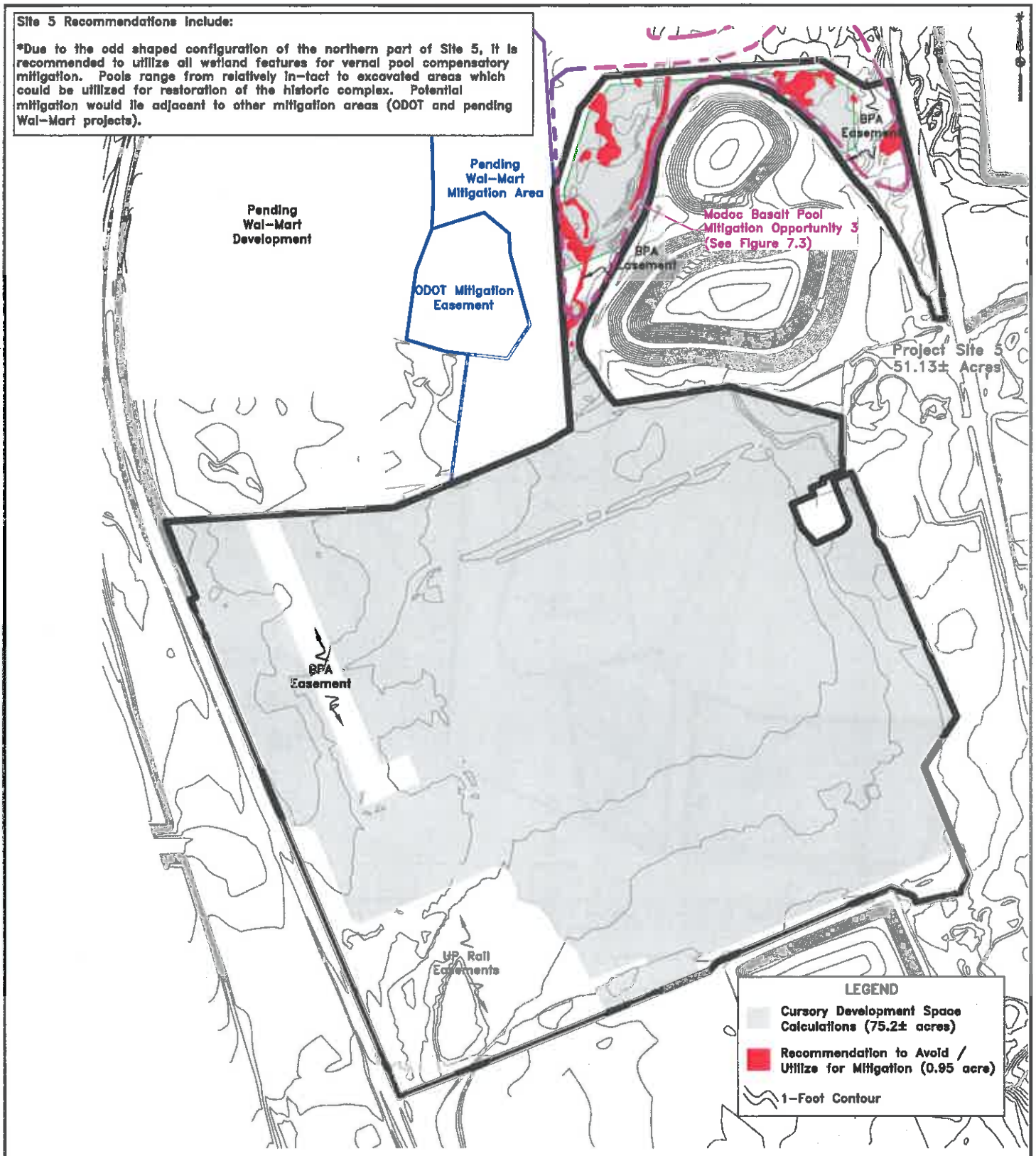
GRAPHIC SCALE
0 175 350
(IN FEET)
1 inch = 350 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

July 2015

SITE 4 DEVELOPMENT & MITIGATION RECOMMENDATIONS

FIGURE 4.4



Source: Adapted from Wasco County and TSI georeferenced civil files.

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

GRAPHIC SCALE
0 200 400
(IN FEET)
1 inch = 400 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

