Revised Draft of October 31, 2003
Medford Locally Significant Wetlands
Conflicting Use and ESEE Analysis

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SECTION 1. BACKGROUND INFORMATION

Introduction

For most of the period since the Medford Comprehensive Plan was first acknowledged in 1977, Medford has coordinated with the Division of State Lands (DSL) in preserving some of its wetland resource sites through the site plan review and subdivision regulatory processes. Medford's comprehensive planning process, however, has not fully addressed federally mandated wetland resource management or Statewide Planning Goal 5 issues, which have become increasingly prominent during the last two decades. The result has been an increased level of uncertainty regarding development involving wetland sites, especially in industrially designated areas. Moreover, as growth pressures increased in the 1990s, and the supply of buildable land has decreased, conflicts between natural resources and urban development have increased.

The Medford City Council recognized the need to identify and manage its wetlands as a result of the City's revision of the Environmental Element of the Medford Comprehensive Plan in 2000. The Environmental Element was further refined relative to the wetland protection program early in 2003. The Conclusions of the current Environmental Element include the following:

5. The City of Medford recognizes wetlands as valuable urban resources that can provide water quality maintenance, stormwater detention, wildlife habitat, and open space. Medford's 2002 Medford *Local Wetlands Inventory and Locally Significant Wetland Determinations* by Wetland Consulting identified and assessed most of the wetlands, in the Urban Growth Boundary. The 2002 *Medford Riparian Inventory and Assessment Bear Creek Tributaries* by Wetland Consulting inventoried and assessed the waterways that are tributary to Bear Creek.

6. Occasionally, the protection of a locally significant wetland (one that has been determined to have significant value according to state criteria) must be balanced against other important community goals. An exceptional "conflicting use" may be more important to the long-term needs of the citizens than preservation of the wetland area.

7. The Medford UGB has been evaluated for potential wetland mitigation sites. Wetland mitigation involves the restoration, enhancement, or creation of wetlands to compensate for permitted wetland losses elsewhere. Restoration and enhancement of existing wetlands is the wetland mitigation most likely to be successful in Medford due to its ecologic and climatic characteristics.

The Goals, Policies, and Implementation Strategies of the Environmental Element include the following:

Policy 4-B: The City of Medford shall protect ground water recharge areas in the planning area by striving to restore and maintain the natural condition of watersheds, waterways, and flood plains.

Goal 6: To recognize Medford's waterways and wetlands as essential components of the urban landscape that improve water quality, sustain wildlife habitat, and provide open space.

Policy 6-A: The City of Medford shall regulate land use activities and public improvements that could adversely impact waterways in the interest of preserving and enhancing such natural features to improve water quality and fish and wildlife habitat.

Policy 6-B: The City of Medford shall regulate land use activities and public improvements that could prevent meeting the federal performance standard of *no net loss* of wetland acreage.

Implementation 6-B (1): Prepare amendments to the Medford *Land Development Code* for consideration by the City Council to adopt "safe harbor" protections or protection developed through an ESEE (environmental, social, economic, and energy) analysis for locally significant wetlands, as defined, pursuant to Oregon Administrative Rules 660-23.

Policy 6-C: The City of Medford shall encourage the incorporation of waterways, wetlands, and natural features into site design and operation of development projects.

Implementation 6-C (1): Promote clustered development in order to avoid alteration of topographical and natural features, to reduce impervious surfaces, and to enhance the aesthetics of development projects. Investigate incentives for clustering development.

Policy 7-A: The City of Medford shall encourage the conservation of plants and wildlife habitat, especially those that are sensitive, rare, declining, unique, or that represent valuable biological resources, through the appropriate management of parks and public and private open space.

Implementation 7-A (1): Develop a long range open space plan for consideration by the City Council that provides for an integrated system of parks, creekside greenways, wetlands, and paths/trails in Medford to enhance the biological diversity and long-term viability of natural resource areas. Coordinate the plan with the *Medford Parks, Recreation, and Leisure Services Plan*, the *Comprehensive Medford Area Drainage Master Plan*, and other relevant plans.

Implementation 7-B (2): Ensure that improvements, such as multi-use paths and storm drainage facilities sited in or near riparian corridors, waterways, wetlands, or other fish and wildlife habitat, include protective buffers, preserve natural vegetation, and comply with the requirements of Oregon Administrative Rules 660-23.

The City's 1999 visioning process, *Medford in the 21st Century – A Vision for Our Future,* expressed the community's desire to "preserve and enhance its urban and natural environments" through a variety of means, including protecting and maintaining creeks and identifying and managing wetlands.

> ***Medford in the 21st Century—A Vision for Our Future:***
> *The City has preserved and enhanced its urban and natural environments through creative beautification, and by protecting and maintaining creeks, preserving and planting more trees, protecting historic sites, and identifying and managing wetlands.*

In October 2002, the Medford City Council adopted a strategic plan for "Medford in the 21st Century". The "Parks, Recreation, and Natural Environment" section emphasizes the importance of identifying and managing wetlands. Action item 2.14 specifies *the "continued, ongoing maintenance and preservation of wetlands within existing parkland."* Action item 2.15 lays out plans *to "review identified wetlands in the Urban Growth Boundary and develop an acquisition/preservation plan for significant wetlands within the community."* Thus, the primary impetus for this study comes from the community itself.

A. Periodic Review Work Task

Medford also has a "Periodic Review" obligation to complete the wetland inventory and conflict resolution process. The City of Medford has an adopted Periodic Review Work

Program that has been approved by the Oregon Land Conservation and Development Commission (LCDC). One of the work program tasks (Task 6) is to complete an inventory of locally significant wetlands, identify land uses that conflict with protection of these wetlands, analyze the ESEE (economic, social, environmental and energy) consequences of alternative courses of action, and adopt land use regulations that resolve conflicts between resource protection and development. This report addresses the conflicting use, ESEE analysis, and programmatic aspects of Task 6.

B. Existing Medford Regulations Affecting Wetlands

Medford's existing wetland regulatory program has three parts:

1. First, Medford limits development within the 100-year floodplain by meeting FEMA (Federal Emergency Management Agency) regulations. These regulations allow development within the floodplain, provided that flood storage capacity is maintained, structures are secured, and habitable floor area is located at least one foot above the 100-year flood level. These regulations do not, however, protect locally significant wetlands.
2. Second, Medford coordinates with DSL when development is proposed on or near wetlands, as required by state statute.
3. Finally, some of Medford's wetlands are *already* protected by the City's recently adopted (in June 2000) "Riparian Corridor" regulations. The Medford Land Development Code (MLDC) includes Riparian Corridor standards[1]. The purpose of these standards is:
   - To protect and restore Medford's waterways and associated riparian areas, thereby protecting and restoring the hydrologic, ecologic, and land conservation functions these areas provide for the community.
   - To protect fish and wildlife habitat, enhance water quality, control erosion and sedimentation, and reduce the effects of flooding.
   - To protect and restore the natural beauty and distinctive character of Medford's waterways as community assets.
   - To provide a means for coordinating the implementation of the Bear Creek Greenway within the Medford Urban Growth Boundary (UGB).
   - To enhance the value of properties near waterways by utilizing the riparian corridor as a visual amenity.

As required by Statewide Planning Goal 5 (OAR 660-023-090) the riparian corridor standards establish a riparian corridor boundary that includes locally significant wetlands (LSW) that lie partially or completely within the boundary. The width of the riparian corridor is measured from the top of bank of fish-bearing streams and depends on average annual stream flow.[2] The

[1] City of Medford Land Development Code, February 2000, Sections 10.920-928.

[2] For fish-bearing streams with an average annual flow of less than 1,000 cubic feet per second (cfs), the riparian corridor is 50 feet measured from top-of-bank or edge of adjacent wetland. For fish-bearing streams with an average annual flow of 1,000 cfs or more, the riparian corridor is 75 feet.

Riparian Corridor standards protect the following streams and their riparian corridors (including adjacent locally significant wetlands):

- Bear Creek (50' riparian corridor)
- Lazy Creek (50' riparian corridor) Proposed
- Larson Creek (50' riparian corridor)
- Lone Pine Creek between Biddle Road and Bear Creek (50' riparian corridor)

Because LSWs within *designated* riparian corridors are already protected by the City's Riparian Corridor standards, this report focuses on *isolated* locally significant wetland resource sites – i.e., sites that are not within or partially within designated riparian corridor boundaries. The following locally significant wetlands are associated with fish-bearing streams and are protected by the City's riparian corridor "safe harbor" regulations:

- BS-W04, 06 and 09 (Bear Creek South);
- LA-W01 and 05 (Larson Creek); and
- LZ-W01-03 (Lazy Creek).[3] Proposed

C. Purpose of this Report

This report is a significant step in Medford's overall strategy to streamline, objectify and update its land use planning and regulatory programs, consistent with Statewide Planning Goals and federal wetland management requirements. A principal theme underlying Medford's planning program is that future land use problems can be minimized to the extent that (1) issues are identified and analyzed in advance, and (2) clear and objective development approval standards are adopted to effectively resolve conflicts.

The City of Medford commissioned this report with several specific objectives in mind:

(1) To identify clusters of locally significant wetlands (i.e., wetland resource sites) that are functionally inter-related and similarly zoned. Each wetland resource site, or cluster, is divided into two categories: high quality and moderate quality wetlands.

(2) To determine "impact areas" outside of wetland boundaries, where development impacts may be reduced through buffers or other means.[4]

(3) To identify uses and activities that are likely to conflict with full protection of each wetland resource site. This is done primarily by reviewing uses allowed by zoning, and by identifying public facilities and transportation projects that are likely to go through wetlands or their impact areas.

[3] City adoption pending.

[4] Generally, this document distinguishes between the terms "mitigation" and "impact reduction." Wetland "mitigation" generally means "mitigation as required by the Division of State Lands," whereas "wetland impact reduction" occurs as a result of standards or conditions imposed by local governments.

(4) To recommend a "limited protection" program that achieves a balance between resource protection and allowing certain conflicting uses with locally required impact reduction. The limited protection option is based on the City's existing Riparian Corridor standards.

(5) To determine the probable impacts of development on significant wetland resource sites - and *vice versa*. Goal 5 requires a determination of the environmental, social, economic, and energy consequences of developing, not developing, or partially developing each wetland resource site. Goal 5 also requires that the impacts of protecting the wetland resource site - especially on affected property owners - also be considered.

(6) To provide the Planning Commission and City Council the information needed to evaluate the ESEE consequences of wetland resource protection so that they can make informed policy decisions concerning the appropriate level of protection that should be afforded to wetland resource sites in the Medford UGB.

The final and primary objective of this report is to comply with Statewide Planning Goal 5 with respect to wetland resource sites. Although City of Medford has the discretion to determine whether and/or how a wetland resource site should be protected, the City must exercise this discretion consistent with Goal 5 and OAR 660-23-000. This report, therefore, is designed to meet LCDC Goal 5 legal standards and to minimize the City's exposure to legal challenges in the future.

As noted above, this report provides the factual and analytical basis necessary for effective citizen and property owner involvement, and for the Planning Commission and City Council decision-making process.[5] The wetland resource functions and values of the LSWs have been determined to the satisfaction of DSL, consistent with applicable DSL administrative rules. Barring factual information to the contrary, the significance of each wetland resource should be taken as a "given" by decision-makers.

This report provides the consultant's professional determination of the economic, social and energy consequences of completely protecting the resource, allowing development to proceed without restriction, or allowing development to proceed on a limited basis. However, it is up to the Planning Commission to recommend, and the City Council to decide, what weight should be given to economic, social and energy factors relative to environmental factors. At one extreme, the City may decide that the wetland resource site is so important that it should be preserved at any cost. At the other end of the spectrum, the City may decide that the costs of protecting the resource are so high, that the resource site should be removed from the Local Wetland Inventory (LWI) altogether.

This report tries to avoid these extremes in two ways. First, sites that DSL has determined to have relatively low resource value (i.e., non-locally significant wetlands) are not recommended for further consideration in this ESEE analysis. There is no need for the

[5] In Columbia Steel Castings v. City of Portland, SC S37723 (1992), the Oregon Supreme Court concluded that "the Goal 5 implementing rules require that an ESEE analysis contain enough information on impacts that resource sites and conflicting uses have on each other to permit the responsible jurisdiction to have 'reasons to explain why decisions are made for specific [resource] sites.' The reasons need be given only if a particular decision is challenged, but the reasons must exist at the time the land use decision is made. The reasons cannot exist if the local government's ESEE study was never sufficiently detailed."

Planning Commission and City Council to devote time in evaluating the consequences of preserving or not preserving the resource, if the resource is relatively insignificant in the first place. However, even non-locally significant wetlands require review by DSL, and the City is required by state law to notify DSL of the existence of such non-LSWs.

Second, locally significant wetland resource sites usually can be partially preserved without severe economic, social or energy consequences. For example, through zoning techniques such as residential density transfer, most resource sites can be at least partially protected without severe economic hardship to the landowner or developer. In some cases, however, locally significant wetlands cannot be protected, even on a limited basis, without severe economic or social consequences. (See site-specific resource recommendations found in Section 3.)

High and Moderate Quality Wetlands

A. Locally Significant Wetlands (LSWs)

The City of Medford completed a Local Wetlands Inventory (LWI) in 1995, in accordance with DSL administrative rules. (OAR 660-023-040) The LWI was updated in 2002. Also in 2002, Medford applied DSL rules to determine which wetlands are "locally significant." The Local Wetlands Inventory was approved by DSL in 2002 and identified the location, quality and quantity of LSWs that must be considered through the Goal 5 process. The Medford City Council adopted the Local Wetland Inventory on April 17, 2003. This action marked the culmination of a three-year planning process that included participation by affected property owners and local citizens in both public open houses and via written comment.

Medford's LSWs are found throughout the UGB, but are concentrated in the north part of the city, by the airport, and in the southern and easterly parts of the city. This report: (1) Identifies important *wetland* natural resource sites and their "conflicting uses", and (2) Evaluates the probable impacts or "consequences" of development and preservation options.

Wetlands within the Medford UGB are considered *significant* if, through the Oregon Freshwater Wetland Assessment Methodology (OFWAM) evaluation, they:

1. Provide diverse wildlife habitat, intact fish habitat, intact water quality function, or intact hydrologic control function;
2. Are located within 1/4-mile of a "water quality limited stream" and have "intact" or "impacted or degraded" water quality function;
3. Contain rare plant communities or federal or state-listed species; or
4. Have a surface water connection to a stream that is habitat for indigenous anadromous salmonids and have "intact" or "impacted or degraded" fish habitat function; or
5. Represent a locally unique native plant community; or
6. Are publicly owned and have educational value.

B. Wetland Site Designation and Ranking

Wetland resource sites were selected based on similar geographic, biological, and conflicting use (zoning) characteristics of Medford wetlands. A wetland site contains significant wetlands that:

1. Are located within the same hydrologic basin;
2. Are located within the same zone category;
3. Contain whole OFWAM assessment units; and
4. Are located within ¼-mile of other wetlands in the site.

Overall, there are 27 wetland resource sites within the UGB. Table 1.1 correlates individual wetlands as identified in the Local Wetland Inventory with wetland resource sites (wetland clusters) considered in this ESEE analysis.

1. High Quality Wetlands

High quality wetlands were determined using a combination of key assessment variables (functions and values) used to determine wetland significance. High Quality Wetlands in Medford are locally significant wetlands that provide highly rated ecological functions. **Table 1.1 identifies high quality wetland sub-sites in bold.** High quality wetlands have at least one of the following characteristics:

1. Have at least two "high" OFWAM function ratings (i.e., diverse wildlife habitat, intact fish habitat, intact water quality function, or intact hydrologic control function); or
2. Contain one or more rare plant communities; or
3. Provide habitat for listed species; or
4. Connect directly to a salmon-bearing stream.

2. Moderate Quality Wetlands

Locally significant wetlands that do not meet the above criteria are categorized as "moderate quality wetlands." These locally significant, moderate quality wetlands are <u>not</u> bolded on Table 1.

Site	Wetland Codes
1	BE-W01
2	BE-W03
3	BS-W01
4	**BS-W04**[1] **BS-W06**[1] **BS-W09**[1]
5	BS-W10
6	BS-W13 BS-W14 BS-W15 BS-W16
7	EK-W08
8	EK-W10 EK-W11
9	EK-W14
10	**LA-W01**[1]
11	LA-W02
12	**LA-W05**[1]
13	LP-W01
14	LP-W02
15	**LP-W05** **LP-W06** LP-W07 LP-W08
16	**LP-W10** **LP-W11** **LP-W12**
17	**LZ-W01**[1] **LZ-W02**[1] **LZ-W03**[1]
18	LZ-W05 LZ-W06 LZ-W07
19	MD-W01
20	MD-W03 MD-W09 **MD-W16** **MD-W20** **MD-W23** **MD-W24** **MD-W25** MD-W26 MD-W44 MD-W13

Site	Wetland Codes
22	MD-W27 MD-W28 MD-W29 MD-W30 MD-W31 MD-W32 MD-W33 MD-W34 MD-W35 MD-W39 **MD-W40** **MD-W41**[2]
23	MD-W46 MD-W47 MD-W48 MD-W49 MD-W50 MD-W51 MD-W52 MD-W53
24	MD-W54
25	MD-W56
26	MD-W62
27	SW-W01
28	**SW-W02**[3] **SW-W03**

[1] These high quality wetlands are protected by the City's existing Riparian Corridor regulations. (Proposed for Lazy Creek.)
[2] The Airport may have graded these high quality wetlands during expansion, in which case the qualities for which they were ranked "significant" or "high quality" may no longer be present.
[3] This high quality wetland may need to be taken off the inventory because it is the subject of an approved DSL wetland fill permit.