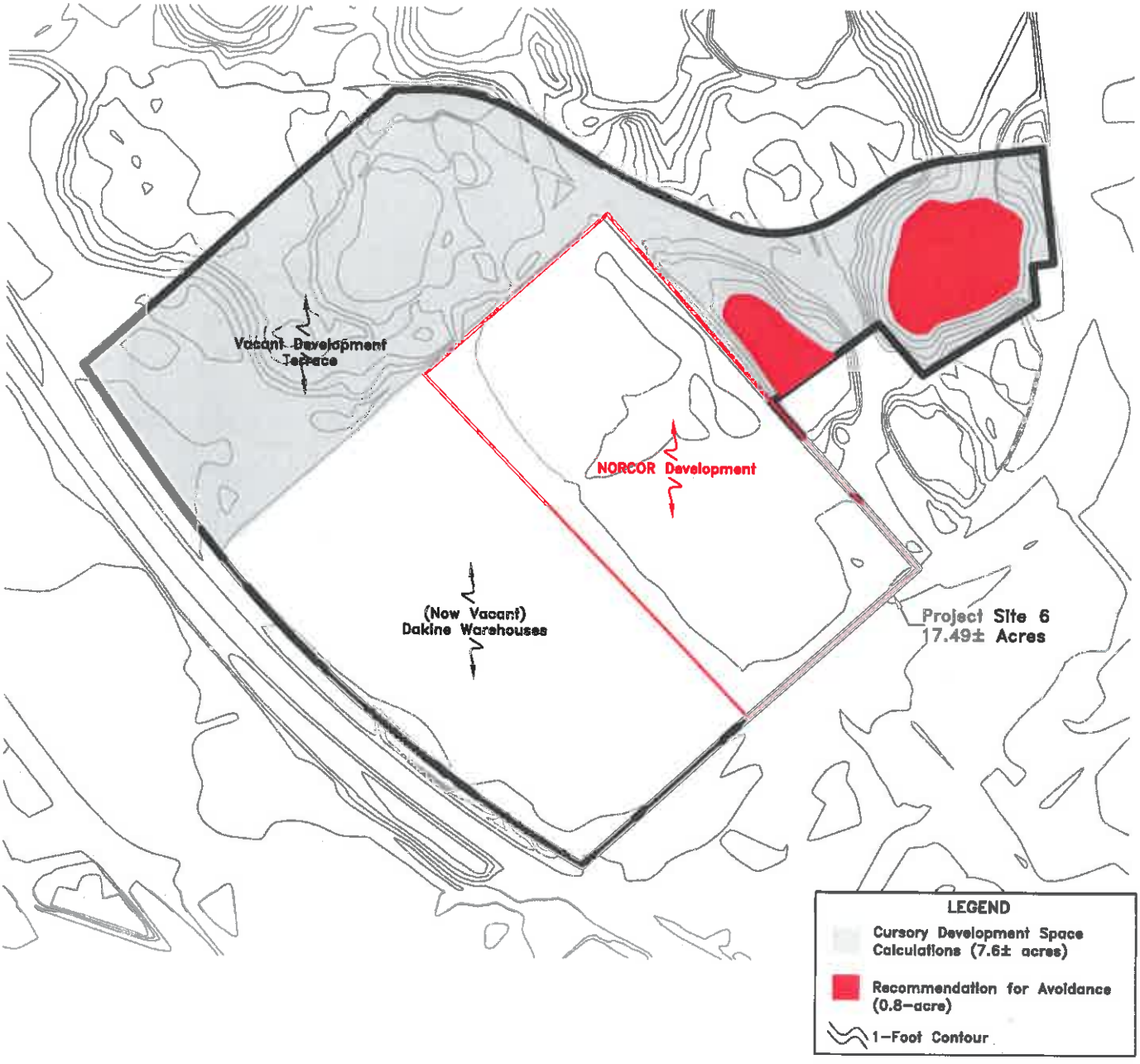
July 2015

SITE 5 DEVELOPMENT & MITIGATION RECOMMENDATIONS

FIGURE 4.5

Site 6 Recommendations Include:

*Avoidance of the the Impounded / Remnant Scabland Depressions. Despite historical regional disturbances which have altered the native hydrology, these features are situated in an irregularly configured and relatively small parcel. Due to location, TAC has identified these areas to be avoided.



Source: Adapted from Wasco County, Tennesson Engineering and TSI civil files.

Terra Science, Inc.
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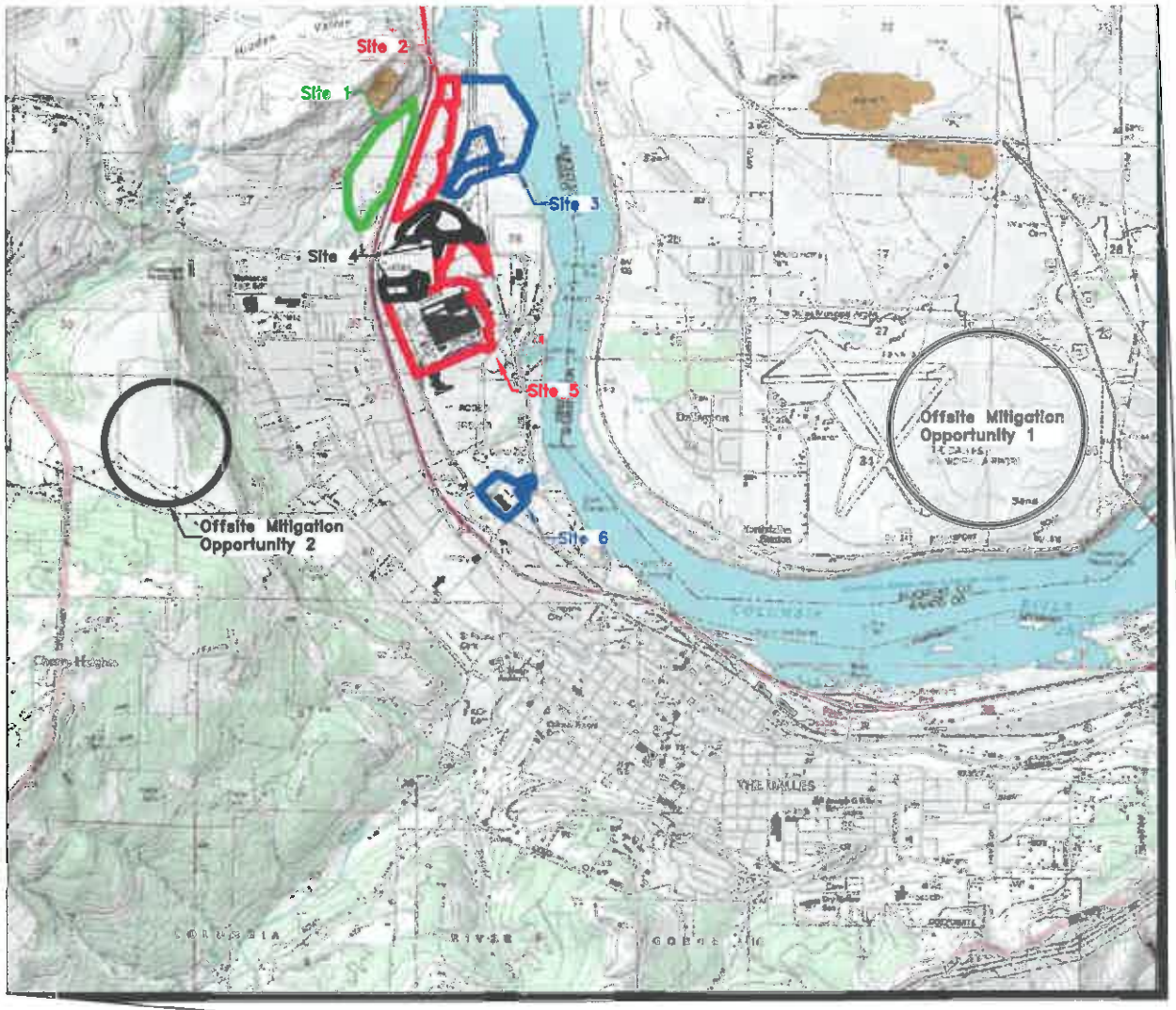
GRAPHIC SCALE
0 100 200
(IN FEET)
1 inch = 200 ft.

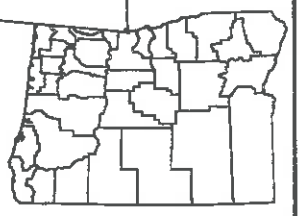
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

July 2015

SITE 6 DEVELOPMENT & MITIGATION RECOMMENDATIONS

FIGURE 4.6





Source: Adapted from U.S. Geological Survey topographic quadrants.

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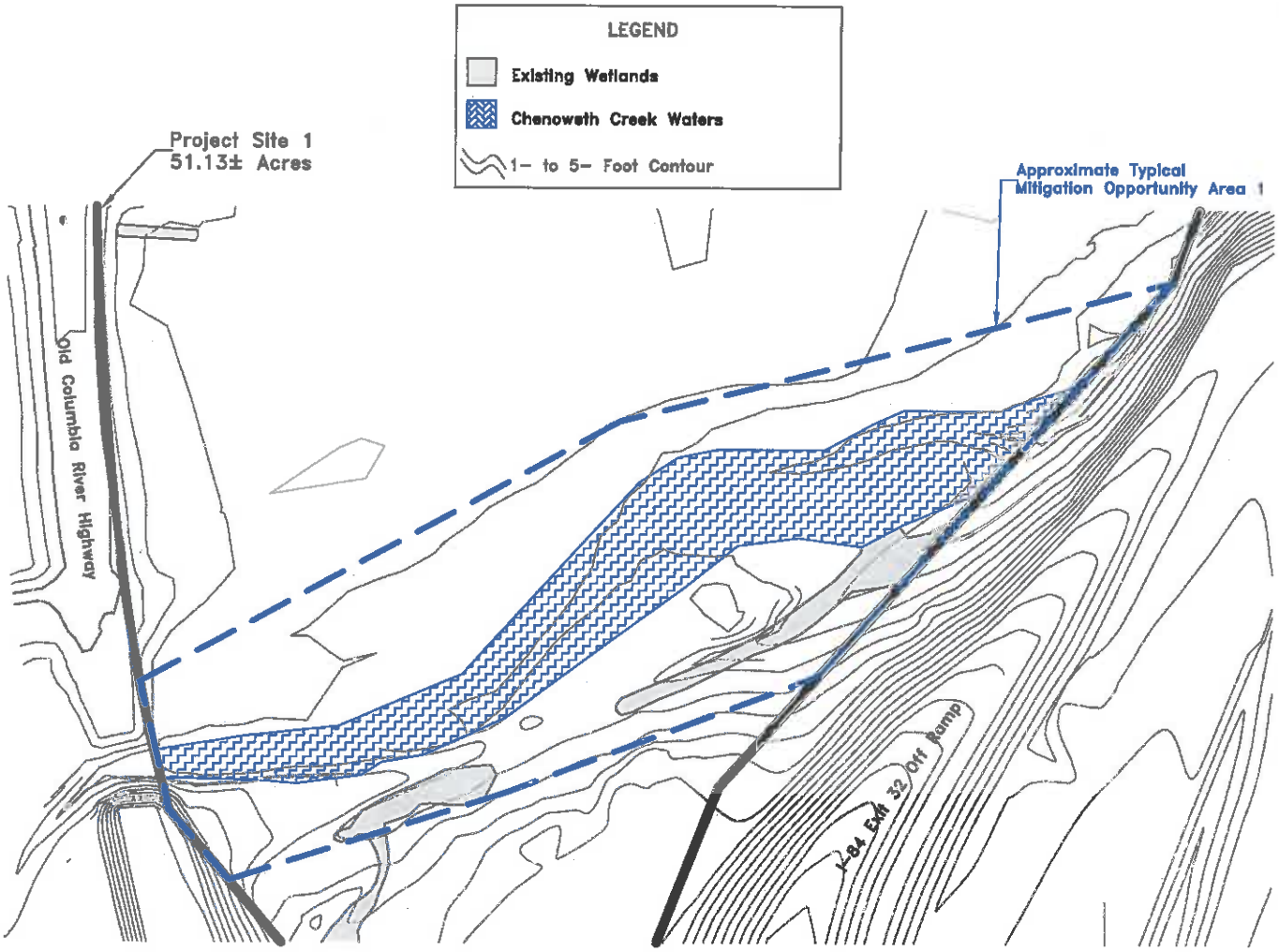
GRAPHIC SCALE
0 1250 2500
(IN FEET)
1 inch = 2500 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

July 2015

POTENTIAL OFFSITE MITIGAION OPPORTUNITIES

FIGURE 5



Cursory analysis indicates Mitigation Opportunity 1 could provide a unique opportunity to provide water / wetland / upland preservation, enhancement and restoration credits. Analysis indicates this area could provide a unique opportunity to provide water / wetland / upland preservation, enhancement and restoration credits. Aerial photography and site reconnaissance suggests fill material was historically placed within floodplain areas north of the creek. Removal of said material, in combination with enhancement of existing upland / wetland areas could yield mitigation credits.