Table 1.2 is derived from Table 1.1 and provides a summary of "high quality wetlands" within the study area. The footnotes from Table 1.1, above, also apply to high quality wetlands in Table 1.2.

Table 1.2: High Quality Wetlands within the Medford UGB

BS-W04	LP-W10	MD-W20	MD-W16
BS-W06[1]	LP-W11	MD-W24	
BS-W09[1]	LP-W12	MD-W25	
LA-W01[1]	LZ-W01[1]	MD-W40	
LA-W05[1]	LZ-W02[1]	MD-W44[2]	
LP-W05	LZ-W03[1]	SW-W02[3]	
LP-W06	MD-W23[2]	SW-W03	

[1] These high quality wetlands are protected by the City's existing "safe harbor" Riparian Corridor regulations, or *will be* protected by proposed Lazy Creek riparian standards.
[2] The Airport may have graded these high quality wetlands during expansion, in which case the qualities for which they were ranked "significant" or "high quality" may no longer be present.
[3] This high quality wetland may need to be taken off the inventory because it is the subject of an approved DSL wetland fill permit.

Wetland Impact Area Determination

The Goal 5 Rule requires that "impact areas" be mapped and considered as part of the ESEE consequences analysis process. OAR 660-023-010(3) defines "impact area" as "a geographic area within which conflicting uses could adversely affect a significant Goal 5 resource." The Goal 5 Rule goes on to state that:

> ***"Local governments shall determine an impact area for each significant resource site. The impact area shall be drawn to include only the area in which allowed uses could adversely affect the identified resource. The impact area defines the geographic limits within which to conduct an ESEE analysis for the identified significant resource site."***

A. Justification for Impact Area Determination

In Medford's case, Winterbrook recommends a relatively limited impact area of 50 feet from the wetland edge. The basis for this 50-foot impact area recommendation is as follows:

1. The Goal 5 Rule establishes a 50-foot riparian corridor as an adequate and reasonable means of limiting impacts for smaller fish-bearing streams.
2. The loss of trees and vegetation within 50 feet of a locally significant wetland would likely decrease shade, lower dissolved oxygen level, decrease groundwater recharge capacity, and increase runoff and pollution to affected wetlands.
3. "Potential tree height" is a factor used to determine the width of riparian areas. Riparian areas help maintain water quality in affected wetlands and provide wildlife habitat. The most typical trees in wetlands in the Medford area are Ash and Willow. These species typically range from 20 to 70 feet in height in Medford. The 50' protective buffer roughly corresponds with actual tree heights found in the riparian areas of isolated wetlands, and therefore provides additional justification for the width of the impact area.
4. Medford effectively limits impacts from stormwater runoff outside the 50-foot impact area through its erosion control and stormwater management standards.

Additional zoning regulations may be appropriate to mitigate for potential development impacts within this limited (50-foot) impact area. Potential impact reduction measures include increased setbacks and wetland and riparian restoration and enhancement.

B. Difference between "Impact Area" and Wetland Setbacks

It is important to distinguish between the wetland resource site "impact area" and development setback regulations that may apply within the impact area. In all cases, recommended setbacks are equal to or less than the impact area. In certain cases, where development has already occurred within the standard setback area, the site-specific recommendation may be to reduce the setback area to account for existing conditions.

As noted below, Winterbrook *generally* recommends that High Quality Wetlands be buffered by a 50-foot setback, which mirrors the standard applied to wetlands within Riparian Corridors. In more developed areas, the site-specific ESEE analysis recommends a smaller setback to take account of existing development.

For Moderate Quality (but still significant) Wetlands, Winterbrook recommends a setback of 25 feet, primarily to reduce economic impacts on individual property owners, for reasons stated in the ESEE analysis to follow. The 25-foot setback also is equal to the margin of error when mapping the location of locally significant wetlands. Therefore, avoidance of a wetland and its 25-foot setback ensures that the wetland *itself* would be avoided. Where existing development has occurred within the setback (e.g., where a street bisects a wetland), the site-specific ESEE analysis may recommend a reduced or no setback area.

This buffer (50 or 25 feet) is included in the overall impact area, which also includes the wetland resource itself.

These recommended buffers may be modified through the ESEE analysis process. For example, where conflicts are minimal, the 25-foot buffer recommended for moderate quality wetlands may be increased to 50 feet. Applying the same logic, where conflicts are severe, the recommended 25- and 50-foot buffers may be reduced through the ESEE process in order to accommodate the needs of conflicting uses.

Conflicting Use Determination

The Goal 5 rule requires that local governments determine uses and activities that conflict with full protection of locally significant wetlands. Land uses and associated activities that impair or diminish resource values must be explicitly identified. This report distinguishes between land uses (*e.g.*, residential uses) and activities associated with a specific land use (*e.g.*, increased impacts that result from people, cars and pets associated with residential development.)

The Goal 5 Administrative Rule (OAR 660-23-040(2)) states that:

> ***"Local governments shall identify conflicting uses that exist, or could occur, with regard to significant Goal 5 resources sites. To identify these uses, local governments shall examine land uses allowed outright or conditionally within the zones applied to the resource site and its impact area. Local governments are not required to consider allowed uses that would be unlikely to occur in the impact area because existing permanent uses occupy the site."***

This report considers both broad land uses that could negatively affect a resource site (*e.g.*, residential subdivisions), as well as activities associated with the broad land use (*e.g.*, vegetation removal and excavation that could diminish wetland resource values).

A. Categories of Conflicting Land Uses

This report identifies five broad categories of conflicting uses. There are two categories of private urban development uses that conflict with LSWs their respective impact areas. These are:

(1) **Residential** development; and

(2) **Commercial and Industrial** development.

Commercial and industrial development have been considered together because (a) they have similar impacts, and (b) many of the uses that are allowed in commercial zones are also allowed in industrial zones, although the reverse is less likely.

Two categories of public facility uses conflict with wetland resource sites when they are constructed on the site or within the "impact area affected." These are:

3) **Public and Transportation Facilities**. This category includes the installation and maintenance of public facilities that are needed to support urban development: and

(4) **Parks, Schools and Recreational Facilities**. This category includes the installation, maintenance and public or private use of parks and recreational facilities. Because schools often have large recreational areas, they are included in this conflicting use category as well.

Finally, the most pervasive adverse impact on wetland functions and values results from removal of vegetation and excavation:

(5) **Vegetation Removal and Grading**. In addition to vegetation removal and grading associated with urban development, this category also includes commercial forestry and agricultural operations.

B. Method for Identifying Conflicts

To identify land use conflicts for each of the above categories, the applicable zoning districts have been examined to identify permitted and conditionally permitted land uses. The consultants have applied their judgment to make sure that land uses which are typically allowed in residential or commercial-industrial zoning districts are included as potential conflicting uses, where appropriate.

Other sources for identifying probable land use conflicts include:

1. Public facilities master plans for sewer, water and storm drainage.
2. Known or probable development proposals (including conditional use permits, planned developments, site reviews and subdivisions), based on the consultants

knowledge or based on discussions with City of Medford staff and other knowledgeable sources.

3. Planned transportation (both vehicular and bicycle) routes, including those that may not be on an adopted inventory or plan.
4. Planned or probable recreational trails and paths.

Once the land use conflicts have been identified, activities and side effects of these land uses are considered. In the ESEE consequences analysis, conflicts resulting from the primary land use, and secondary land use activities, are considered together in packages. Under each conflicting use, associated activities that also conflict with wetland resource sites are listed.[6] As noted above, a land use conflicts with a wetland resource site if it is located within the boundaries of the resource site or within the "impact area."

Generally, this report is not concerned with existing land use impacts on wetland resource sites, insofar as the location of existing buildings and structures on a site is concerned. Rather, this report is intended to be useful to the City in determining whether and how to (1) make siting decisions for new or expanding conflicting uses, and (2) regulate the conflicting activities of existing and potential land uses.

There are a number of conflicting nuisance impacts that typically are not regulated by zoning but typically are controlled, to some extent, by other city regulations. Such conflicting, non-land-use related activities include, but are not limited to:

- Pet impacts, including domestic animal wastes and harassing of wildlife;
- Off-road vehicle impacts, including mountain bikes, motor bikes, etc., which could destroy habitat or harm water quality;
- Human impacts resulting from people working or playing, or passing through or near the wetland resource site;
- Vandal and fire impacts;
- Increased noise levels except for industrial point sources;
- Air quality impacts, which could, in turn, adversely affect habitat value; and
- Household and industrial waste spills or dumping.

The activities above are not typically regulated through the *land use* process, although their impacts usually increase as an area is urbanized and population increases. These impacts are not site-specific land use impacts that are directly attributable to development of a particular property, or for which conditions of approval are attached through the development review process. The regulation of these impacts is legislative in nature, and is often beyond the control of City of Medford (*e.g.,* wandering pets are regulated by Jackson County Animal Control). Therefore, these activities are not considered "land use" conflicts *per se*, and therefore are beyond the scope of this analysis.

[6] In the discussion below, each broad category of conflicting uses listed, followed by the number sub-categories of conflicting uses. Where the term "including" is used in providing examples of conflicting land uses, the intent is illustrative. Thus "including" should be read as "including but not limited to." The term "siting" refers to the location of the conflicting land use's buildings and accessory facilities (including structures, parking facilities and outdoor storage) on a particular site.

C. Conflicting Use Matrix

Table 1.3 is a conflicting use matrix that identifies general category of conflicting use that affects each inventoried wetland resource site and constituent LSW.

Table 1.3: Summary of Conflicting Use Categories

Conflicting Use Categories	GLUP Map	Wetland Resource Sites	Plan Designation Description
Residential Supplemental ESEE Analysis			
Urban Residential	**UR**	1-2, 4 (in part), 5, 7-10, 12, 14-16, 18, 24-25	The Urban Residential designation permits lower density urban residential uses (one to ten units per gross acre), including standard and small lot detached single-family dwellings, accessory dwelling units, and mobile home parks. PUDs allow density increase. Moderate land clearing and grading, vegetation removal, site maintenance; moderate impervious surfaces.
Urban High Density Residential	**UH**	11, 15 (in part)	The Urban High Density Residential designation permits higher density urban residential uses (15 to 30 units per gross acre), provides for multi-family development, including duplexes, apartments, and group quarters. PUDs allow density increase. Moderate to high land clearing and grading, vegetation removal, site maintenance; moderate to high impervious surfaces.
Commercial / Industrial Supplemental ESEE Analysis			
Commercial	**CM**	4, 5, 6, 15, 26, 27, 28	The Commercial designation allows commercial development as well as residential development under certain circumstances. The C-H zone is intended to accommodate heavy commercial development along highways, and is located near industrial zones and away from residential, retail commercial, and general office uses. High land clearing and grading, vegetation removal, site maintenance; high impervious surfaces.
Service Commercial	**CS**	11	The Service Commercial designation allows service and office uses as well as residential development under certain circumstances. The C-S/P zone is intended to be customer oriented while limiting retail uses.
Airport	**A**	13, 20, 21, 22, 23	The Airport designation applies to the Rogue Valley International – Medford Airport and its affected environs. The Light Industrial (I-L) zone is applied to the airport and associated uses. Intensive land clearing and grading, vegetation removal, site maintenance; moderate to high

Conflicting Use Categories	GLUP Map	Wetland Resource Sites	Plan Designation Description
			impervious surfaces. Specific conflicts identified in the Airport Master Plan.
General Industrial	**GI**	1, 13, 19, 20, 21, 22, 23 (in part), 25, 26	The General Industrial designation applies to both general (I-G) and light industrial (I-L) zones. I-L allows office and light manufacturing uses, and is suitable for areas near commercial and residential lands. I-G allows production and processing activities that can have noise, vibration, air pollution, radiation, glare, fires and similar impacts. High to intensive land clearing and grading, vegetation removal, site maintenance; high to intensive impervious surfaces.
Heavy Industrial	**HI**	21, 22,23 (in part), 25, 26, 27	The Heavy Industrial designation applies to both general (I-G) and heavy industrial (I-H) zones. It allows activities with large noise, vibration, air pollution, radiation, glare, fires and similar impacts. Intensive land clearing and grading, vegetation removal, site maintenance; intensive impervious surfaces.
Public Facilities and Transportation Supplemental ESEE Analysis			
Public Facilities	**All**	3, 6, 8, 9, 14, 16, 18, 19, 21-23	Existing public facilities and those proposed in the Public Facilities Element of the Comprehensive Plan, Transportation System Plan, Capital Improvement Program, and facility master plans.
Parks and Schools Supplemental ESEE Analysis			
Parks and Schools	**PS**	2, 17	The Parks and Schools designation applies to existing and proposed public parks and schools (no specific zoning district). Low to moderate land clearing and grading, vegetation removal, site maintenance; low to moderate impervious surfaces.
Vegetation Removal and Grading Supplemental ESEE Analysis			
Vegetation Removal and Grading	**All**	All	General vegetation removal and grading (that may be unrelated to building activities above).

*** Note**: Because there are only two wetland resource sites in this category, the reader is directed to the site-specific ESEE analyses. The supplemental ESEE analyses identify potential conflicting uses.

SECTION 2. SUPPLEMENTAL ESEE ANALYSES

The ESEE consequences analysis serves as the basis for future regulation of development activities affecting Goal 5 wetland resource sites. (See OAR 660-23-040.) The ESEE analysis must explain what the impacts on the resource would be if the conflicting use were allowed (or allowed on a limited basis), and what the impacts on the conflicting use would be if the resource were protected (or protected on a limited basis). This analysis must be resource site-specific, and should not be generalized for all similar resource sites. (See Section 3, Site Specific ESEE Analyses.)

OAR 660-23-040(1) and (4) describe the purpose and requirements for a Goal 5 ESEE consequences analysis:

> ***"1) Local governments shall develop a program to achieve Goal 5 for all significant resource sites based on an analysis of the economic, social, environmental, and energy (ESEE) consequences that could result from a decision to allow, limit, or prohibit a conflicting use. * * * The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected. * * ****
> ***4) Local governments shall analyze the ESEE consequences that could result from decisions to allow, limit, or prohibit a conflicting use. The analysis may address each of the identified conflicting uses, or it may address a group of similar conflicting uses. A local government may conduct a single analysis for two or more resource sites that are within the same area or that are similarly situated and subject to the same zoning. The local government may establish a matrix of commonly occurring conflicting uses and apply the matrix to particular resource sites in order to facilitate the analysis. A local government may conduct a single analysis for a site containing more than one significant Goal 5 resource. The ESEE analysis must consider any applicable statewide goal or acknowledged plan requirements, including the requirements of Goal 5. The analyses of the ESEE consequences shall be adopted either as part of the plan or as a land use regulation."***

Program Options for Conflict Resolution

OAR 660-23-010 requires the consideration of three basic options for programs to carry out the results of the ESEE analysis: (1) preserve the resource site; (2) allow conflicting uses completely; or (3) allow conflicting uses on a limited basis.

1. Protect the Resource Site - Conflicting Uses Prohibited

Where the ESEE consequences of *fully* protecting have been determined to be acceptable to the governing body, there may be a decision to preserve a resource site as an undisturbed natural area. Such a resource site would be completely off limits to any conflicting land use or activity - including passive recreational use. This report does not recommend full protection for any locally significant wetland.

2. Allow Conflicting Uses Completely - Regardless of Impacts on Resource Site

Allowing conflicting uses for an entire wetland resource site means that none of the locally significant wetlands that comprise the resource site would be preserved. In most cases, this extreme approach is unnecessary, because locally significant wetlands can be largely preserved while allowing conflicting uses on a given parcel.

There may be a few instances where one or more of the LSWs that comprise the wetland resource site must be removed in order to allow a conflicting use. Such limited protection (see below) sacrifice is justified where the ESEE consequences of preserving even a portion of the wetland resource site are so severe as to allow conflicting uses fully, which has the effect of removing the LSW from the Locally Significant Wetland Inventory. In such cases, there would be no local protection, although the Division of State Lands would retain jurisdiction. (See limited protection option, below.)

3. Allow Conflicting Uses on Limited Basis - Partially Protect the Resource Site

In most cases, this report recommends protecting the wetland resource site on a limited basis, by allowing certain conflicting uses with mitigation. The "limit" option may also include partial or total elimination of an LSW or its buffer area, while retaining most of the Wetland Resource Site (and most of its constituent LSWs and buffer areas) intact. The recommended Goal 5 limited protection program is based on the City's existing riparian corridor "safe harbor" regulations, and is outlined in the following section.

Conflicting uses may be limited in one of two ways: first, LSWs or their impact areas may be reduced in size; or second, certain conflicting uses may be allowed provided that impacts from the conflicting use are reduced. The Goal 5 protection program suggested below, the "Proposed Limited Protection Program," combines these two approaches.

If the ESEE analysis determines that the consequences of protecting one or more LSWs and their associated buffer areas are too severe, the size of the wetland or its buffer width may be reduced through this legislative process. Because most wetland resource sites include clusters of LSWs, it is possible that one or more individual wetlands may be removed from the local inventory as part of the local balancing process. In addition, the "Proposed Limited Protection Program" allows for certain uses (e.g., public facilities and streets) subject to environmental impact reduction measures.

Proposed Limited Protection Program

The ESEE analysis must consider the consequences of full resource protection, allowing conflicting uses fully, and allowing conflicting uses on a limited basis. For the ESEE analysis to be meaningful, further definition of "allowing conflicting uses on a limited basis" is required. This report recommends building on Medford's existing conflict resolution and regulatory framework.