While riverine hydrogeomorphic class mitigation could be considered 'out-of-kind' for regulatory purposes, DSL and USACE indicated this as a preferred option for non-vernal pool impacts in the IRGP footprint. Potential mitigation would significantly increase the spatial footprint of the existing floodplain, increase potential Essential Salmonid Habitat (ESH) and aid in water quality to the DEQ listed 303(d) stream. Functional lifts would also be anticipated for Hydrologic Function, Water Quality Group, Fish Support Group, Aquatic Support Group and Ecological Condition. As deliberated by the TAC, functional lifts provided by Chenoweth Creek mitigation would be considered sufficient evidence to allow for non-vernal pool type impacts throughout the IRGP footprint.

Mitigation would require significant excavation to remove fill material, obtain target grades and provide micro-topography characteristic of the historic floodplain. Upon completion of earthwork, native seed mixtures, plugs, shrubs and trees would need to be installed to control erosion and begin establishment of target riparian communities and habitats. In addition to installation, mitigation should propose eradication of invasive species (especially *Rubus armeniacus*) and replacement with native species. It would be anticipated that potential riparian mitigation would ultimately evolve into forested and scrub-shrub communities.

Source: Adapted from Wasco County and TSI georeferenced civil files.

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GRAPHIC SCALE
0 75 150
(IN FEET)
1 inch = 150 ft.

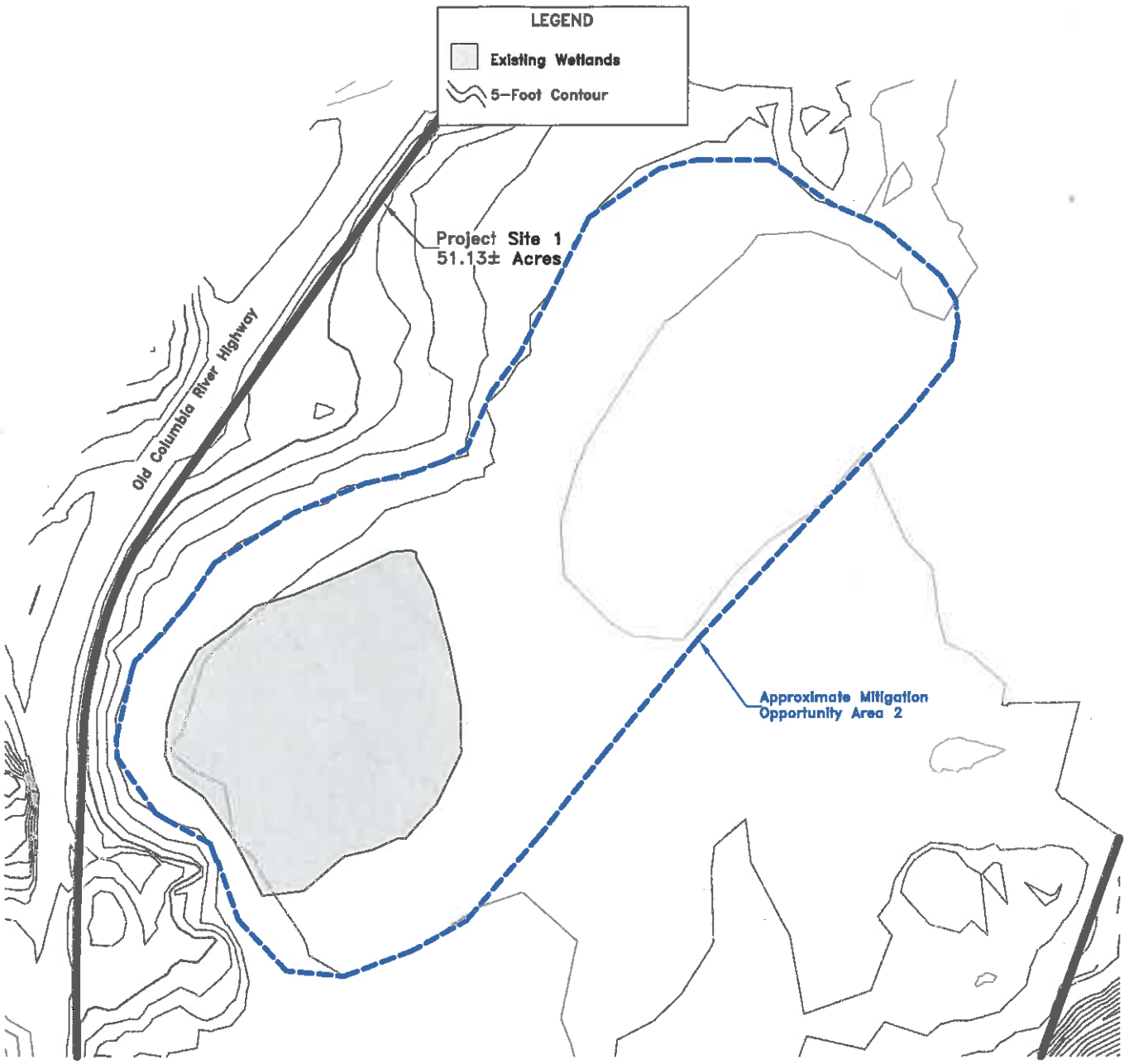
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

TYPICAL MITIGATION OPPORTUNITY 1

July 2015

The identified mitigation opportunity footprint is provided as a cursory analysis tool only. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints.