A. Existing Riparian Corridor Regulations

The City's existing Riparian Corridor development standards protect fish-bearing streams and their respective setback areas (riparian corridors) on a limited basis. Vegetation removal and excavation are limited. Public facilities and street improvements are allowed within the Riparian Corridor, as well as replacement and expansion of existing structures, subject to proposed local mitigation standards. The Land Conservation and Development Commission (LCDC) has acknowledged the Riparian Corridor regulations (MLDC 10.920-928). The existing Riparian Corridor standards *already* protect (on a limited basis) locally significant wetlands that are *adjacent* to fish-bearing streams.[7]

B. Recommended Modifications to Riparian Corridor Regulations

As a starting point for purposes of evaluating probable ESEE consequences of the "limited protection" option, Winterbrook recommends expanding the Riparian Corridor standards to include locally significant wetlands (LSWs), and to re-name it the "Riparian Corridor and Wetlands (RCW)" overlay district. Some or all of these recommended provisions may change as a result of the public involvement process, in which case the ESEE analysis would require amendment as well.

1. MLDC 10.920 would be amended to read "Riparian Corridors and Wetlands, Purposes." This section would be amended to incorporate additional purpose sections to address conservation of locally significant wetlands, mitigation for unavoidable impacts, and coordination with state and federal regulatory agencies.
2. MLDC 10.921, Riparian Corridors and Wetlands, Definitions, would include definitions of wetland functions and values, high and moderate quality wetlands, and wetland impact reduction, and wetland restoration and enhancement. [Note: Regarding the existing definition of locally significant wetlands: we recommend that the word "optional" be clarified in the definition: *"Medford Comprehensive Plan specifies the optional wetlands, if any, determined to be locally significant."* This may refer to the optional significance criteria, but the statement can be confusing.]
3. MLDC 10.922, Applicability, would describe the circumstances under which the RCW overlay district applies as well as the responsible review authority. The RCW Overlay District would be applied only to those wetlands that are designated for limited protection after considering ESEE consequences through a legislative process. If all or part of an LSW or its buffer area were proposed for elimination through the ESEE process, it would be taken off the official inventory (i.e., overlay district) map. Applications for plan authorizations, development permits or building permits would be subject to review, if development were proposed within the mapped RCW area.
4. MLDC 10.923, Location, would describe the precise location of the RCW overlay district. In addition to riparian corridors, the RCW would identify and map:
    a. Conserved high quality LSWs plus a 50-foot setback area; and

b. Conserved moderate quality LSWs plus a 25-foot setback area.[8]
c. Development proposed outside the RCW overlay District boundary would not be subject to further review under RCW District standards.

5. MLDC 10.924 would be amended to describe permitted activities within the RCW overlay district, subject to review by staff and DSL and Army Corps of Engineers. Permitted uses and activities would not change from the existing riparian regulations, and would include:
    a. Wetland enhancement. The modification of a wetland to improve one or more wetland resource functions, or to restore lost functions. This may include actions that result in increased native wildlife and plant species, increased amount and diversity of natural habitat, improvements to water quality or quantity, or other improvements to wetland ecological functions. Wetland restoration or enhancement actions result in no loss of any wetland or resource function, and the gain of at least one function.
    b. Wetland native vegetation restoration or removal of invasive plant species.
    c. Normal farm practices on land zoned EFU.
    d. Flood control and channel maintenance, subject to mitigation standards.
    e. Replacement and expansion of a permanent legal nonconforming structure, subject to mitigation standards.
    f. Perimeter mowing and tree removal necessary for hazard prevention.
    g. New or replacement fencing, subject to mitigation standards.
6. MLDC 10.925 would be amended to describe conditionally permitted activities subject to review by the Planning Commission, DSL and the Corps within the RCW overlay district. Again, listed conditional uses would remain the same and would include:
    a. Water-related and dependent uses.
    b. Utilities and public improvements.
    c. Streets and roads.
    d. Multi-use paths, access ways, trails, interpretative areas and similar passive recreational activities and outdoor furniture.
7. MLDC 10.926 would be amended to describe prohibited activities. Again, prohibited uses would remain the same and would include:
    a. Placement of new structures or impervious surfaces.
    b. Excavation and vegetation removal (other than perimeter mowing for fire protection).
    c. Expansion of non-native ornamental landscaping.
    d. Dumping of garbage, lawn debris or other material.
8. MLDC 10.928 would be re-named "Conservation and Maintenance of Riparian Corridors and Wetlands." This section would otherwise remain the same.

9. A new section would be added to describe local impact reduction measures. (See below.)

[8] Note: the 25-foot setback area is equal to the margin of error for wetland boundaries identified in the Local Wetlands Inventory (LWI). Therefore, *at least* a 25-foot setback area is needed to allow development to proceed without a formal delineation and concurrence from DSL.

Potential Impact Reduction Standards:

Winterbrook recommends consideration of the following local impact reduction standards:

1. An impact evaluation, prepared by a biologist or wetland scientist, demonstrates that the proposed road crossing or utility corridor is unavoidable based on an evaluation of the impacts to identified wetland and riparian functions of at least three feasible and significantly different alternatives.

2. Impact Reduction Measures that demonstrate that unavoidable impacts will be minimized through compliance with the following standards:
   a) Roads and utility lines are aligned through buffer areas; wetland and riparian impacts shall only be permitted where no practicable alternatives exist.
   b) The road or utility line is designed to the minimum size (width) requirements for the proposed use.
   c) The disturbance corridor for roads is the width established under (a), plus 15 feet on either side of the road. The disturbance corridor for utilities is the width established under (a), plus 5 feet on either side of the utility line.
   d) Road crossing is by bridge or open arch culvert.
   e) Utility crossings are bored wherever practicable.
   f) Wetlands impacted by development must be replaced (restored or created) on a 2:1 (area) ratio on-site, or 2.5:1 ratio off-site.
   g) Riparian corridors impacted by development must be enhanced on a 2:1 (area) ratio on-site, or 2.5:1 ratio off-site.
   h) Disturbance areas must be planted with native species as follows:
      1. Trees removed during construction must be replaced at a ratio of three trees for each one removed. Replacement trees must be a minimum one-half inch diameter.
      2. Three different shrub species at a minimum one-gallon size or bare root must be planted at a density of 3 plants per 100 square feet.
      3. The remaining disturbance area must be planted with forbs and grasses to attain 80 percent vegetative cover within one growing season; and,
      4. At least half of the replacement trees and shrubs must be located between the road or utility line and the affected wetland or stream channel.

Residential Supplemental ESEE Analysis

Uses and Activities that Conflict with Wetland Resource Values

This supplemental ESEE analysis is concerned with residential uses, allowed conditional uses and accessory uses affecting wetland resource sites that are designated UR (Urban Residential), UMDR (Urban Medium Density Residential), and UHDR (Urban High Density Residential). These three plan designation are implemented by seven Medford zoning districts:

- SFR-2, Single-Family Residential – 0.8-2 units per gross acre
- SFR-4, Single-Family Residential – 2.5-4 units per gross acre
- SFR-6, Single-Family Residential – 4-6 units per gross acre
- SFR-10, Single-Family Residential – 6-10 units per gross acre
- MFR-15 – 10 -15 dwelling units per gross acre
- MFR-20 – 15 - 20 dwelling units per gross acre
- MFR-30 – 20 -30 dwelling units per gross acre

MLDC 10.708 describes how "Residential Density Calculations" are made. Allowable density is determined by (a) determining gross acreage, (b) subtracting, at the developer's option, "natural unbuildable areas" (i.e., creeks between the tops-of-banks and wetlands, but not including setback areas), and (c) multiplying by the units per gross acre specified in the underlying zoning district. Specific conflicting uses include land divisions, public and semi-public uses like fire stations and religious institutions, construction of houses and accessory structures, construction of fences, driveways and parking areas, lawns and gardens, and construction of supporting streets and utilities.[9]

Many of the wetland resource sites are located on residentially zoned land and some are within the 100-year floodplain. This land use category includes land uses permitted in City of Medford's residential zoning districts. Medford's residential zones are organized such that uses that are permitted in the less intensive single family districts are also permitted in the more intensive multiple family districts.

1. Conflicting Land Uses

A. Siting of private and public land uses permitted outright or conditionally in any of City of Medford's residentially designated areas on existing lots, including:
   1. Single family or manufactured homes, duplexes and multiple family development (including condominiums, congregate care facilities and group care facilities);
   2. Semi-public uses, including churches, child care facilities, lodges and institutional buildings; and
   3. Parking lots, loading areas, driveways, and accessory structures including signs.

B. Land divisions

2. Conflicting Land Use Activities

A. Construction impacts, *e.g.,* short term impacts (noise, runoff, erosion, disruption of vegetation, etc.) resulting from construction of conflicting uses;

B. Water quality impacts, *e.g.,* surface water runoff, including runoff from streets and parking lots, erosion, and runoff from fertilized and chemically treated lawns and gardens; and

C. Outdoor lighting, which could adversely affect wildlife.

Table 2.1 identifies significant wetland resource sites and sub-sites in this category. **High quality wetlands are shown in bold and have a recommended setback of 50 feet.** Moderate quality wetlands have a recommended setback of 25 feet.

[9] Other supplemental ESEE analyses consider other categories of conflicting uses, including planned public facilities and vegetation removal and grading.

Table 2.1 Residential Wetland Resource Sites Designated Residential

Wetland Resource Site	Wetland Code(s)	Wet land Acres	Recommend-ed Setback Area	Section	Plan Map Desig-nation	Zoning/ Applicable Overlay	Adjacent Land Use
1	BE-W01	14.49	25'	371W18	UR	SFR-6 / AA	Vacant
2	BE-W03	0.93	25'	371W20	UR	SFR-4	Park, Vacant
7	EK-W08	1.56	25'	372W25	UR	SR-2.5	Partially Developed
8	EK-W10	1.47	25'	372W35	UR	SFR-6 / PD	Partially Developed
	EK-W11	6.19	25'	372W35	UR	SR-2.5, SFR-6 / PD	Partially Developed
9	EK-W14	1.3	25'	382W02	UR	RR-5	Partially Developed, Mobile home
10	**LA-W01**	**5.57**	**50'**	**371W32**	**UR**	**SFR-4 / PD**	**Developed, School, Condo**
11	LA-W02	0.98	25'	371W33	UH / SC	MFR-30/ C-S/P	Vacant
12	**LA-W05**	**8.24**	**50'**	**371W34**	**UR**	**EFU**	**Vacant**
14	LP-W02	2.53	25'	371W17	UR	SFR-4	Partially Developed
15	**LP-W05**	**7.08**	**50'**	**371W21**	**UR/UH**	**SFR-4/MFR-20**	**Partially Developed**
	LP-W06	**3.49**	**50'**	**371W21**	**UR**	**SFR-4**	**Partially Developed**
	LP-W07	3.46	25'	371W21	UR	EFU/SFR-4	Vacant
	LP-W08	0.62	25'	371W21	UR	EFU	Vacant
16	**LP-W10**	**11.25**	**50'**	**371W21**	**UR**	**SFR-4 EFU**	**Partially developed**
	LP-W11	**0.61**	**50'**	**371W21**	**UR**	**SFR-4**	**Partially Developed**
	LP-W12	**2.43**	**50'**	**371W21**	**UR**	**SFR-4**	**Vacant**
18	LZ-W05	0.62	25'	371W23	UR	SFR-4	Vacant
	LZ-W06	1.31	25'	371W22 371W23	UR	SFR-4	Developed
	LZ-W07	2.98	25'	371W23	UR	SFR-4 / PD	Partially Developed
23	MD-W54	8.77	25'	371W08, 371W08	UR	SFR-6	Vacant
24	MD-W56	1.92	25'	371W08	UR	SFR-4	Partially Developed-School

Locally Significant Wetlands with a UR or UHDR plan designation comprise approximately 87 acres, or about half of the total LSW area within the Medford UGB. Of these, 88.73 acres (45

percent) of the total LSW acreage within the UGB) are designated UR (lower density residential zones). The remaining acres (5.8 percent of the total LSW acreage) are designated UH (apartment zoning).

A. Consequences of Fully Allowing Conflicting Residential Development

1. Environmental Consequences of Unrestricted Residential Development

The wetlands in this category should be considered as part of a much larger ecological system of urban wetlands, stream corridors, and vegetated uplands associated with the Bear Creek drainage basin. The intrinsic value of any particular wetland is affected by the degree of human intrusion and its connection with stream corridors and other natural resources. Wetlands contribute directly to decreased flooding potential and to improved water quantity and quality, fish and wildlife habitat, and groundwater recharge.

Wetlands decrease flooding potential by providing flood water storage, dissipating the force of moving water, and by allowing storm water to seep gradually into the ground rather than moving rapidly over the surface and increasing flood damage and erosion. Wetlands improve water quantity and quality in a number of ways. Vegetated soils allow water to filter downward to the groundwater reservoir, adding volume to surface waters during low flow. Wetlands allow sediment to settle out or be trapped by wetland vegetation before it reaches streams. Natural vegetation also absorbs hazardous chemicals and heavy metals, reducing water pollution. Thus, loss of wetlands caused by low-density residential development contributes to flooding and reduces the quantity and quality of ground and surface water.

Varying levels of plant and animal diversity characterize wetlands. Wetlands provide improved fish and wildlife habitat by contributing to an integrated stream corridor ecosystem, which provides food, water, shelter, breeding and rearing areas, and water for aquatic and terrestrial animals and birds. Reductions in the quality, quantity and availability of food, water, cover and living space all have significant detrimental effects on wildlife. Where wetlands are connected to other natural resources, they also provide essential travel corridors for wildlife.

The Medford Local Wetlands Inventory report describes and analyzes nine criteria for wetland evaluation and characterization. That report includes four specific biological measures that would be compromised by development: wildlife habitat, fish habitat, water quality, and hydrological control. These four criteria are evaluated in the following manner: **wildlife habitat** evaluates the habitat diversity for species generally associated with wetlands and wetland edges; **fish habitat** evaluates how the wetland contributes to fish habitat in streams, ponds or lakes associated with the wetland; **water quality** evaluates the potential of a wetland to reduce the impacts that excess nutrients in storm water runoff have on downstream waters; **hydrological control** evaluates the effectiveness of a wetland in storing floodwaters and reducing downstream flood peaks.

The environmental consequences of allowing full development over the wetland are that the qualities that make each inventoried wetland significant would be lost. (See also site-specific ESEE analyses in Section 3.) When housing development (including buildings, roads and driveways, and lawns and gardens) replaces native vegetation, the value of the wetland for habitat decreases dramatically. (See Vegetation Removal and Grading Supplemental ESEE Analysis.) Residential development in wetland areas does not necessarily eliminate all fish and wildlife habitat, but it changes the habitat in a way that decreases biodiversity, because more aggressive and adaptable species tend to survive and displace less adaptable species under changed ecological circumstances.

Residential development in wetlands replaces native vegetation with impervious surface area, and contributes to flooding, reduced groundwater recharge, and increased sediment and nutrient loading (from lawns, gardens, household wastes). The result is decreased water quantity and quality, and diminished fish and wildlife habitat.

The Medford LWI report describes and analyzes the environmental qualities of each wetland in this category that would be compromised by unrestricted residential development. Depending on the specific LSW, environmental impacts from unrestricted development include loss of wildlife habitat, fish habitat, water quality function, or hydrologic control function; and/or loss of rare plant communities, federal or state-listed species, or locally unique native plant communities.

If full development of the wetland resource site was allowed, then the environmental consequences to the wetland are that the qualities, which make each inventoried wetland significant, would be lost. Depending on the characteristics of the specific LSW, environmental impacts from unrestricted development include loss of wildlife habitat, fish habitat, water quality function, or hydrologic control function; and/or loss of rare plant or animal species.

2. Economic Consequences of Unrestricted Residential Development

The economic consequences of replacing significant wetland resource sites with unrestricted residential development are less obvious, but are worthy of consideration. By allowing unrestricted development of the wetland resource site, development costs could be reduced. Since each wetland in this category is, by definition, a *locally significant wetland*, each would be regulated by state and federal agencies in any event. However, *local* regulatory costs could increase - both for the developer and the City. Economic consequences vary considerably based on individual site conditions, as noted in the discussion of the economic consequences of conserving the wetland, below.

From the developer's point of view, the lack of local regulations could mean decreased uncertainty and design costs -- costs that may be passed on to the housing consumer. Put simply, it is often easier and less time-consuming to develop through the subdivision rather than through the planned unit development process. The costs of additional consultant time would be avoided, the thought and energy required to design the project could be reduced, and there would be less local government discretion and perhaps greater certainty in the review process.

Local government regulation of wetlands could also affect the number, location and type of dwelling units, which could be detrimental to more traditional developers. Developers

must build to the local housing market. If the market (or the developer's perception of the market) is limited to large single-family homes on large lots, then additional local regulation of wetlands could mean the difference between a development "penciling out" or not, at any given point in time.

On the other hand, there are a number of less obvious economic consequences that need to be considered. First, many studies[10] have demonstrated that wetlands can add value to developments -- both for neighbors and for purchasers of lots or units in the development. Development over a wetland could have the effect of decreasing neighboring property values and reducing the sales price of lots and houses in new development.

Second, local governments and property owners face potential increases in storm water management, flood control and federally mandated water quality improvement costs as wetlands are developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created through artificial detention and water quality ponds, at considerable public expense. Medford is facing major costs in meeting federal NPDES permitting requirements; costs that could increase wetland water quality functions are lost. Flood insurance rates may also increase in the future, based on flood studies that may have to be revised because they underestimated urban runoff rates.

Third, there could be a negative economic value by not providing a clear and objective *local* process for resolving development/wetland conflicts. If the local, review process is not clearly spelled out in the MLDC, the uncertainty and delay costs could increase for everyone involved.

3. Social Consequences of Unrestricted Residential Development

The social consequences of allowing unrestricted development of significant wetland resource sites would be mixed. On the positive side, housing costs could be reduced, assuming that the developer passes on potential development savings to the consumer. By increasing the amount of buildable land inside the Medford UGB, expansion of the UGB on to farm and grazing land could be slightly delayed. Out-of-direction travel to avoid the wetland, and associated pollution and traffic impacts could be slightly reduced, assuming that subdivisions in the future would otherwise be designed in a "grid" pattern. The MLDC density transfer provisions provide opportunities to mitigate, or even reverse, negative social consequences, as described under the social consequences of resource conservation.

The negative side of the unrestricted residential development equation is more compelling. Wetlands usually add amenity value to residentially developed land, and

[10] Documentation of adverse economic impacts resulting from loss of wetland values can be further reviewed in the following websites:

http://www.sdearthtimes.com/et0697/et0697s1.html,
http://www.nps.gov/pwro/rtca/econ_index.htm
http://www.nps.gov/pwro/rtca/propval.htm#real,
http://www.packard.org/index.cgi?page=cargillcomm&

would only marginally reduce the amount of buildable land. Social consequences (lost open space and views) would be adverse as a result of developing the wetland area, which could otherwise be used as open space for the residential development. Wetlands provide educational opportunities for those living near them, which would be lost. Wetlands also provide opportunities for urban quiet and solitude, the lack of which has adverse social consequences.

The Medford LWI report describes and analyzes the social qualities of each wetland in this category that would be compromised by unrestricted residential development. That report includes specific measures for educational potential, visual/aesthetic quality, and water based recreational opportunities. The social consequences of allowing full development over the wetland are that the human-related qualities, which help make each wetland significant, would be lost.

4. Energy Consequences of Unrestricted Residential Development

Energy consequences of unrestricted residential development of wetlands are also mixed. Again, assuming standard subdivision practices, the results of building over the wetland could be more efficient use of residential land, which could prevent premature expansion of the UGB, higher urban densities, more efficient use of infrastructure, shorter travel distances and less out-of-direction travel. From a solar perspective, it is possible that vegetation from forested wetlands could shade south-facing windows of houses, thus reducing solar access. In summary, the adverse energy consequences could be significant, provided that developers choose, or City regulations required, the maximum development allowed under the MLDC in a grid street pattern with solar access design.

On the negative side, wetland vegetation has a moderating effect on climate. Trees provide shade that cools buildings in the summer and serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local recreational opportunities, thus reducing the need to drive for outdoor experiences. Thus, loss of wetland vegetation would have some adverse energy consequences.

B. Consequences of Prohibiting Conflicting Residential Development (Fully Protecting the Wetland Resource Site)

This portion of the ESEE analysis looks at the impacts of prohibiting the conflicting (residential) use on the wetland site itself and appropriate impact area, thus conserving a significant wetland resource site.

1. Environmental Consequences of Prohibiting Residential Development

The environmental values that would be retained by conservation of wetlands are listed in the Local Wetland Inventory report. These values would be largely retained by prohibiting development on and near wetlands. Thus, the environmental consequences of prohibiting conflicting residential uses include preservation of wildlife habitat, fish habitat, water quality function, and/or hydrologic control function; and/or preservation of rare plant communities, federal or state-listed species, or locally unique native plant communities.

2. Economic Consequences of Prohibiting Residential Development

It is useful to look at the economic consequences of fully protecting the significant wetland resource site from different points of view. Often, impacts are less significant at the study area level than for the individual property owner. The ESEE analyses for wetland resource sites address the special characteristics of wetland cluster in relation to property owner interests.

Study Area Level

At the study area level, the economic consequences of *avoiding* wetlands and their impact areas on vacant UR and UH properties are measurable.

As of 2001, the Medford UGB included an estimated 2,666 acres of vacant and underutilized UR land area, of which an estimated 46.45 acres are covered by LSWs and 65.62 acres are within LSW impact areas. The vacant UR land within the UGB has the capacity for an additional 10,664 dwelling units at an average of four units per gross acre. However, since the buildable lands inventory did not exclude wetlands, it is useful to recalculate dwelling unit potential excluding wetlands. The net effect of excluding LSWs wetlands and their impact areas is to reduce dwelling unit capacity on UR land to 10,216 units.

In this worst case scenario, if all 46.45 LSW acres on vacant buildable UR (Low Density Residential) land were fully preserved, *no development* was to occur within the impact areas of LSWs, and *density transfer* was not permitted, *then* the Medford UGB would be able to accommodate 448 fewer dwelling units – a reduction in dwelling unit capacity of 4.2 percent. In this unrealistic case, the Medford UGB would have to expand about one year earlier than otherwise to accommodate the low density residential housing needs of approximately 380 units per year identified in the Housing Element of the Comprehensive Plan.

At the study area level, the economic consequences of *avoiding* wetlands on Medium and High Density Residential properties are also minimal. As of 2001, the Medford UGB included an estimated 357 acres of vacant, and underutilized UHDR and UMDR land, of which an estimated acres are within wetlands and acres are within the respective wetland impact areas. According to the buildable lands inventory, Medford has the capacity for approximately 4,998 additional UMDR and UHDR dwelling units, assuming an average gross density of 14 units per acre. However, the buildable land inventory did not exclude wetlands. In the worst case scenario, if all wetland acres were fully preserved, and *no development* was to occur on their impact areas, and *density transfer* was not permitted, then the current Medford UGB would be able to accommodate fewer UMDR/UHDR dwelling units, which is less than a one year need.

From the above, it is clear that Medford has sufficient vacant and under-utilized residential land to meet projected housing needs for the planning period. Even if existing density transfer provisions were not used, it is unlikely that full protection of LSWs and their impact areas would result in premature UGB expansion. However, it is important to note that such expansion would be expensive for the city in terms of planning and public facilities costs, and in increased commuter costs. It could also harm Jackson County's agricultural economy.

It is also important to note that the worst-case scenario is unrealistic, in that it assumes: (a) *no* state or federal wetlands protection program; (b) that all 46.45 UR, and UMDR/UHDR wetland acres and their impact areas would be fully protected, and (c) that the MLDC density transfer provisions would not be used. As noted in the "limited protection" discussion below, the MLDC density transfer provisions make it possible to transfer the dwelling units that would otherwise have been lost to wetland conservation.

Property Owner Impact

From the property owner's point of view, the local regulations that *prohibit* development within LSWs and their impact areas, without density transfer, usually mean a loss of property owner's ability to develop the entire site for residential use. Although DSL often restricts development on LSWs, current DSL rules do not limit development within impact areas.

Positive Economic Consequences

On the other hand, there are positive economic consequences associated with wetland conservation. First, several referenced studies discussed demonstrate that wetlands can add value to developments—both for neighbors and for purchasers of lots or units in the development. Conserving wetlands through density transfer and thoughtful design would probably increase neighboring property values as well as the sales price of lots and houses in new development.

Second, potential costs for stormwater management, flood control and federally mandated water quality improvement programs may decrease if wetlands are not developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created through artificial detention and water quality ponds, at considerable public and/or private expense. Medford and Jackson County are facing major costs in meeting federal NPDES permitting requirements, costs that could increase if wetland water quality functions are lost. Flood insurance rates could also increase in the future, based on flood studies that may have to be revised because they underestimated urban runoff rates.

Third, there may be a positive economic value by providing a clear and objective *local* process for resolving development/wetland conflicts. If the local review process is clearly spelled out in the MLDC, the uncertainty and delay costs could decrease for everyone involved.

3. Social Consequences of Prohibiting Residential Development

The social consequences of fully protecting wetland resource sites in this category would be mixed. On the negative side, housing costs are likely to increase, as the supply of buildable land within the UGB decreases, assuming that the developer passes on potential development savings from cluster housing to the consumer. Without density transfer, the UGB could need to expand prematurely, thus increasing travel times and lost leisure time.

On the other hand, wetlands usually add amenity value to residentially developed land. Social consequences (open space, views, more affordable cluster housing, better urban design) would be positive as a result of conserving the wetland area, which could be used as open space for the residential development. Wetlands provide educational

opportunities for those living near them, which would be maintained. Wetlands also provide opportunities for urban quiet and solitude, which has positive social consequences.

The Medford LWI report describes and analyzes the social qualities of each wetland in this category that would be conserved through planned residential development and density transfer. That report includes specific measures for educational potential, visual/aesthetic quality, and recreational opportunities. The social consequences of conserving the wetlands are the retention of the qualities that help make each wetland *significant*.

4. Energy Consequences of Prohibiting Residential Development

Energy consequences of full wetland protection are also mixed. Without density transfer provisions, there could be significant loss of housing unit potential, and premature UGB expansion. This could result in increased vehicle miles traveled and other impacts associated with "urban sprawl." Public transportation options would also be less attractive. Full protection of wetlands also makes a grid street system more difficult to achieve, with further adverse impacts on energy consumption.

On the positive side, wetland water and vegetation has a moderating effect on climate. Where trees are present, they provide shade that cool buildings in the summer and serve as a windbreak in the winter. Less impervious surface means less summer heat. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local recreational opportunities, thus reducing the need to drive for outdoor experiences. Thus, conservation of wetland vegetation would have some positive energy consequences.

C. Consequences of Limiting Conflicting n Residential Development

This portion of the ESEE analysis looks at the impacts of limiting conflicting residential uses on the wetland site and within its impact area, as indicated in the recommended wetland conservation program. This program would expand the City's existing Riparian Corridor standards to include LSWs and their respective setback areas (25' for moderate quality wetlands and 50' for high quality wetlands). Public facilities and street improvements would be allowed within LSWs and their impact areas after considering alternatives and impact reduction standards. Replacement and expansion of existing structures would also be allowed, subject to mitigation standards. Density transfer would be encouraged from both the LSW and its impact area, to buildable land on the same development site.

Thus, the primary differences between the full and limited wetland resource protection programs are (a) the buffer for moderate quality wetlands would extend 25' beyond the estimated wetland boundary (which has a 25-foot margin of error in any case), (b) public facilities (including streets and trails) may be allowed within the LSW or its buffer following an alternatives analysis, and (c) density transfer is assumed.

1. Environmental Consequences of Limiting Residential Development

The environmental values that would be retained by conservation of wetlands are listed in the Local Wetland Inventory report. These values would be largely retained by

prohibiting development on and near wetlands. Thus, the environmental consequences of prohibiting conflicting residential uses include preservation of wildlife habitat, fish habitat, water quality function, and/or hydrologic control function; and/or preservation of rare plant communities, federal or state-listed species, or locally unique native plant communities.

2. Economic Consequences of Limiting Residential Development

It is useful to look at the economic consequences of fully protecting the significant wetland resource site from different points of view. Often, impacts are less significant at the study area level than for the individual property owner. The ESEE analyses for each wetland resource site address the special characteristics of the wetland cluster in relation to property owner interests.

Study Area Level

At the study area level, the economic consequences of *limited protection* LSWs and their respective buffers on *vacant* UR properties are also measurable. Because most of the LSWs that comprise Wetland Resource Sites are of moderate quality, the recommended buffer would be 25 feet.

As of 2001, the Medford UGB included an estimated 2,666 acres of vacant and underutilized UR land area, and 357 acres of vacant and underutilized UHDR / UMDR land area. Just over ?? of these acres are within LSWs and approximately ?? acres are within proposed buffer (as opposed to impact) areas. The vacant UR land within the UGB has the capacity for an additional 10,664 dwelling units at an average of four units per gross acre, and vacant UMDR/UHDR land has the capacity for 4,998 additional dwelling units, assuming an average of 14 dwelling units per gross acre.

The limited protection program would allow density transfer from the LSW and its proposed setback area, to buildable portions of affected properties. The potential for density transfer on each UR, UMDR, and UHDR site is addressed in the site-specific ESEE analysis. The proposed limited protection program encourages 100% density transfer from the wetland and its buffer (setback) area to buildable areas on the same property. Thus, the unrestricted portion of most UR, UMDR, and UHDR properties could develop at permitted densities, further decreasing possibility of premature UGB expansion. Under the limited protection program, the regional economic consequences of conserving wetlands would be negligible. Only if a wetland (when combined with other natural constraints) covers more than half of a property, would residential densities necessarily be reduced. As shown in the site-specific ESEE analyses, such cases are uncommon in Medford.

Developer Impact

From the property owner and developer's point of view, the local regulations provide greater certainty regarding site development. Although buildable area would be reduced, avoidance of the wetland and its 25'-50' setback area means that no wetland delineation would be required. If, on the other hand, the applicant were to propose limited public facilities development within an LSW or its buffer area, wetland delineation (and DSL concurrence in this delineation) would be required. Such delineation should occur prior to finding the application complete, so that development plans can be accurately prepared.

To the developer or property owner, the value of a cluster-housing unit may not be the same as a single-family housing unit on a 5,000 square foot lot. The MLDC density transfer standards at least allow the *option* of density transfer. Moreover, development costs for clustered housing units are probably considerably less per unit developed, although the sales price per unit is also likely to be less. Clustered housing also provides the opportunity to build more affordable housing units, which are an economic benefit to moderate-income housing consumers.

Positive Economic Consequences

There are positive economic consequences associated with wetland conservation. First, referenced studies demonstrate that wetlands can add value to developments — both for neighbors and for purchasers of lots or units in the development. Conserving wetlands through density transfer and thoughtful design would probably increase neighboring property values as well as the sales price of lots and houses in new development.

Second, potential costs for storm water management, flood control and federally mandated water quality improvement program may decrease if wetlands are not developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be recreated through artificial detention and water quality ponds, at considerable public expense. Medford and Jackson County are facing major costs in meeting federal NPDES permitting requirements; costs that could increase if wetland water quality functions are lost. Flood insurance rates could also increase in the future, based on flood studies that may have to be revised because they underestimated urban run-off rates.

Third, there could be a positive economic value by providing a clear and objective *local* process for resolving development/wetland conflicts. If the local, review process is clearly spelled out in the MLDC, the uncertainty and delay costs could decrease for everyone involved.

3. Social Consequences of Limiting Residential Development

The social consequences of fully protecting wetland resource sites in this category would be mixed, but are largely positive. On the positive side, housing costs could be reduced, assuming that the developer passes on potential development savings from cluster housing to the consumer. Out-of-direction travel to avoid the wetland, and associated pollution and traffic impacts could be slightly increased, although thoughtful design can usually avoid this problem. The MLDC density transfer provides opportunities to mitigate, or even reverse, negative social consequences, through clustering of development and integrating wetlands into the overall design of the residential development.

Wetlands usually add amenity value to residentially developed land, and would only marginally reduce the amount of buildable land. Social consequences (open space, views, more affordable cluster housing, better urban design) would be positive as a result of conserving the wetland area, which could be used as open space for the residential development. Wetlands provide educational opportunities for those living near them, which would be maintained. Wetlands also provide opportunities for urban quiet and solitude, which has positive social consequences.

The Medford LWI report describes and analyzes the social qualities of each wetland in this category that would be conserved through planned residential development and density transfer. That report includes specific measures for educational potential, visual/aesthetic quality, and recreational opportunities. The social consequences of conserving the wetland are retention of the qualities that help make each wetland *significant*.

4. Energy Consequences of Limiting Residential Development

Energy consequences of wetland conservation are also mixed, but are largely positive. With density transfer provisions, wetlands could be conserved without major loss of housing unit potential, and without significant impact on the Medford UGB. Higher urban densities could be achieved, resulting in more efficient use of infrastructure, shorter travel distances, and reliance on less energy consumptive modes of travel.

While it is possible that vegetation from forested wetlands could shade south-facing windows of houses, the provisions of the MLDC encourage siting of homes to maximize solar access. In summary, the positive energy consequences of wetland conservation through the PUD process could be significant, provided that developers choose, or City regulations required, the maximum development allowed under the MLDC, in a grid street pattern, with appropriate solar access design.

Wetland vegetation has a moderating effect on climate. Trees provide shade that cools buildings in the summer and serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local recreational opportunities, thus reducing the need to drive for outdoor experiences. Thus, conservation of wetland vegetation would have additional positive energy consequences.

COMMERCIAL AND INDUSTRIAL SUPPLEMENTAL ESEE ANALYSIS

This supplemental ESEE analysis is concerned with conflicting commercial and industrial uses affecting significant wetland resource sites. Conflicting uses include all permitted or conditionally permitted uses as shown below:

GLUP Plan Designation	Implementing Zoning
Commercial (CM)	General Commercial
	Regional Commercial
	Community Commercial
	Neighborhood Commercial
Service Commercial (SC)	Service Commercial-Professional Office
Heavy Industrial (HI)	Heavy Industrial
	General Industrial
General Industrial (GI)	General Industrial

	Light Industrial
Airport (A)	No specific zone – usually Light Industrial

Accessory uses, such as parking lots, landscaping, storage areas, waste disposal and supporting public facilities (other than projects listed in the Public Facilities Element of the Medford Comprehensive. Plan) are also considered conflicting uses for the purposes of this analysis.