FIGURE 6.1



As documented by TSI's delineation, the Central Depression wetland and surrounding uplands are dominated by invasive *Dipsacus fullonum* and contain little to no native vegetation coverage. As such, Typical Mitigation Opportunity 2 could yield enhancement and creation and mitigation credits suitable to offset non-vernal pool type impacts.

Mitigation would require excavation to increase and expand current wetland hydrology. That is, the saturation driven wetland (and surrounding uplands) could be selectively excavated to provide varying levels of inundation. While this feature lacks direct surface connectivity to Chenoweth Creek, mitigation would significantly increase functions and values associated with Hydrologic Function and Water Quality Groups. Functional lifts would also be anticipated for Carbon Sequestration, Terrestrial Support Group, and Ecological Condition. Mitigation would require extensive site preparation to begin eradication of the existing invasive plant community. Select excavation and grading would be required to obtain target hydrology levels and habitat zones followed by native plant establishment. Target communities could include herbaceous communities containing patches of scrub-shrub species surrounded by upland trees and shrubs.

Source: Adapted from Wasco County and TSI georeferenced civil files.

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GRAPHIC SCALE
0 75 150
(IN FEET)
1 inch = 150 ft.

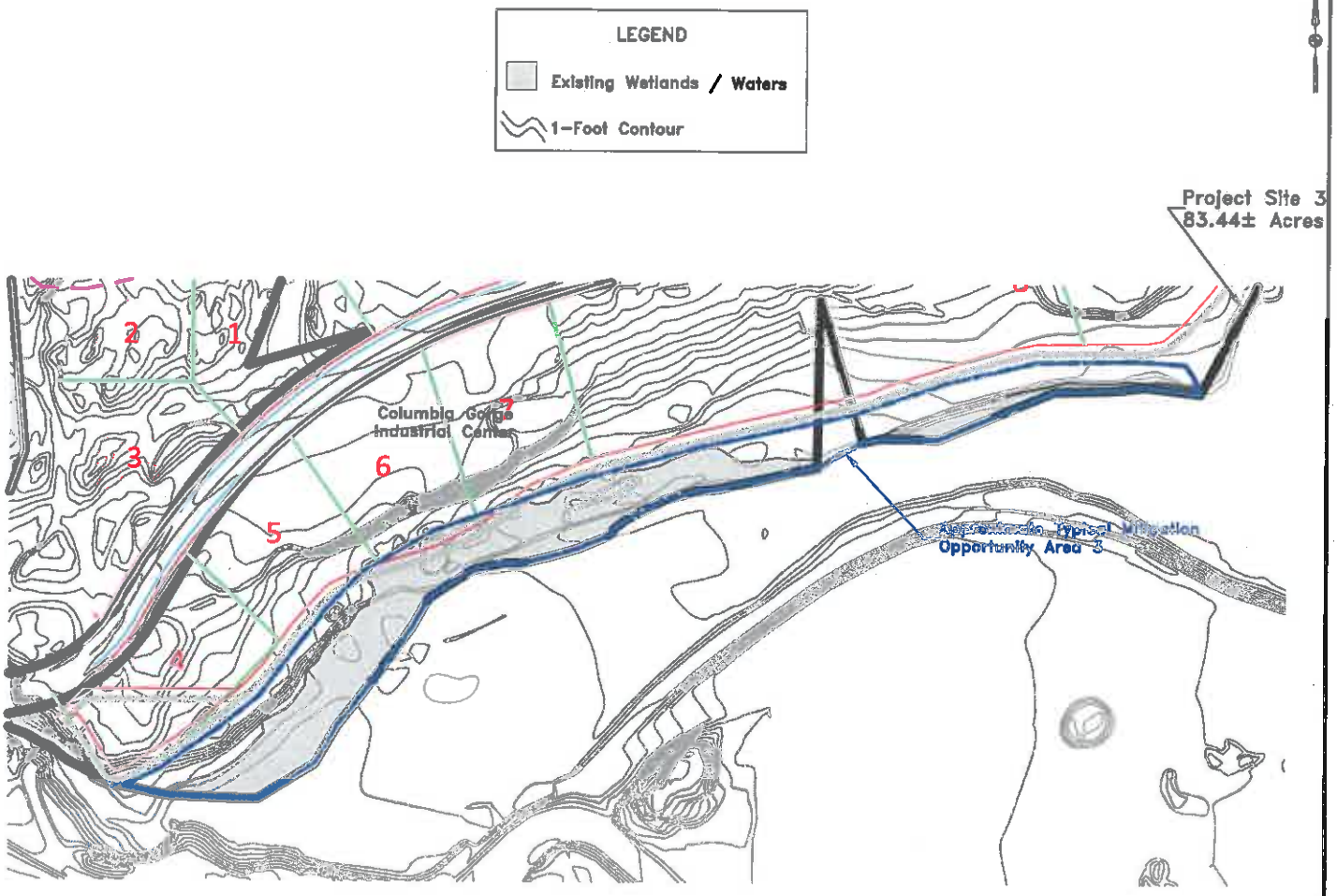
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

TYPICAL MITIGATION OPPORTUNITY 2

July 2015

The identified mitigation opportunity footprint is provided as a cursory analysis tool only. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints.

FIGURE 6.2



Cursory analysis indicates Mitigation Opportunity 1 could provide a unique opportunity to provide water / wetland / upland preservation, enhancement and restoration credits. Similar to the Typical Mitigation Opportunity 1, this approach could enhance and restore the Chenoweth Creek floodplain along the southern border of Site 3 (see Figure 6.3). While not assessed for the IRGP process, restoration and enhancement potential lies immediately south of participating Site 3. Aerial photography review, delineation results and site reconnaissance indicates significant amounts of fill material were historically placed within the Chenoweth Creek riparian and floodplain area. Removal of this material, in combination with enhancement of existing upland / wetland areas could yield mitigation credits suitable to offset non-vernal pool related impacts.