Commercial and Industrial Land Uses and Activities

In most cases, commercial and industrial land uses[11] are more intensive than residential land uses, because they usually have more impervious surface, greater building coverage, more vehicular traffic and more hazardous wastes. However, commercial and industrial uses could have fewer secondary affects on wetland resource sites, because there are usually fewer human beings and pets using these sites for recreational purposes. Thus, the key issue in resolving conflicts between commercial-industrial uses and wetland resource sites is to keep parking lots, structures and storage areas from locating within the boundaries of LSW sites or their respective buffer areas.

1. Conflicting Land Uses

A. Siting of semi-public and office uses;
B. Siting of commercial uses and industrial uses, including:
    1. Industrial uses with associated outdoor storage, parking lots, driveways, accessory structures and signage;
    2. Commercial uses with associated outdoor storage, parking lots, driveways, accessory structures and signage;

2. Conflicting Land Use Activities

A. Construction impacts, *e.g.,* short term impacts (noise, runoff, erosion, disruption of vegetation, etc.) resulting from construction of conflicting uses;
B. Water quality impacts, *e.g.,* surface water runoff, including runoff from streets and parking lots, erosion, and runoff from fertilized and chemically treated lawns and gardens;
C. Outdoor lighting and industrial noise, which could adversely affect wildlife.

Medford Economic Market Analysis

The *Medford Economic Market Analysis* prepared in 2003[12] asserts that 22 percent of Medford's land base is classified as industrial, and another 13 percent as commercial. Between 1981 and 2000, the absorption rate for General and Heavy Industrial land, was 17.5 and 4.6 acres per year,

[11] Medford has five commercial zones: C-S/P (Service Commercial and Professional Office), C-N (Neighborhood Commercial); C-C (Community Commercial); C-H (Heavy Commercial) and C-R (Regional Commercial), and three industrial zones: I-L (Light Industrial), I-G (General Industrial) and I-H (Heavy Industrial).

[12] *Medford Economic Market Analysis*, March 2003. E.D. Hovee & Company.

respectively. The City's absorption rate for commercial land during the same period was 21 acres per year. Several of Medford's Wetland Resource Sites (including scores of LSWs) are located on commercial or industrial land, as indicated in Table 2.3 below. This land use pattern is typical of Oregon communities, which traditionally have designated industrial, commercial and airport land in lowland areas that are less suitable for housing construction. The *significant* wetland resource sites represent 95.9 acres and 48.5 percent of the total acreage of the significant wetlands in the study area.

Table 2.3 identifies wetland resource sites and sub-sites in this category. **High quality wetlands are in bold and have a recommended setback of 50 feet.** Moderate quality wetlands have a recommended setback of 25 feet. The following *significant* wetland resource sites are in this Category:

Table 2.3: LSWs Subject to Commercial/Industrial ESEE Analysis

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
3	BS-W01	0.51	25'	371W32	CM	C-R	Partially developed
4	**BS-W06**	**4.55**	**50'**	**371W32**	**CM**	**EFU, GC / RR-5**	**Partially developed**
5	BS-W10	0.77	25'	381W04	CM	EFU	Partially developed
6	BS-W13	2.41	25'	381W04	CM	EFU	Vacant
	BS-W14		25'	381W04	CM	EFU	Vacant
	BS-W15	1.39	25'	381W04	CM	EFU	Vacant
	BS-W16		25'	381W04	CM	EFU	Vacant
13	LP-W01	0.68	25'		GI	I-L / AA	Partially developed
19	MD-W01	4.87	25'	362W36	GI	AD-MU / AA	Partially developed
20	MD-W03	1.44	25'		GI, A	AD-MU, I-L / AA	Partially developed
	MD-W09	4.24	25'	372W01A	A, GI	I-L, I-G / AA	Vacant
	MD-W16	**6.03**	**50'**	**372W01D 371W062**	**A**	**I-L / AA**	**Partially developed**
	MD-W20	**<0.5**	**50'**	**371W062**	**A**	**I-L / AA**	**Partially developed**
	MD-W24	**1.74**	**50'**	**371W07**	**A**	**I-L / AA**	**Partially developed**
	MD-W25		**50'**	**371W07**	**A**	**I-L / AA**	**Partially developed**
	MD-W26	8.99	25'	371W06	A	I-L / AA	Vacant

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
	MD-W44	**8.03**	**50'**	**371W07**	**A**	**I-L / AA**	**Partially developed**
	MD-W13	1.59	25'	372W01	GI	AD-MU / AA	Partially developed
21	MD-W27	20.37	25'	371W06	HI	I-L / AR	Partially developed
	MD-W28		25'	371W06	HI	I-L / AR	Partially developed
	MD-W29		25'	371W06	HI	I-L / AR	Partially developed
	MD-W30		25'	371W06	HI	I-L / AR	Partially developed
	MD-W31		25'	371W06	HI	I-L / AR	Partially developed
	MD-W32		25'	371W06	HI	I-L / AR	Partially developed
	MD-W33		25'	371W06	HI	I-L / AR	Partially developed
	MD-W34	1.05	25'	371W06	HI	I-L / AR	Partially developed
	MD-W35	1.65	25'	371W06	HI	I-L / AR	Partially developed
	MD-W39	14.77	25'	371W06	HI	I-L / AR	Partially developed
	MD-W40	**5.18**	**50'**	**371W06, 371W07**	**GI**	**I-L, I-G / AR**	**Partially developed**
	MD-W41	0.54	25'	371W06	GI	I-G	Partially developed
22	MD-W46	0.77	25'	371W07	A	I-L / AA	Partially developed
	MD-W47		25'	371W07	HI	I-L / AA	Partially developed
	MD-W48		25'	371W07	A	I-L / AA	Partially developed
	MD-W49		25'	371W07	A	I-L / AA	Partially developed
	MD-W50		25'	371W07	A	I-L / AA	Partially developed
	MD-W51	1.09	25'	371W07	HI	I-L / AA	Partially developed
	MD-W52		25'	371W07	HI	I-L / AA	Partially developed

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
	MD-W53		25'	371W07	HI	I-L / AA	Partially developed
28	**SW-W02**	**2.71**	**50'**	**361W32**	**CM**	**C-H**	**Partially developed**
	SW-W03		**50'**	**361W32**	**CM**	**C-H**	**Partially developed**

Regulatory Context

Until recently, the ESEE consequences of commercial and industrial development affecting *any* wetland in industrial and commercial areas were reviewed *on a case-by-case basis* prior to development. The City simply referred requests to fill wetlands that appeared on the Local Wetlands Inventory to DSL. As noted in the Introduction to the study, locally significant wetlands located within Riparian Corridors are protected. The purpose of this analysis is to provide the City with factual information needed to resolve conflicts between commercial and industrial uses and significant wetland sites.

A. Consequences of Fully Allowing Conflicting Commercial/Industrial Development

1. Environmental Consequences of Unrestricted Commercial/Industrial Development

The wetlands in this category should be considered as part of a much larger ecological system of urban wetlands and stream corridors in the Bear Creek Valley. The intrinsic value of any particular wetland is affected by the degree of human intrusion and its connection with stream corridors and other natural resources. Wetlands contribute directly to decreased flooding potential and to improved water quantity and quality, fish and wildlife habitat, and groundwater recharge.

Wetlands decrease flooding potential by providing flood water storage, dissipating the force of moving water, and by allowing storm water to seep gradually into the ground rather than moving rapidly over the surface and increasing flood damage and erosion. Wetlands improve water quantity and quality in a number of ways. Vegetated soils allow water to filter downward to the groundwater reservoir, adding volume to surface waters during low flow periods. Wetlands allow sediment to settle out and be trapped by vegetation before it reaches streams. Natural vegetation also absorbs chemicals and heavy metals, reducing water pollution. Thus, loss of wetlands contributes to flooding and reduces the quantity and quality of ground and surface water.

Varying levels of plant and animal diversity characterize wetlands. Wetlands provide fish and wildlife habitat by contributing to an integrated stream corridor ecosystem, which provides food, water, shelter, breeding and rearing areas for aquatic and terrestrial animals and birds. Reductions in the quality, quantity and availability of food, water, cover and living space have significant detrimental effects on wildlife. Wetlands that are connected to other natural resources allow travel corridors for wildlife.

When industrial/commercial development (including buildings, roads and driveways, landscaping, storage, parking) replaces native vegetation, the value of the wetland for habitat decreases dramatically. (See Vegetation Removal Supplemental ESEE Analysis.) Industrial/commercial development in wetland areas does not necessarily eliminate all fish and wildlife habitat, but changes the habitat in a way that decreases biodiversity, because only more aggressive and adaptable species can survive under changed ecological circumstances.

Commercial/industrial development in wetlands replaces native vegetation with impervious surface area, and contributes to flooding, reduced groundwater recharge, and increased sediment and nutrient loading (from lawns, wastes, etc.). The result is decreased water quantity and quality, and diminished fish and wildlife habitat. Industrial/commercial development usually poses less of a threat to the ecological integrity of significant wetland resource sites from children, pets and recreational activities. However, commercial/ industrial development does pose specific threats to wetlands, including garbage and littering, disposal of industrial wastes, runoff from large parking lots, use of fertilizers and pesticides, fences and other structures which limit wildlife access, noise, and glare.

The Medford Local Wetlands Inventory report describes and analyzes nine criteria for wetland evaluation and characterization. That report includes four specific biological measures that are compromised by development: wildlife habitat, fish habitat, water quality, and hydrological control. These four criteria are evaluated in the following manner: **wildlife habitat** evaluates the habitat diversity for species generally associated with wetlands and wetland edges; **fish habitat** evaluates how the wetland contributes to fish habitat in streams, ponds or lakes associated with the wetland; **water quality** evaluates the potential of a wetland to reduce the impacts that excess nutrients in storm water runoff have on downstream waters; **hydrological control** evaluates the effectiveness of a wetland in storing floodwaters and reducing downstream flood peaks.

The environmental consequence of allowing full commercial/industrial development over all LSWs and their impact areas is that the functions and values listed above would be lost.

2. Economic Consequences of Unrestricted Commercial / Industrial Development

The economic consequences of not protecting significant wetland resource sites would be different, depending on the level of analysis. For the property owner, the economic impacts of allowing full industrial development of the site would be positive. If the wetland is developed, approximately 10 additional employees per acre of wetland could be provided for on a property. Assessor's records show that commercial land values vary widely. It is unclear what affect the presence of a wetland had on assessed values. What is clear is that full protection of wetlands located on commercial and industrial sites could result in considerable lost value to property owners.

However, these costs need to be balanced against the cost of off-site mitigation or payment of in-lieu fees, which is estimated at $60,000 to $100,000 an acre. Thus, the off-site mitigation costs (in the event that off-site mitigation were to be approved by DSL and the Army Corps) would be considerable. Economic consequences vary considerably based on individual site conditions, as noted in the discussion of the economic consequences of conserving the wetland, below.

From the industrial or commercial developer's point of view, the lack of local regulations could mean decreased uncertainty and design costs. The costs of additional consultant time could be avoided, the thought and energy required to design the project may be reduced, and there would be less local government discretion and perhaps greater certainty in the review process. On the other hand, there are a number of less obvious economic consequences that need to be considered. First, wetlands can add amenity value to developments – especially business and campus industrial parks. It is less likely that conservation of wetlands would benefit standard commercial or industrial developments, except as a means of storm water quantity and quality control.

Second, local governments and property owners face potential increases in storm water management, flood control and federally mandated water quality improvement costs as wetlands are developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created as sumps, or artificial detention and water quality ponds, at considerable private and public expense. The City of Medford, Jackson County and industrial/commercial property owners are facing major costs in meeting federal NPDES permitting requirements – costs that could increase if wetland water quality functions are lost. Flood insurance rates may also increase in the future, based on flood studies that may have to be revised because they under-estimated urban run-off rates.

Third, there could be a negative economic value by not providing a clear and objective *local* process for resolving development/wetland conflicts. If the local review process is not clearly spelled out in the MLDC, the uncertainty and delay costs could increase for everyone involved.

3. Social Consequences of Unrestricted Commercial/Industrial Development

The social consequences of allowing unrestricted commercial/industrial development of significant wetland resource sites are mixed. On the positive side, needed employment opportunities and convenient shopping and service opportunities in the Medford UGB would be maintained. By maintaining the full amount of vacant and underutilized commercial/industrial land inside the Urban Growth Boundary, expansion of the UGB onto farm and grazing land could be delayed.

The social value of providing employment within the Medford UGB is significant. If employment, commerce and services are concentrated inside the existing UGB, commuter travel could be minimized, which has positive social impacts. Pollution could be reduced, there could be more disposable income for other consumer wants, productivity could increase and there could be more leisure time to spend on non-work/non-shopping activities. In addition, development costs could be reduced, assuming that the wetland would not be otherwise protected under state and federal regulations.

There also would be negative social consequences. If development was to occur on wetlands covering commercial/industrial land, urban setting and water based recreational functions and values, among others, would be lost. Open space views for travelers along the I-5 Corridor could be adversely affected. Workers would not have the advantage of open space views or places to spend free time.

Wetlands usually add some amenity value to commercial / industrial developed land, and only marginally reduce the amount of buildable land. Social consequences (lost open space and views) would be adverse as a result of developing the wetland area, which could otherwise be used as open space for the residential development. Wetlands provide educational opportunities for those working near them, which would be lost. Wetlands also provide opportunities for urban quiet and solitude, the lack of which has adverse social consequences.

The Medford LWI report describes and analyzes the social qualities of each wetland in this category that would be compromised by unrestricted residential development. That report includes specific measures for educational potential, visual/aesthetic quality, and water based recreational opportunities. The social consequences of allowing full development over the wetland would be that the qualities, which help make each wetland significant, would be lost.

4. Energy Consequences of Unrestricted Commercial / Industrial Development

Energy consequences of unrestricted commercial/industrial development of wetlands are also mixed. Assuming standard development practices, the results of building over the

wetland could be more efficient use of commercial/industrial land, which could prevent premature expansion of the UGB, higher urban densities, more efficient use of infrastructure, shorter travel distances and less out-of-direction travel. From a solar perspective, it is possible that vegetation from forested wetlands could shade south-facing windows, thus reducing solar access. In summary, the adverse energy consequences could be significant.

On the negative side, wetland vegetation has a moderating effect on climate. Trees provide shade that cool buildings in the summer and serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local recreational opportunities, thus reducing the need to drive for outdoor experiences. Thus, loss of wetland vegetation would have some adverse energy consequences.

B. Consequences of Prohibiting Conflicting Commercial/Industrial Development

This portion of the ESEE analysis looks at the impacts of conserving a significant wetland resource site on the conflicting use – in this case, commercial/industrial development.

1. Environmental Consequences of Prohibiting Commercial/Industrial Development

The environmental values that would be retained by conservation of wetlands are described above. The Medford LWI report describes and analyzes the environmental qualities of each wetland in this category, which would be largely retained by prohibiting development on and near wetlands, and restricting commercial/industrial development within the 50-foot impact area. Even with "full protection" of significant wetland resource sites, activities associated with commercial/industrial development (increased human activity, run-off, toxic spills, noise, glare, trespass, etc.), which cannot be fully controlled by land use regulations, would probably degrade wetland values over time. The environmental consequences of conserving wetlands are that these qualities, which make each wetland significant, would be maintained.

2. Economic Consequences of Prohibiting Commercial/Industrial Development

It is useful to look at the economic consequences of conserving the significant wetland resource site from different points of view. Impacts are often different at the study area level than from the point of view of the individual property owner. The ESEE analyses for each individual significant wetland resource site address the special characteristics of that site in relation to property owner interests.

Study Area Level

Statewide Planning Goal 9 (Economy) requires that cities conduct an "economic opportunities analysis" that describes the types of industries and businesses that are likely to locate in the community and identifies the siting needs of such "targeted industries". Goal 9 also requires local governments to provide "at least an adequate supply" of suitable industrial and commercial sites that meet local industrial and commercial siting criteria.

At the study area level, there are measurable economic consequences associated with prohibiting industrial and commercial development within all LSWs and their impact areas. Table 2.3.1 shows the supply of vacant and underutilized commercial and industrial land, and compares these figures with potential loss of commercial and industrial land that could result from full wetland protection.

Table 2.3.1 Full Resource Protection Option – Potential Industrial and Commercial Land Supply Impacts

Land Use Type	Vacant Under-Utilized Acres	Wetland Acres	Wetland Impact Acres	Remaining Vacant or Under-Utilized Acres	Employee-to-Acre Ratio	Potential Employment *after Full Protection of LSWs and Impact Areas*	Potential Employee Capacity Reduction
Commercial	334	9	19	306	18.7	5,722	523
General/Heavy Industrial	1,261	48	47	1,166	4.8	5,597	456
Subtotals	**1,595**	**57**	**66**	**1,472**	**N/A**	**11,319**	**979**
Percentages	**100%**	**3.6%**	**4.1%**	**92.3%**	**N/A**	**100%**	**8.6%**

As of 2003, the Medford UGB included an estimated 334 acres of vacant and underutilized commercial land, and commercial land area, of which an estimated 9 acres are wetlands and 19 acres are wetland impact areas. More significantly, there are approximately 657 and 604 acres of vacant and underutilized General and Heavy Industrial acres, respectively. Of these 1,261 industrial acres, approximately 48 acres are LSWs and 47 acres are located within wetland impact areas.

Assuming an average commercial employment-to-acre ratio of 18.7[13], there would be the lost capacity of approximately 523 commercial jobs if all wetlands and their respective impact areas were fully protected. On the other hand, there would be a remaining capacity for 5,722 commercial jobs, even if all locally significant wetlands and their impact areas were fully protected. Assuming an industrial employment-to-acre ratio of 4.8[14], there would

[13] *Medford Economic Market Analysis*, March 2002.

[14] Ibid.

be the lost capacity of approximately 456 industrial sector jobs, assuming full protection of all LSWs and their associated impact areas. However, under the full protection option, there would be a residual capacity for approximately 5,597 industrial jobs within the Medford UGB.

In the event that wetlands – and not their impact areas – were fully protected, then the vacant commercially designated land in the Medford UGB could still accommodate 6,077 new commercial jobs at 18.7 employees per acre. If all wetland acres on industrially zoned land were fully preserved, then the vacant industrially designated land in the Medford UGB could still accommodate 5,822 new industrial jobs at 4.8 employees per acre.

Medford has also invested considerable public dollars in providing infrastructure (transportation, sewer, water, storm drainage, utilities) to commercial and industrial land in the industrial and commercial lands within the UGB. The return on public investment would be reduced in proportion to the amount of industrial land that cannot be developed due to wetland or other constraints.

The Airport is a third designation within this category. Within the City of Medford, the airport designation is found on lands owned by Jackson County, and is implemented by the Light Industrial (I-L) zoning district. Approximately 21 acres of wetland impact area (including the wetlands themselves) are located on vacant or underutilized airport lands.

Location of Wetland on Property

Wetlands often serve as effective boundaries separating property ownerships. In several cases, wetlands are associated with riparian corridors. In such cases, wetland conservation has little or no additional adverse economic impact. In situations where the wetland covers most of a small property, or blocks all access to a property, the economic consequences could be extremely adverse, and make it impossible to completely avoid the wetland. Such situations are noted in the ESEE analyses associated with individual properties.

Unlike residential properties, commercial and industrial uses often do not have required setbacks, unless they abut residential land. One method open to property owners to alleviate adverse economic consequences resulting from wetlands is the exceptions process, which could allow dimensional standards of the applicable zoning district to be modified to allow siting outside the wetland.

Developer Impact

From the developer's point of view, local regulations could mean increased uncertainty and possibly increased design costs. It is often easier and less time-consuming to develop over a wetland, rather than around it, especially where large, rectangular buildings are required. The costs of additional consultant time could increase, as could the level of thought and energy required to design the project. There would be greater local government discretion and perhaps greater uncertainty in the review process.

As noted above, all locally *significant* wetlands are regulated by state and federal standards anyway, so that the supply of industrial and commercial land will be reduced somewhat in any event. By mapping LSWs and their impact areas, buyers and sellers of industrial and commercial properties have a much better idea of how much of their land is actually buildable, and how much would be subject to local, state or federal regulations.

Positive Economic Consequences

On the other hand, there are positive economic consequences associated with wetland conservation. First, many studies have demonstrated that wetlands can add value to developments - both for neighboring properties and for commercial/industrial developments. Conserving wetlands through thoughtful design would probably increase neighboring property values and may, depending on the nature of the proposed commercial/industrial use, increase lease or sales price of space or lots.

Second, potential costs for storm water management, flood control and federally mandated water quality improvement program could decrease if wetlands were not developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created as sumps, or artificial detention and water quality ponds, at considerable public expense. Medford is facing major costs in meeting federal NPDES permitting requirements; costs that could increase if wetland water quality functions are lost. Flood insurance rates may also increase in the future, based on flood studies that may have to be revised because they underestimated urban runoff rates.

Third, there could be a positive economic value by providing a clear and objective *local* process for resolving development/wetland conflicts. If the local review process is clearly spelled out in the MLDC, the uncertainty and delay costs could decrease for everyone involved.

3. Social Consequences of Prohibiting Commercial/Industrial Development

The social consequences of conserving significant wetland resource sites are mixed. Unlike residential development, however, the City's density transfer process is not a mitigation tool in terms of lost jobs. In order to conserve significant wetland resource sites that are zoned for industrial and commercial uses, the opportunity for jobs close to urban housing may be diminished. If all significant wetland resource sites were conserved, then 123 acres and 1,790 jobs could be displaced to agricultural and grazing land outside the existing UGB. The importance of close-in employment opportunities needs to be balanced against the clear benefits of wetland conservation.

On the positive side, wetlands may add amenity value to developed land. The social consequences (open space and views) would be positive as a result of conserving the significant wetland areas, which can be used as open space for employees and the general

shopping public. Wetlands provide educational opportunities for those working near them, which would be maintained. Wetlands also provide opportunities for urban quiet and solitude, which has positive social consequences.

The Medford LWI report describes and analyzes the social qualities of each wetland in this category. That report includes specific measures for educational potential, visual/aesthetic quality, and water based recreational opportunities. The social consequences of conserving the wetland are retention of the qualities that help make each wetland *significant*.

4. Energy Consequences of Prohibiting Commercial/Industrial Development

Energy consequences of wetland conservation are also mixed, but in this case would be largely negative. Unlike on residential land, all wetlands cannot be preserved on commercial/industrial land without impacts on the Medford UGB. Urban jobs could be displaced to more distant areas, increasing travel time, congestion, and stress. Especially along the major corridors, where transportation access is a key locational factor, the energy consequences of wetland conservation would be significant and adverse.

It is less likely that vegetation from forested wetlands would shade large industrial or commercial users, or significantly impair solar access. However, wetland vegetation has a moderating effect on climate. Trees provide shade that cools buildings in the summer serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local recreational opportunities, thus reducing the need to drive for outdoor experiences. Thus, conservation of wetland vegetation would have additional positive energy consequences.

C. Consequences of Limiting Conflicting Commercial/Industrial Development

Conflicting uses could be limited in one of two ways: first, LSWs or their impact areas may be reduced in size; or second, certain conflicting uses may be allowed provided that impacts from the conflicting use are reduced. The Goal 5 protection program suggested in Section 1, the "Proposed Limited Protection Program," combines these two approaches. If the ESEE analysis determines that the consequences of protecting one or more LSWs and their associated buffer areas are too severe, the size of the wetland or its buffer width may be reduced through this legislative process. Because most wetland resource sites include clusters of LSWs, it is possible that one or more individual wetlands may be removed from the local inventory as part of the local balancing process. In addition, the "Proposed Limited Protection Program" allows for certain uses (e.g., public facilities and streets) subject to impact reduction measures.

1. Environmental Consequences of Limiting Commercial/Industrial Development

The environmental values that would be retained by conservation of wetlands are described above. The LWI report describes and analyzes the environmental qualities of each wetland in this category, which would be largely retained by prohibiting development on and near wetlands, or partially retained by restricting commercial/industrial development within the 25 to 50-foot buffer area. The ESEE analysis anticipates that public facilities and streets will be constructed through certain LSWs, and that impacts from public facility construction will be reduced through a combination of local, state and federal wetland mitigation standards.

2. Economic Consequences of Limiting Commercial / Industrial Development

It is useful to look at the economic consequences of conserving the significant wetland resource site from different points of view. Impacts are often different at the study area level than from the point of view of the individual property owner. The ESEE analyses for each individual significant wetland resource site address the special characteristics of that site in relation to property owner interests.

Study Area Level

At the study area level, the economic consequences of *avoiding* wetlands on commercial/ industrial properties are significant. As of 2003, the Medford UGB included an estimated 334 acres of vacant, and underutilized commercial land area, of which an estimated 9 acres (2.7 percent) are wetlands and 19 acres (5.7 percent) are wetland impact acres. More significantly, there are approximately 657 acres of vacant, and underutilized General Industrial designated land and 604 acres of vacant and underutilized Heavy Industrial designated land, of which 48 acres (3.8 percent) are wetlands and 47 acres (3.7 percent) are wetland impact areas.

Assuming an average commercial employment-to-acre ratio of 18.7, there would be the lost capacity of approximately 523 commercial jobs if all wetlands and their respective impact areas were fully protected. Assuming an industrial employment-to-acre ratio of 4.8, there would be the lost capacity of approximately 456 industrial sector jobs, given full protection of all wetlands and associated impact areas. In this unlikely case, the supply of industrial land within the Medford UGB would be used up about ? years earlier.

If all wetland acres on commercially zoned land were fully preserved, then the Medford UGB could still accommodate 5,722 new commercial jobs at 18.7 employees per acre. If all wetland acres on industrially zoned land were fully preserved, then the Medford UGB could still accommodate 5,597 new industrial jobs at 4.8 employees per acre. .[15]

[15] In 2003, Medford conducted a study to determine the adequacy of its industrial and commercial land supply: *The Medford Economic Market Analysis*, March 2003. This study suggests a potential deficit of 725-1,583 acres of

Medford has also invested considerable public dollars in providing infrastructure (transportation, sewer, water, storm drainage, utilities) to commercial and industrial land in the UGB. The return on public investment would be reduced in proportion to the amount of commercial and industrial land that could not be developed due to wetland or other constraints.

This scenario is unrealistic, in that it assumes: (a) *no* state or federal wetlands protection program; and (b) that all 123 acres of significant wetlands and their respective impact areas would be fully protected. A more reasonable scenario would be to reduce the impact area by half, making a buffer of 25 feet instead of 50. Less than 25 percent of wetland resources on commercial and industrial land are high quality, and most of these are in cluster sites that may have overlapping impact areas. Therefore this provides a reasonable option that still maintains the integrity of affected wetland resources.

The airport is a third designation within this category. Within the City of Medford, the airport designation is found on lands owned by Jackson County, and is mostly implemented by the light industrial (I-L) zoning district. Approximately 21 acres of wetland impact area (51 percent) are located on vacant, buildable airport lands.

Location of Wetland on Property

Wetlands often serve as effective boundaries separating property ownerships. In several cases, wetlands are associated with riparian corridors. In such cases, wetland conservation has no additional adverse economic impact. In situations where the wetland covers most of a small property, or blocks all access to a property, the economic consequences could be adverse, and make it impossible to completely avoid the wetland. Such situations are noted on the ESEE analyses associated with individual properties.

Unlike residential properties, commercial and industrial properties often do not have required setbacks, unless they abut residential land, so. One method open to property owners to alleviate adverse economic consequences resulting from wetland protection is the exceptions process, which could allow dimensional standards of the applicable zoning district to be modified to allow siting outside the wetland.

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employment land over the next 20 years. This conclusion may be misleading because it subtracted some 1,140 vacant acres simply because wetlands are located *somewhere* on a particular property. This assumption probably is inaccurate, because often there are large buildable areas remaining on the property after accounting for wetlands and their respective buffer areas. Planning Department studies indicate that the City has sufficient land to accommodate projected industrial employment needs for the 20-year planning period, even after subtracting locally significant wetlands and the respective buffer areas but may have a need for additional commercial land unless redevelopment will play a larger part in the future

Developer Impact

From the developer's point of view, local regulations would mean increased regulatory certainty but reduced land area for development. It is often easier and less time-consuming to develop over a wetland, rather than around it, especially where large, rectangular buildings are required. The costs of additional consultant time could increase, as could the level of thought and energy required to design the project.

Positive Economic Consequences

On the other hand, there are positive economic consequences associated with wetland conservation. First, many studies have demonstrated that wetlands can add value to developments – both for neighboring properties and for the commercial/industrial developments. Conserving wetlands through thoughtful design would probably increase neighboring property values and may, depending on the nature of the proposed commercial/ industrial use, increase lease or sales price of space or lots.

Second, potential costs for storm water management, flood control and federally mandated water quality improvement program could decrease if wetlands are not developed. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created as sumps, or artificial detention and water quality ponds, at considerable public expense. Medford is facing major costs in meeting federal NPDES permitting requirements; costs that could increase if wetland water quality functions are lost. Flood insurance rates may also increase in the future, based on flood studies that may have to be revised because they underestimated urban runoff rates.

Third, there may be a positive economic value by providing a clear and objective *local* process for resolving development/wetland conflicts. If the local review process is clearly spelled out in the MLDC, the uncertainty and delay costs could decrease for everyone involved.

Public and Transportation Facilities Supplemental ESEE Analysis

This supplemental ESEE analysis is concerned with public facilities that are needed to support urban development, such as streets, trails, sewer, storm drainage, and water facilities. Airport expansion projects also fall into this category. Major sanitary sewer, water, storm drainage or transportation facilities usually are recognized on the City's facilities master plans and Transportation System Plan (TSP). Public facilities also include private utilities (electrical, cable, telephone and gas), airport facilities, power facilities (substations and transmission) and communication towers, and storm drainage facilities. These public projects are, by definition, necessary to support planned urban development. Not included under the public facilities definition are schools, hospitals and similar institutional uses.

1. Conflicting Land Uses

A. Sewage collection facilities and lines;
B. Water treatment and storage facilities, and lines;
C. Storm water detention facilities and collection lines;
D. Transportation facilities, including multi-use paths and streets;
E. Airport facilities;
F. Electrical substations and major transmission lines (including non-public lines);
G. Communication towers (including private and public towers);
H. Above and below ground utilities - including telephone, electrical, gas, and cable TV.

2. Conflicting Land Use Activities

A. Maintenance and reconstruction of public facilities, including vegetation management (mowing, trimming, tree removal and spraying), excavation and installation of new facilities; and
B. Construction impacts, including short-term impacts (noise, runoff, erosion, disruption of vegetation, etc.) resulting from construction of conflicting uses.

The ESEE Analysis should consider whether wetland resource sites and their impact areas can be avoided by the planned public facility, and if not, how can the impacts of the planned public facility project be reduced. Avoidance is often most difficult for this category, because (a) gravity flow sewer lines often are most economical and energy efficient if constructed within a drainage corridor, and (b) planned road extensions are often most economical and direct when constructed in wetlands, because wetlands frequently have been passed over as development sites.

Many public facilities, especially those constructed to support individual developments, are not recognized on public facility plans. Occasionally such facilities must cross a wetland to reach sewer, water, storm drainage, or transportation facilities. The level of protection afforded a wetland in this circumstance depends on the City's policy determination, based in part on this analysis, and in part on public testimony.

Table 2.4 identifies wetland resource sites and sub-sites in this category. **High quality wetlands are in bold and have a recommended setback of 50 feet.** Moderate quality wetlands have a recommended setback of 25 feet. The following *significant* wetland resource sites are in this Category:

Table 2.4: LSWs Subject to Public Facilities ESEE Analysis

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
3	BS-W01	0.51	25'	371W32	CM	C-R	Partially developed
6	BS-W13	2.41	25'	381W04	CM	EFU	Vacant
	BS-W14		25'	381W04	CM	EFU	Vacant
	BS-W15	1.39	25'	381W04	CM	EFU	Vacant

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
	BS-W16		25’	381W04	CM	EFU	Vacant
8	EK-W10	1.47	25’	372W35	UR	SFR-6 / PD	Vacant, Developed
	EK-W11	6.19	25’	372W35	UR	SR-2.5, SFR-6 / PD	Vacant, Developed
9	EK-W14	1.3	25’	382W02	UR	RR-5	Developed, Mobile home
14	LP-W02	2.53	25’	371W17	UR	SFR-4	Developed
16	**LP-W10**	**11.25**	**50’**	**371W21**	**UR**	**SFR-4 EFU**	**Vacant, Partially developed**
	LP-W11	**0.61**	**50’**	**371W21**	**UR**	**SFR**	**Partially Developed**
	LP-W12	**2.43**	**50’**	**371W21**	**UR**	**SFR**	**Vacant**
18	LZ-W05	0.62	25’	371W23	UR	RR-5, SFR-4	Vacant
	LZ-W06	1.31	25’	371W22 371W23	UR	SFR-4	Developed
	LZ-W07	2.98	25’	371W23	UR	SFR-4 / PD	Vacant, Partially Developed
19	MD-W01	4.87	25’	362W36	GI	AD-MU / AA	Partially developed
21	MD-W27	20.37	25’	371W06	HI	I-L / AR	Partially developed
	MD-W28		25’	371W06	HI	I-L / AR	Partially developed
	MD-W29		25’	371W06	HI	I-L / AR	Partially developed
	MD-W30		25’	371W06	HI	I-L / AR	Partially developed
	MD-W31		25’	371W06	HI	I-L / AR	Partially developed
	MD-W32		25’	371W06	HI	I-L / AR	Partially developed
	MD-W33		25’	371W06	HI	I-L / AR	Partially developed
	MD-W34	1.05	25’	371W06	HI	I-L / AR	Partially developed
	MD-W35	1.65	25’	371W06	HI	I-L / AR	Partially developed

Wetland Resource Site	Wetland Site and Code	Wetland Size (acres)	Recom-mended Setback Area	Section	Plan Map Designation	Zoning/ Applicable Overlay	Adjacent Land Use
	MD-W39	14.77	25’	371W06	HI	I-L / AR	Partially developed
	MD-W40	**5.18**	**50’**	**371W06, 371W07**	**GI**	**I-L, I-G / AR**	**Partially developed**
	MD-W41	0.54	25’	371W06	GI	I-G	Partially developed
22	MD-W46	0.77	25’	371W07	A	I-L / AA	Partially developed
	MD-W47		25’	371W07	HI	I-L / AA	Partially developed
	MD-W48		25’	371W07	A	I-L / AA	Partially developed
	MD-W49		25’	371W07	A	I-L / AA	Partially developed
	MD-W50		25’	371W07	A	I-L / AA	Partially developed
	MD-W51	1.09	25’	371W07	HI	I-L / AA	Partially developed
	MD-W52		25’	371W07	HI	I-L / AA	Partially developed
	MD-W53		25’	371W07	HI	I-L / AA	Partially developed
23	MD-W54	8.77	25’	371W08	UR	SFR-6	Vacant

A. Consequences of Fully Allowing Conflicting Public and Transportation Facilities Conflicting Uses

1. Environmental Consequences of Unrestricted Public and Transportation Facilities

In most cases, allowing the conflicting public facility does not mean that the LSW would be destroyed. The environmental consequences of constructing and maintaining planned public facilities depend on the answer to two primary questions: 1. Can the LSW be avoided, either partially or completely? and, 2. If avoidance is impractical, can the project

be constructed so as to mitigate adverse impacts? These determinations can only be made on a site-specific basis.