As previously indicated, DSL and USACE indicate riparian mitigation is a preferred option for non-vernal pool impacts in the IRGP footprint. Potential mitigation would significantly increase the spatial footprint of the existing floodplain, increase ESH habitat and aid in water quality to the DEQ listed 303(d) stream. Functional lifts would also be anticipated for Hydrologic Function, Water Quality Group, Fish Support Group, Aquatic Support Group and Ecological Condition.
Mitigation would require significant excavation to remove fill material and obtain target grades and to provide micro-topography characteristic of the historic floodplain. Upon completion of earthwork, native seed mixtures, plugs, shrubs and trees would need to be installed to control erosion and begin establishment of target riparian communities and habitats. In addition to materials installation, mitigation should propose eradication of invasive species (especially *Rubus armeniacus*) and replacement with native species. It is anticipated that riparian mitigation would ultimately evolve into forested and scrub-shrub communities.

Source: Adapted from Wasco County, HHPR and TSI georeferenced civil files.

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GRAPHIC SCALE
0 125 250
(IN FEET)
1 inch = 250 ft.

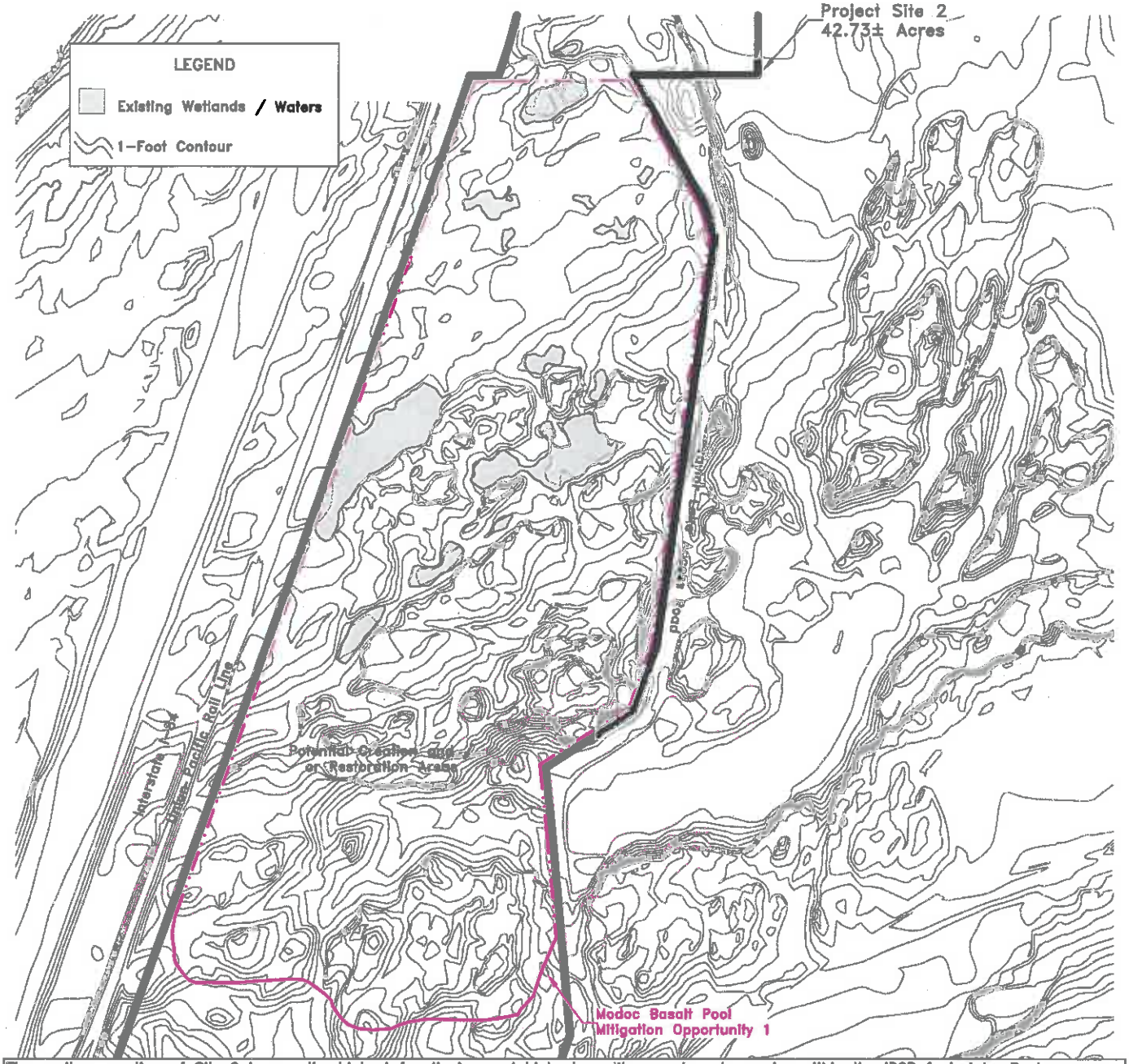
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

TYPICAL MITIGATION OPPORTUNITY 3

July 2015

The identified mitigation opportunity footprint is provided as a cursory analysis tool only. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints.

FIGURE 6.3



The northern portion of Site 2 houses the highest functioning and highest quality vernal pool complex within the IRGP footprint. Pools range from in-tact areas within very rugged basalt outcrops to areas experiencing historic and ongoing disturbances in the northern extents. Vernal Pool Opportunity 1 could provide wetland / upland preservation credits, enhancement and potential vernal pool wetland creation opportunities.

Review of the recent Wal-Mart permit decision indicates wetland preservation would provide credit at a 4:1 ratio while creation and restoration would be assessed at typical ratios. As upland areas are critical to sustaining the integrity of these pools, credit should be obtained for adjacent uplands in a future mitigation footprint.