The Local Wetland Inventory report describes wetland functions and values that could be adversely affected by the location and construction of public facilities projects. That report includes specific measures of ecological integrity, wetland wildlife habitat, and flood control. If unrestricted public facilities construction were permitted through the wetland, it would mean that the qualities that make each wetland significant would be compromised.

Wetlands contribute directly to decreased flooding potential and to improved water quantity and quality, fish and wildlife habitat, and groundwater recharge. Wetlands decrease flooding potential by providing flood water storage, dissipating the force of moving water, and by allowing storm water to seep gradually into the ground rather than moving rapidly over the surface. Wetlands improve water quantity and quality in a number of ways. Vegetated soils allow water to filter downward to the groundwater reservoir, adding volume to surface waters during low flow. Wetlands allow sediment to settle out or be trapped by wetland vegetation before it reaches streams. Natural vegetation also absorbs hazardous chemicals and heavy metals, reducing water pollution. Thus, loss of wetlands caused by low-density residential development contributes to flooding and reduces the quantity and quality of ground and surface water.

Varying levels of plant and animal diversity characterize wetlands. Wetlands provide improve fish and wildlife habitat by contributing to an integrated stream corridor ecosystem, which provides food, water, shelter, breeding and rearing areas for aquatic and terrestrial animals and birds. Reductions in the quality, quantity and availability of food, water, cover and living space all have significant detrimental effects on wildlife.

Of the many types of public facilities, street construction is often the most destructive of wetland values. Often the choice for routing major streets is between removing existing development, and constructing the street through a wetland, because the wetland was previously passed over by development. Street construction could result in draining the wetland, removing native vegetation, or bisecting the wetland with consequent loss of connectivity. Run-off from impervious surface areas could also adversely affect water quality. Traffic along the street can kill wetland wildlife. Moreover, streets provide public access to wetland resource sites, which could result in a variety of adverse impacts, including vandalism, garbage dumping, and increased human and pet activity.

An effective way to minimize these impacts is to jog the street around the wetland, and possibly to limit public access (which also limits wildlife access) from the street through fencing. Opening a natural area to public view makes it a public asset that is more likely to be cared for, rather than, for example, placing creeks at the backs of lots. The City is encouraging street placement along waterways so that they don't become dumping

grounds. Fencing would have to be properly designed if the wetland was to be presented as a public amenity worth investing public money in.

Planned street locations are particularly problematical for wetland resources in Medford, because future major streets often have been planned through undeveloped wetland areas, rather than through neighborhoods. Thus, the City appears to have made the *de facto* policy choice to place a higher value on street connectivity than on wetland conservation.

Sanitary sewer construction can also have significant adverse impacts. Gravity flow sewers are often routed through wetland precisely because wetlands are lowlands. In addition to short-term impacts for vegetation removal and excavation, improper construction of bedding for sewer lines can drain a wetland permanently. An effective means of minimizing sewer impacts is to design the sewer line to avoid the wetland. Where this is impossible, appropriate design and construction methods can often bring the wetland back to its original condition within a few years.

Storm sewer construction can have major adverse impacts on wetland functions and values especially on water quality. Where closed conduit systems deposit large quantities of untreated storm water directly to a wetland, wetland functions and values can be compromised in a short period of time. Although principal functions of wetland include nutrient attenuation, flood control, and sediment reduction, the design and construction of storm water control systems should avoid over-taxing the capacity of individual wetlands to perform these functions.

Water system improvements probably have the least adverse impact on wetland functions and values. Their design and construction does not require a great deal of space, and they are typically constructed at high, rather than lower, elevations. Where water lines must cross through a wetland, their impacts can be readily reduced through proper design and re-vegetation.

2. Economic Consequences of Unrestricted Public and Transportation Facilities

State and federal wetland regulations require that avoidance be considered as the first option where wetlands stand in the way of planned public facilities. Avoidance can increase the costs of public facilities construction and maintenance, due to a) increased costs of constructing longer streets or lines, b) increased costs of acquiring upland (and possibly developed properties) adjacent to wetlands, c) increased costs for pumping stations which may be required if gravity flow systems cannot be constructed, d) increased commuting costs for out-of-direction travel, and e) increased maintenance costs for longer or less direct streets or lines.

Avoidance is often most difficult for this conflicting use category. As noted above, gravity flow sanitary and storm sewer lines often are most economical and energy

efficient if constructed within a drainage corridor, where wetlands tend to be located. Planned road extensions are often most economical and direct when constructed through, rather than around wetlands, because wetlands frequently have been passed over as development sites.

However, these costs need to be balanced against the cost of on- or off-site mitigation, which may range from approximately $60,000 to $100,000 an acre, depending on the type of wetland. Thus, the off-site mitigation costs (in the event that off-site mitigation were to be approved by DSL and the Army Corps) may be considerable.

Economic consequences vary considerably based on individual site conditions, as noted in the site-specific ESEE analyses where planned public facilities are identified as a conflicting use. As noted above, *avoidance and mitigation* must be considered in any case. However, from the project manager's point of view, fewer *local* regulations could mean decreased uncertainty and design costs. The costs of additional consultant time could be avoided, the thought and energy required to design the project could be reduced, and there would be less local planning discretion and perhaps greater certainty in the review process.

3. Social Consequences of Unrestricted Public and Transportation Facilities

The social consequences of allowing planned public facilities are mixed. Public facilities projects are essential to serve existing and planned population and employment growth in Medford. On the positive side, public construction and maintenance costs would probably be lessened if wetlands impacts were either avoided or reduced. By maintaining all of the buildable land currently inside the Urban Growth Boundary, the efficiency of service provision would be maintained. Out-of-direction travel to avoid LSWs, and associated pollution and traffic impacts could be slightly reduced, assuming that future streets are designed in a "grid" pattern.

Social consequences (lost open space and views) would be adverse as a result of constructing public facilities through those wetland sites that could otherwise be used as public open space. Wetlands provide educational opportunities for those living near them, which could be lost. Wetlands also provide opportunities for urban quiet and solitude, the lack of which has adverse social consequences

The LWI report identifies social qualities of each wetland in this category that would be compromised by unrestricted public facilities construction. That report includes specific criteria for educational potential, visual/aesthetic quality, and recreational opportunities. The social consequences of allowing public facilities construction over the wetland are that the human-related qualities that help make each wetland significant would be lost.

4. Energy Consequences of Unrestricted Public and Transportation Facilities

The energy consequences of allowing planned public facilities are generally positive. Straight streets (which do not jog to avoid wetlands) are the most efficient way of moving traffic. Straight sewer lines built near stream beds (where wetlands are most often found) require fewer pump stations and conserve more energy.

On the other hand, integration of wetlands into area-wide drainage programs would be much more energy efficient than filling wetlands and constructing closed conduit systems. Other energy consequences counter-balance each other, as described in other supplemental ESEE analyses.

B. Consequences of Prohibiting Conflicting Public and Transportation Facilities Conflicting Uses

This portion of the ESEE analysis looks at the impacts of fully protecting LSWs by prohibiting the construction and maintenance of planned public facilities.

1. Environmental Consequences of Prohibiting Public and Transportation Facilities

The environmental values that would be retained by full protection of wetlands are described above. The LWI report describes the environmental qualities of each wetland in this category, which would be largely retained by prohibiting public facilities construction and maintenance on and near wetlands. Even with "full protection" of LSWs, there are activities associated with public facilities construction and maintenance (increased human activity, runoff noise, glare, trespass, vandalism, etc.), which cannot be fully controlled by land use regulations or design techniques, that would probably degrade wetland resource values over time.

The Medford Local Wetlands Inventory report describes and analyzes nine criteria for wetland evaluation and characterization. That report includes four specific biological measures that are compromised by development: wildlife habitat, fish habitat, water quality, and hydrological control. These four criteria are evaluated in the following manner: **wildlife habitat** evaluates the habitat diversity for species generally associated with wetlands and wetland edges; **fish habitat** evaluates how the wetland contributes to fish habitat in streams, ponds or lakes associated with the wetland; **water quality** evaluates the potential of a wetland to reduce the impacts that excess nutrients in storm water runoff have on downstream waters; **hydrological control** evaluates the effectiveness of a wetland in storing floodwaters and reducing downstream flood peaks. The environmental consequences of conserving wetlands are that prohibiting the conflicting use and conserving the wetland would maintain these qualities, which make each wetland significant.

2. Economic Consequences of Prohibiting Public and Transportation Facilities

The economic consequences of conserving LSWs that lie in the path of planned public facilities are mixed, but largely negative. This is especially true in Medford, because wetland areas have been selected as preferred transportation routes because of their undeveloped status. Design, construction and maintenance costs generally would increase, as streets, sanitary sewer collection systems, and water storage and distribution systems are redesigned to avoid or mitigate wetlands. Long-term public maintenance costs could also increase. In other words, there are public as well as private costs associated with maintaining water quality and urban wildlife habitat.

From the City's perspective, considerable public dollars have already been invested in planning for and constructing infrastructure (transportation, sewer, water, storm drainage, utilities) to serve buildable land in Medford. The return on public investment would be reduced in proportion to the amount of open space land that cannot be developed for more active recreational use, due to wetland resource conservation.

However, most of these economic impacts will likely occur whether or not the each LSW is locally regulated, because of state and federal avoidance and mitigation requirements. While locally *significant* wetlands are regulated by state and federal standards anyway, local regulations could require that the environmental and social functions and values of LSWs be considered in the public facilities design process. This would probably translate into increased design, construction and maintenance cost.

3. Social Consequences of Prohibiting Public and Transportation Facilities

The social consequences of fully protecting LSWs can be made positive through appropriate design of planned public facilities. On the positive side, the public would benefit from conservation of LSWs, because natural, urban open space would be conserved. On the other hand, wetland avoidance and mitigation for public facilities costs public tax dollars. Overall, taxes could increase to support more environmentally sensitive design and construction of planned public facilities.

On the negative side, if planned public facilities could not be constructed to serve existing and planned growth, the social consequences of wetland conservation would be serious and adverse. Public facilities projects are essential to serving existing and planned population and employment growth in the city. Conserving wetlands could mean slightly decreasing the amount of buildable land inside the current Urban Growth Boundary, and slightly less efficient service provision if expansion of the UGB to had to occur sooner. Out-of-direction travel to avoid LSWs, and associated pollution and traffic impacts could be slightly increased.

The LWI report describes the social qualities of each wetland in this category that would be compromised by public facilities construction and maintenance. Urban educational opportunities and aesthetic values are especially important when considering conflicts with removal of open space. The LWI report includes specific measures for educational potential, visual/aesthetic quality, and recreational opportunities. The social consequences of conserving the wetlands are that the qualities that help make each wetland significant would be maintained. Wetlands can also play an integral role in the development and implementation of a comprehensive stormwater management/resource management/open space program.

4. Energy Consequences of Prohibiting Public and Transportation Facilities

Energy consequences of wetland conservation are also mixed, but are tilted somewhat to the negative. Connecting streets must jog or not be constructed at all to avoid LSWs, which means increased out-of-direction travel and slower traffic in most cases. Avoidance of streambeds in the construction of sewer lines often means more pump stations, which requires more energy. On the other hand, integration of wetlands into area-wide drainage programs would be much more energy efficient than filling wetlands and constructing closed conduit systems. Other energy consequences counter-balance each other, as described in other supplemental ESEE

C. Consequences of Limiting Conflicting Public and Transportation Facilities

This portion of the ESEE analysis looks at the impacts of limiting conflicting public and transportation facilities uses on wetland resource sites and their associated impact areas, as indicated in the recommended wetland conservation program. As previously outlined, this recommended program would expand the City's existing Riparian Corridor standards to include LSWs and their respective setback areas (25' for moderate quality wetlands and 50' for high quality wetlands). Public facilities and street improvements would be allowed within LSWs and their impact areas where no reasonable alternative exists. Replacement and expansion of existing structures would also be allowed, subject to impact reduction standards.

1. Environmental Consequences of Limiting Public and Transportation Facilities

The environmental values that would be retained by conservation of wetlands have been described above, under the "full protection" option. The LWI report describes the environmental qualities of each wetland in this category, which would be partially retained by allowing public and transportation facilities where no reasonable alternative exists, and with appropriate impact reduction standards. Where streets can jog in one direction or another to skirt the edge, rather than the center, of a wetland complex this should be

considered. With impact reduction, this would allow most wetland functions and values to be retained.

However, the site-specific ESEE analyses note several instances where new streets are proposed through major wetland complexes, both in residential and industrial areas. In such situations, wetland resource values would be substantially reduced by street construction, even with impact reduction. For this reason, the City should look carefully at the "no build" option in cases where new streets are planned through the center of locally significant wetlands.

2. Economic Consequences of Limiting Public and Transportation Facilities

Several of Medford's planned streets and utilities are shown as running directly through locally significant wetlands. The limited protection option allows public facilities, including streets, to be constructed consistent with existing plans – where no reasonable alternative exists. However, it is likely that local transportation planners did not take wetlands and wetland mitigation costs into consideration at the time these plans were developed.

Since wetland mitigation typically costs typically run in the $100,000 per acre range, it would be worthwhile for Medford and Jackson County to re-visit some street locations in light of the ESEE benefits that wetlands provide, as well as the cost of wetland mitigation. For the agency constructing the public facility, it could be more economical to construct through wetlands and their buffer areas, because these undeveloped areas often provide the most direct and least costly (per pipe or street mile) alternative. In many cases, the only other alternative would be to construct the street through existing industrial, commercial or residential development – which might not be considered a as "reasonable." Thus, from city or county investment standpoint, the most economical option may be going through the wetland, while meeting the substantial public costs necessary to meet DSL mitigation requirements, and to replicate the needed functions of the wetland.

From the property owner's point of view, increased transportation access is normally a benefit. However, as noted in several site-specific ESEE analyses, once the public street is constructed and wetland impact reduction occurs (especially if the mitigation is "on site"), there may be little room left for residential, commercial or industrial development. In such situations, the property's value is twice reduced: first from lost of buildable area to street right-of-way, and second, the loss of buildable area to on-site mitigation, which in most cases, is preferred. In such situations, the property owner could opt to sell the entire parcel to the agency constructing the road, rather than attempt to develop what's left of a parcel with a new road and wetland mitigation site. Thus, from the perspective of achieving the highest and best use of a particular industrial, commercial or residential property, it may make sense to consider <u>not</u> extending the street through some wetland sites, and allow the property owner to develop portions of the site without wetlands.

On the other hand, potential costs for storm water management, flood control and federally mandated water quality improvement program could decrease if wetlands are not impacted or only partially impacted. Wetlands should be viewed as part of the storm water management system; often, when wetlands are destroyed, their functions must be re-created as sumps, or artificial detention and water quality ponds, at considerable public expense. Medford is facing major costs in meeting federal NPDES permitting requirements, costs that could increase if wetland water quality functions are lost. Flood insurance rates may also increase in the future, based on flood studies that may have to be revised because they under-estimated urban run-off rates.

3. Social Consequences of Limiting Public and Transportation Facilities

Medford's planned street and utility system has been designed to provide direct, functional routes to minimize facility construction and maintenance costs, and to avoid acquisition of developed industrial, commercial and residential property. Minimizing public costs, reducing vehicle miles traveled, and reducing the loss of established homes and businesses all have positive social value.

On the other hand, wetlands in residential areas provide visual relief from uninterrupted development, and wetlands make much better neighbors than major streets in residential areas. Thus, there can be positive social benefits associated with maintaining the wetland and not building the street through residential areas. This argument is less compelling for industrial and commercial areas, where efficient access probably has more social utility than maintaining wetlands.

In some cases, the extremes discussed above could be avoided through appropriate location and design of planned public facilities. By jogging streets to avoid wetlands, the monotony of long, straight streets through undifferentiated neighborhoods could be avoided. Conserved wetlands provide visual relief for commuters, businesses and residents alike. A sanitary sewer project through a drainage corridor can have positive social and educational benefits (in addition to providing a basic service), by constructing pedestrian pathways as part of the project. Even water reservoirs can be attractively designed to blend in with the natural environment, rather than contrasting with it.

4. Energy Consequences of Limiting Public and Transportation Facilities

The energy consequences of allowing public and transportation facilities to be routed through wetlands – where there are not reasonable alternatives and with environmental impact reduction – are generally positive. Simply put, out-of-direction travel increases energy usage. The decrease in travel distance needs to be weighed against energy conservation benefits associated with wetlands and vegetation (i.e., temperature modification, shade, reduced heat reflection from impervious services).

Parks, Schools and Recreational Uses

The General Land Use Plan includes a "Parks and Schools" designation that applies to public park and school facilities. New park and schools uses are conditional uses in Medford's residential zones. Parks are permitted outright in most commercial and industrial zones. It is a common misconception that wetland resources sites are protected from development by virtue of their being located within a park. Although wetland resources values and park uses can co-exist in an urban setting, recreational use of wetland resource sites does have adverse impacts.