Preservation pools would serve as reference areas for other mitigation actions. That is, enhancement, restoration and / or creation actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. For preservation, minimal vegetation management would be required to maintain existing communities. Enhancement, restoration and / or creation areas would require select grading and vegetation re-establishment to obtain target habitats. Functional lifts are anticipated for Hydrologic Function, Water Quality Group, Aquatic Support Group, Terrestrial Support Group.

Source: Adapted from Wasco County and TSI georeferenced civil files.

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GRAPHIC SCALE
0 125 250
(IN FEET)
1 inch = 250 ft.

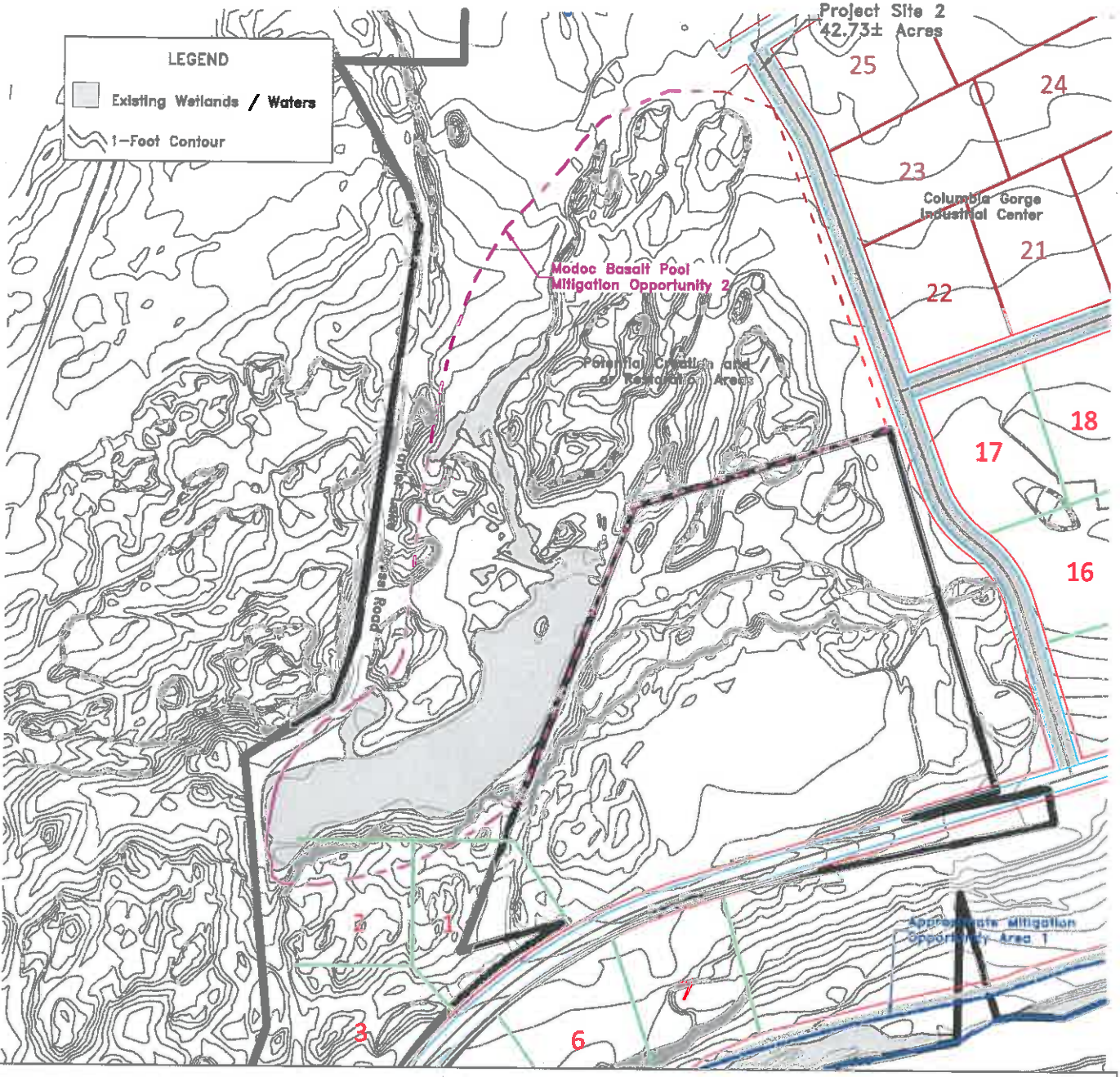
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

VERNAL POOL MITIGATION OPPORTUNITY 1

July 2015

The identified mitigation opportunity footprint is provided as a cursory analysis tool only. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints.

FIGURE 7.1



Vernal Pool Mitigation Opportunity 2 could utilize existing wetlands and adjacent areas to provide a combination of preservation, enhancement and restoration credits. Aerial photography and delineation results document historic fill, excavation and land manipulation encroachments within a relatively in-tact basalt valley. It is anticipated that mitigation would restore, expand and preserve the historically present wetland complex to provide vernal pool type credits.

Mitigation would require select excavation, material placement and contouring to achieve target grades and hydrological conditions. As the mitigation features are hydrologically dependent upon adjacent basalt uplands, mitigation credit for upland preservation should also be granted. Preservation wetlands would serve as reference areas for potential mitigation actions. That is, enhancement and restoration actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. Mitigation vegetation goals would be establishment of native herbaceous communities with scrub-shrub inclusions along the bases of basalt outcrops. Basalt vernal pool mitigation would create, restore and increase functional lifts for Hydrologic Function, Water Quality Group, Terrestrial Support Group and Ecological Condition.

Source: Adapted from Wasco County, HHPR and TSI georeferenced civil files.

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GRAPHIC SCALE
0 125 250
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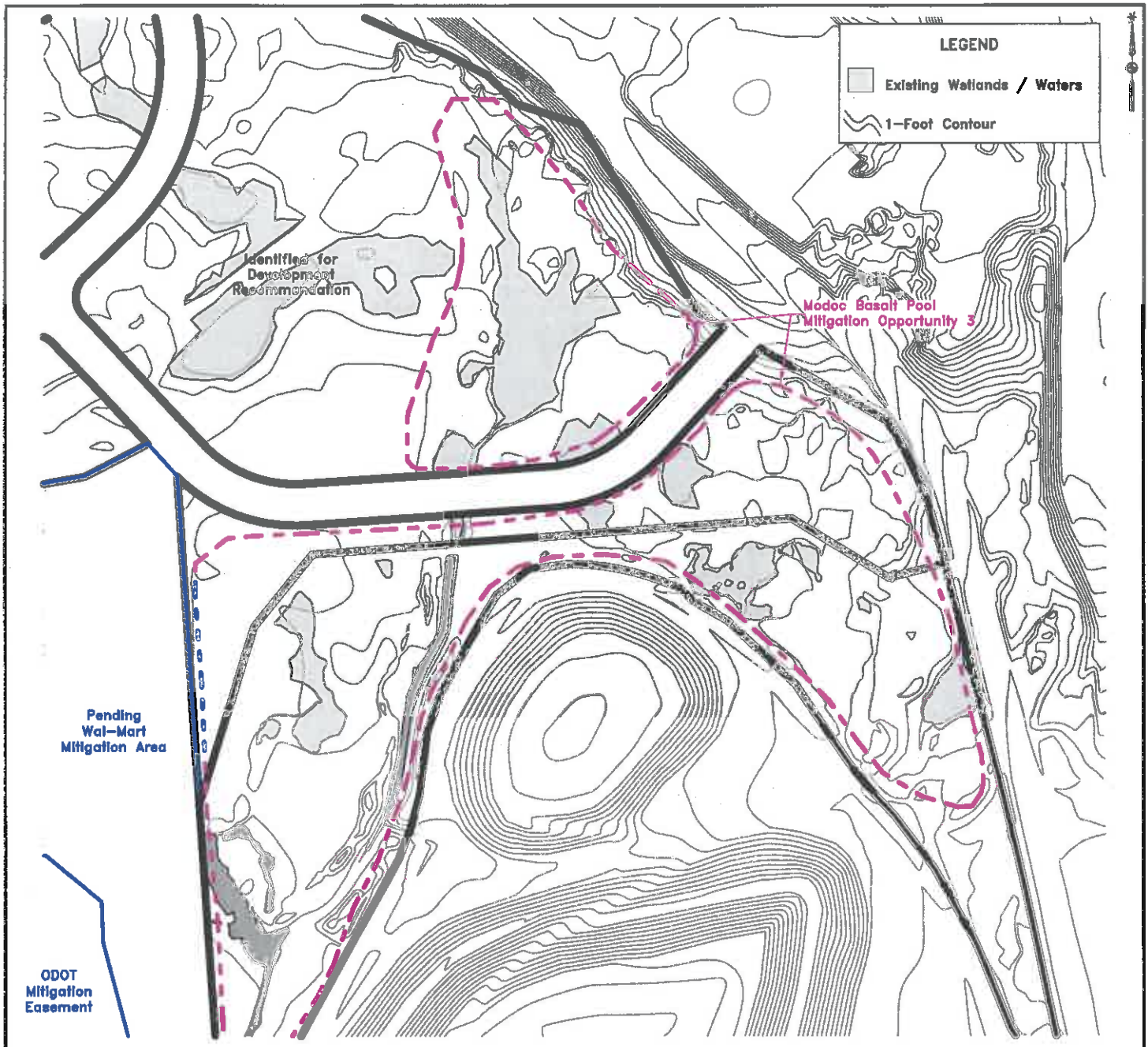
DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

VERNAL POOL MITIGATION OPPORTUNITY 2

July 2015

The identified mitigation opportunity footprint is provided as a cursory analysis tool only. A more detailed site assessment of existing and historical conditions beyond the scope of this IRGP process is necessary to properly document potential mitigation scenarios and footprints.

FIGURE 7.2



Vernal Pool Mitigation Opportunity 3 could include a combination of wetland / upland preservation, restoration and enhancement. While preservation areas remain relatively undisturbed, the remainder of this opportunity footprint has experienced significant grading disturbances. Specifically, delineation and ORWAP results document historical disturbances which result in highly degraded and disturbed wetland areas ranging from impounded scabland depressions to excavated ditches.

Mitigation would require select excavation, material placement and contouring to achieve target grades and hydrological conditions. As the mitigation features are hydrologically dependent upon adjacent basalt uplands, mitigation credit for upland preservation should also be granted. Mitigation would be suitable for offsetting vernal pool type impacts.

Onsite preservation pools would serve as reference areas for potential mitigation actions. That is, enhancement and restoration actions would be executed in a manner to obtain the hydrological and vegetation characteristics present within preserved pools. Mitigation vegetation goals would be establishment of native herbaceous communities with scrub-shrub inclusions along the bases of basalt outcrops. Basalt vernal pool mitigation would create, restore and increase functional lifts for Hydrologic Function, Water Quality Group, Terrestrial Support Group and Ecological Condition.

Source: Adapted from Wasco County and TSI georeferenced civil files.

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

GRAPHIC SCALE
0 100 200
(IN FEET)
1 inch = 200 ft.

DEVELOPMENT AND COMPENSATORY MITIGATION FEASIBILITY REPORT FOR THE POTENTIAL PORT OF THE DALLES IRGP PROCESS
The Dalles, Wasco County, Oregon

VERNAL POOL MITIGATION OPPORTUNITY 3

July 2015

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FIGURE 7.3