1. Conflicting Land Uses

A. Recreational buildings and accessory structures such as restroom facilities and parking lots;
B. Developed parks, including such facilities as tennis courts, ball diamonds and picnic grounds; and
C. Passive parks, including facilities such as pedestrian and bicycle trails, access roads, viewing stations and parking lots.

2. Conflicting Land Use Activities

A. Construction impacts, including short term impacts (noise, runoff, erosion, disruption of vegetation, etc.) resulting from construction of conflicting uses;
B. Water quality impacts, including surface water runoff, runoff from streets and parking lots, and fertilized and sprayed lawns and gardens; and
C. Outdoor lighting, which could adversely affect wildlife.

Because there are only two wetland resource sites that fall completely within this category, Winterbrook has not created a separate "supplemental" ESEE analysis. Please see Section 3, Site Specific ESEE Analyses, applicable to Wetland Resource Site No. 17 and 24.

Native Vegetation Removal and Grading Supplemental ESEE Analysis

Removal of native vegetation, whether as a result of clearing, excavation, commercial harvesting, or farming, can adversely affect wetland functions and values. All wetland resource sites are potentially affected by vegetation removal and excavation. Certain sites, which are especially susceptible to degradation from these activities, are individually identified in the site-specific ESEE analysis. This focus of this analysis is on removal of *native plant species*. Removal of non-native (introduced) species, such as Himalayan blackberries, is not considered a conflicting use; indeed it is usually beneficial to wetland resources, if done properly.

DSL regulations limit wetland fill and removal, but not vegetation removal. Outside of riparian areas associated with fish-bearing streams (Riparian Corridors), existing Medford regulations limit

vegetation removal only through the land use review process (land divisions, site plan review, planned developments), but not as a separate activity.

Land Use Activities Conflicts

A. Tree-cutting and clearing of native vegetation, which destroys habitat, destroys scenic value and increases erosion;
B. Grading, fill and removal whether related to permitted construction or not.
C. Spraying for disease and weed control, which may destroy or impair native vegetation and habitat, and may sicken or kill wildlife; and
D. Road construction, construction of staging areas and impacts from native vegetation removal.

In urban areas, every site has conflicting uses. Even passive park areas, which are intended to "preserve" the resource, usually involve some level of development, or allow for public access.[16] Therefore, there are no wetland resource sites with no conflicting uses, although the level of conflict allowed, for example, within the Bear Creek Greenway is highly restricted.

A. Consequences of Prohibiting Native Vegetation Removal and Grading

This supplemental ESEE analysis looks at the consequences of fully protecting a wetland and its impact area from *all* grading and vegetation removal. Generally, the environmental consequences would be positive, but economic consequences (especially for individual property owners) would be negative, due to loss of buildable land.

1. Environmental Consequences of Prohibiting Native Vegetation Removal and Grading

Urban wetlands should be considered as part of a much larger ecological system of wetlands, stream corridors and vegetated uplands. The intrinsic value of any particular wetland is affected by the quality and quantity of native vegetation cover. Most of the functions and values of wetland resources are adversely affected by loss of native vegetation.

Ecological integrity, wetland wildlife habitat, visual/aesthetic quality, sediment trapping, and nutrient attenuation are all dependent upon maintenance of native vegetation. In fact, a critical focus of many wetland restoration projects is the removal of non-native wetland plants and replacement with native species. One of the greatest threats to native species is

[16] For example, there are some natural resource sites that are protected as "Open Space" through the Planned Unit Development process, as a result of approved density transfers. These open space areas typically are free of development, but may allow for public access, installation of public facilities or maintenance of vegetation, all of which are minor conflicts with wildlife habitat values. The point is not necessarily to restrict such activity, but to identify and account for conflicting uses through this process.

habitat loss. Invasive non-native species are a major component of habitat loss, which in turn leads to loss of biodiversity, often causing local extinctions of native plants and animals.

Maintenance of wetland vegetation contributes directly to improved water quantity, quality, and fish and wildlife habitat. The retention of native vegetation is a critical element in these wetland functions and values. Wetlands decrease flooding potential by providing flood water storage, dissipating the force of moving water, and by allowing storm water to seep gradually into the ground rather than moving rapidly over the surface. Without native vegetative cover, the potential for flood damage and erosion increases. Vegetated soils allow water to filter downward to the groundwater reservoir, adding volume to surface waters during low flow periods. Wetlands allow sediment to settle out and be trapped by vegetation before it reaches streams. Native vegetation also absorbs chemicals and heavy metals, reducing water pollution. Thus degradation of wetlands caused by vegetation removal, contributes to the direct loss of wetland functions and values.

When native vegetation is removed, the value of the wetland for habitat decreases dramatically. Spraying, cutting, or scraping of vegetation is often considered to be "routine maintenance", but has the effect of changing the vegetative regime and habitat qualities of a wetland. The removal of native vegetation usually results in replacement with introduced and hardier species.

The environmental values that would be retained by conservation of wetlands are described above, and are extremely positive. The LWI report describes and analyzes the environmental qualities of each wetland in this category, which would be largely retained by prohibiting vegetation removal on and near wetlands. Even with "full protection" of wetland vegetation, activities associated with development (pets, children, ATVs, run-off, etc.), which cannot be fully controlled by land use regulations, could result in loss or degradation of wetland vegetation over time.

In conclusion, the Medford Local Wetlands Inventory report describes and analyzes nine criteria for wetland evaluation and characterization. That report includes four specific biological measures that are compromised by development: wildlife habitat, fish habitat, water quality, and hydrological control. These four criteria are evaluated in the following manner: **wildlife habitat** evaluates the habitat diversity for species generally associated with wetlands and wetland edges; **fish habitat** evaluates how the wetland contributes to fish habitat in streams, ponds or lakes associated with the wetland; **water quality** evaluates the potential of a wetland to reduce the impacts that excess nutrients in storm water runoff have on downstream waters; **hydrological control** evaluates the effectiveness of a wetland in storing floodwaters and reducing downstream flood peaks. The environmental consequences of fully protecting both the wetland and its impact area from all grading and native vegetation removal would be positive.

2. Economic Consequences of Prohibiting Native Vegetation Removal and Grading

Prohibiting all grading and native vegetation removal within LSWs and their impact areas would have some direct negative economic consequences to the property owner (loss of buildable land) and indirect economic consequences to the community (lower land use efficiency and higher per unit costs for providing public facilities and services). Prohibiting all grading and vegetation removal within the impact area could also increase site preparation construction costs.

There are a number of positive economic consequences associated with completely prohibiting vegetation removal or excavation within a wetland and its impact area. To the extent that wetlands contribute to the economic value of a property (scenic, open space, etc.), this value could be diminished if native vegetation was removed or the site converted from a natural state. Conserving native vegetation can have positive economic value, by minimizing erosion and maximizing water quality, which can increase the economic value of urban property. Especially in residential areas, prohibiting vegetation removal within wetlands and their impact areas would have positive economic impacts for neighboring residential property owners, whose properties would benefit from nearby open space.

It is useful to look at the economic consequences of conserving the significant wetland resource site from different points of view. Often, impacts are less significant at the study area level than from the point of view of the individual property owner. The ESEE analyses for each individual significant wetland resource site address the special characteristics of that site in relation to property owner interests.

On the other hand, developers and homeowners increasingly recognize the economic value of natural areas. It is not uncommon for developers, homeowners or governments to place "conservation easements" over wetlands to ensure their maintenance in a natural state. As public attitudes towards wetlands change, native vegetation removal will have more pronounced and adverse economic impacts on neighboring property owners.

3. Social Consequences of Prohibiting Native Vegetation Removal and Grading

The social consequences of protecting all native vegetation on significant wetland resource sites and their respective impact areas are mixed. On the positive side, wetland vegetation could add amenity value to residentially developed land. Social consequences *(natural* open space, views, undisturbed wildlife habitat areas close to population centers) would be positive as a result of conserving the wetland vegetation. Wetlands *with native vegetation* provide educational opportunities for those living near them, which would be maintained.

On the negative side, conservation of native vegetation precludes a "park-like" appearance, which has its own social appeal. Wetlands, which are mowed and maintained primarily for human use, could have increased open space value to some people. In addition, a prohibition on removal of native vegetation can conflict with the need to mow or otherwise remove vegetation as a fire protection measure.

The LWI report describes and analyzes the social qualities of each wetland in this category, which would be preserved by retaining native vegetation. That report includes specific measures for educational potential, visual/aesthetic quality, and water based recreational opportunities. The social consequences of conserving wetland vegetation would be virtually the same as the consequences of conserving the wetland itself. In many cases, it is the quality and quantity of the wetland vegetation that makes the wetland *significant.*

4. Energy Consequences of Prohibiting Native Vegetation Removal and Grading

The energy consequences of native vegetation conservation are not major. From a solar perspective, it is possible that vegetation from forested wetlands could shade south-facing windows of houses, thus reducing solar access, although this is less likely with taller buildings.

On the negative side, conservation of wetland vegetation would have a moderating effect on climate. Trees provide shade, which cool buildings in the summer and serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands with *native vegetation* provide the opportunity to experience "nature" directly and locally, without having to utilize energy to reach the countryside.

A. Consequences of Unrestricted Native Vegetation Removal and Grading

1. Environmental Consequences of Unrestricted Native Vegetation Removal and Grading

Urban wetlands should be considered as part of a much larger ecological system of wetlands, stream corridors and vegetated uplands. The intrinsic value of any particular wetland is affected by the quality and quantity of native vegetation cover. Most of the functions and values of wetland resources would be adversely affected by loss of native vegetation.

Ecological integrity, wetland wildlife habitat, visual/aesthetic quality, sediment trapping, and nutrient attenuation are all dependent upon maintenance of native vegetation. In fact,

a critical focus of many wetland impact reduction projects is the removal of non-native wetland plants and replacement with native species. One of the greatest threats to native species is habitat loss. Invasive non-native species are a major component of habitat loss, which in turn leads to loss of biodiversity, often causing local extinctions of native plants and animals.

Retention of wetland vegetation contributes directly to improved water quantity, quality, and fish and wildlife habitat. The retention of native vegetation is a critical element in these wetland functions and values. Wetlands decrease flooding potential by providing flood water storage, dissipating the force of moving water, and by allowing storm water to seep gradually into the ground rather than moving rapidly over the surface. Without native vegetative cover, the potential for flood damage and erosion increases. Vegetated soils allow water to filter downward to the groundwater reservoir, adding volume to surface waters during low flow periods. Wetlands allow sediment to settle out and be trapped by vegetation before it reaches streams. Native vegetation also absorbs chemicals and heavy metals, reducing water pollution. Thus degradation of wetlands caused by vegetation removal, contributes to the direct loss of wetland functions and values.

When native vegetation is removed, the value of the wetland for habitat decreases dramatically. Spraying, cutting, or scraping of vegetation is often considered to be "routine maintenance", but has the effect of changing the vegetative regime and habitat qualities of a wetland. The removal of native vegetation usually results in replacement with introduced and hardier species. A state-listed endangered plant (*Cooks lomatium*) in Wetland Resource Site No. 20 could be severely impacted by vegetation removal activities.

The Medford Local Wetlands Inventory report describes and analyzes nine criteria for wetland evaluation and characterization. That report includes four specific biological measures that are compromised by development: wildlife habitat, fish habitat, water quality, and hydrological control. These four criteria are evaluated in the following manner: **wildlife habitat** evaluates the habitat diversity for species generally associated with wetlands and wetland edges; **fish habitat** evaluates how the wetland contributes to fish habitat in streams, ponds or lakes associated with the wetland; **water quality** evaluates the potential of a wetland to reduce the impacts that excess nutrients in storm water runoff have on downstream waters; **hydrological control** evaluates the effectiveness of a wetland in storing floodwaters and reducing downstream flood peaks. The environmental consequences of allowing native vegetation removal on a wetland - whether through excavation, maintenance, chemical or mechanical removal - are that the qualities that make each inventoried wetland *significant* would be lost.

2. Economic Consequences of Unrestricted Native Vegetation Removal and Grading

Allowing unrestricted grading and vegetation removal could marginally reduce site preparation construction costs, but otherwise has few positive economic consequences. Unrestricted grading activities would likely have adverse off-site economic consequences, due to increased erosion and possible alteration of natural drainage systems. Removal of native vegetation may result in use of property for lawns or gardens. Where a more manicured appearance is perceived as a desirable property trait, there could be a slight increase property values, although maintenance costs also increase.

On the other hand, developers and homeowners increasingly recognize the economic value of natural areas. It is not uncommon for developers, homeowners or governments to place "conservation easements" over wetlands to ensure their maintenance in a natural state. As public attitudes towards wetlands change, native vegetation removal will have more pronounced and adverse economic impacts on neighboring property owners.

3. Social Consequences of Unrestricted Native Vegetation Removal and Grading

The consequences of allowing unrestricted vegetation removal and/or excavation on social values associated with significant wetland resource sites are largely adverse. Educational and amenity values of affected wetlands would be lost. On the positive side, native vegetation removal allows for creation of a more "park-like" appearance, which has its own social appeal. Wetlands that are mowed and maintained primarily for human use could have increased open space value to some people, and increased fire resistance.

On the other hand, retention of native vegetation in urban wetlands is what makes such wetlands *valuable* for those who live and work nearby. Over the last decade, the public attitude toward wetland conservation has changed dramatically. Neighborhood property owners and associations, joining with environmental groups, have opposed developments that result in a loss of wetland values. Citizens have a much greater awareness, and place a much higher value, on conserving both the natural appearance and wildlife habitat values of wetlands.

4. Energy Consequences of Unrestricted Native Vegetation Removal and Grading

The energy consequences of unrestricted native vegetation removal and grading would result in the loss of the moderating effect that water areas and vegetation have on local climate. Trees provide shade that cools buildings in the summer and serve as a windbreak in the winter. Plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands also provide local "natural" opportunities, thus reducing the need to utilize energy to reach outdoor experiences.

C. Consequences of Limiting Native Vegetation Removal and Grading

This supplemental ESEE analysis considers the consequences of limiting vegetation removal and grading as prescribed in proposed wetland regulations. Vegetation removal and grading would be limited for wetlands and their respective setback area (often less than the impact area), and public facilities would be permitted with impact reduction (where no reasonable alternative exists).

1. Environmental Consequences of Limiting Native Vegetation Removal and Grading

Most of the environmental values discussed in the full protection option would be retained under this option – provided that full compensation for reduced wetland values occurred. For lower quality wetlands, the marginal environmental value associated with protecting the entire 50-foot impact area (as opposed to the 25-foot setback area) is relatively small. For high value wetlands, the environmental consequences of encroaching on the proposed 50-foot setback area would be greater.

The LWI report includes specific measures for ecological integrity, wetland wildlife habitat, sediment trapping, and aesthetics. With impact reduction, most of these qualities can be retained.

2. Economic Consequences of Limiting Native Vegetation Removal and Grading

Limiting vegetation removal and grading to the area outside the wetland setback (except for public facilities) would have direct adverse economic consequences for the property owner, because buildable land area would be restricted. Economic impacts would be less, however, than under the "full resource protection" option. Removal of native vegetation may result in use of property for lawns or gardens. Where a more manicured appearance is perceived as a desirable property trait, there may be a slight increase property values.

On the other hand, the limited protection option addresses several adverse economic consequences associated with unrestricted vegetation removal or excavation. To the extent that wetlands contribute to the economic value of a property (scenic, open space, etc.), this value would be seriously diminished if native vegetation was completely removed or the site converted from a natural state. Conserving native vegetation can have positive economic value, by minimizing erosion and maximizing water quality, which can increase the economic value of urban property.

It is useful to look at the economic consequences of conserving the significant wetland resource site from different points of view. Often, impacts are less significant at the study area level than from the point of view of the individual property owner. The ESEE

analysis for each *individual* significant wetland resource site addresses the special characteristics of that site in relation to property owner interests.

3. Social Consequences of Limiting Native Vegetation Removal and Grading

The social consequences of conserving native vegetation on significant wetland resource sites are mixed. On the positive side, wetland vegetation could add amenity value to residentially developed land. Social consequences *(natural* open space, views, undisturbed wildlife habitat areas close to population centers) would be positive as a result of conserving the wetland vegetation. Wetlands *with native vegetation* provide educational opportunities for those living near them, which would be maintained.

On the negative side, conservation of native vegetation precludes a "park-like" appearance, which has its own social appeal. Wetlands, which are mowed and maintained primarily for human use, could have increased open space value to some people, and increased fire resistance.

The LWI report describes and analyzes the social qualities of each wetland in this category, which would be largely conserved by retaining native vegetation. That report includes specific measures for educational potential, visual/aesthetic quality, and water based recreational opportunities. The social consequences of conserving wetland vegetation are virtually the same as the consequences of conserving the wetland itself. In many cases, it is the quality and quantity of the wetland vegetation that makes the wetland *significant.*

4. Energy Consequences of Prohibiting Native Vegetation Removal and Grading

The energy consequences of native vegetation conservation are not major. From a solar perspective, it is possible that vegetation from forested wetlands could shade south-facing windows of houses, thus reducing solar access, although this is less likely with taller buildings.

On the negative side, conservation of wetland vegetation would have a moderating effect on climate. Trees provide shade that cools buildings in the summer and serve as a windbreak in the winter. At a macro level, plants absorb sunlight and transpire during the growing season, slightly reducing ambient air temperatures. Wetlands with *native vegetation* provide the opportunity to experience "nature" directly and locally, without having to utilize energy to reach the countryside.

SECTION 3. SITE SPECIFIC ESEE ANALYSES

(Provided Separately)