

ECONOMIC, SOCIAL, ENVIRONMENTAL, AND ENERGY ANALYSIS AND RECOMMENDATIONS

**FOR NATURAL, SCENIC, AND OPEN SPACE RESOURCES WITHIN
MULTNOMAH COUNTY UNINCORPORATED URBAN AREAS**

Part of the Multnomah County-Portland Unincorporated
Urban Areas Functional Plan Compliance Project

Final Report



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**Adopted by Multnomah County Board of
Commissioners October 11, 2001
Effective January 1, 2002**

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County Ordinance No. 967

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Printed on Recycled Paper

October 2001

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INTRODUCTION

This report was prepared as part of the Multnomah County-Portland Unincorporated Urban Areas Functional Plan Compliance Project. Under a jointly adopted intergovernmental agreement between Multnomah County (County) and the City of Portland (City), the City provided the County Board of Commissioners with a compliance report and set of recommendations designed to meet the requirements of the Urban Growth Management Functional Plan. The planning area includes those areas of unincorporated Multnomah County that are within both the city’s Urban Services Boundary and the metropolitan regional Urban Growth Boundary.

As part of this process, the City is implementing measures to comply with Statewide Planning Goal 5, which requires all Oregon cities and counties “to conserve open space and protect natural and scenic resources.” This is the second of two documents that address compliance with Goal 5. The first document, the *Inventory of Natural, Scenic, and Open Space Resources – Final Report* (Inventory, published separately), presents the location, quantity, and quality of significant Goal 5 resources within the planning area.

This report presents subsequent steps in the Goal 5 process: identification of conflicting uses; analysis of economic, social, environmental, and energy (ESEE) consequences of protecting resources where conflicts exist; and development of a plan to protect significant resources. These steps are applied to resources within the four significant resource sites identified in the Inventory. The unincorporated Multnomah County lands included in this study are located in six distinct areas along the perimeter of the Portland City Limits. Based on the Inventory, four of the six areas were found to contain significant Goal 5 resources. No Goal 5 resources were found at the NE 162nd/Halsey area and at the Brentwood-Darlington (SE 72nd and Harney) area. The four sites included in the inventory are Johnson Creek (Site 28), Linnton (Site 105-A), Sylvan (Site 111-A), and Dunthorpe (Site 117-A). These sites correspond to the following Multnomah County unincorporated areas (UIA): Johnson Creek (UIA #16, 18), Linnton (UIA #2), Sylvan (UIA #0, 5, 7, 8, 10, 11, 35, 38), and Dunthorpe (UIA #31). Resource site locations are shown on Figure 1.

CONFLICTING USE ANALYSIS

Following the inventory of Goal 5 resources, local governments must identify conflicting uses within inventoried resource sites. According to the Goal 5 administrative rule, a conflicting use is one that, if allowed, could negatively impact a significant resource site. To identify such conflicts, the rule directs local governments to examine the uses allowed within broad zoning categories (e.g., residential, commercial). As part of the Compliance Project, current zoning designations used by Multnomah County were replaced with City of Portland base zones. This analysis uses the new City base zones to examine potential conflicting uses. The analysis considers uses allowed by right, uses subject to limitations or conditions (i.e., conditional uses), and certain uses that may not be allowed in a base zone but may be permitted by recognition of

legal nonconforming status or as a temporary activity. Existing land uses, including legal nonconforming uses, are also examined.

Within the unincorporated areas of Multnomah County, housing is the most common existing use; other uses include parks, marinas, cemeteries, and institutions. Each of these uses occurs on properties that contain significant resources as identified in the Inventory report. Significant resources are also located on properties with the following proposed City zoning: Open Space (OS), Residential Forest (RF), Residential 20,000 (R20), Residential 10,000 (R10), Residential 5,000 (R5), and General Employment 1 (EG1). The following section describes the uses allowed within each of these zones. The next section then addresses the potential conflicts and resource impacts caused by each of these uses.

Uses Permitted by Zoning

The following discussion identifies allowed land uses in each proposed City base zone for each resource site. The discussion also includes an examination of the uses not assigned to a single zoning category, such as temporary uses. The subsequent analysis of ESEE consequences of protecting significant resources will address the existing and potential conflicting uses allowed within each resource site.

Table 1 depicts the proposed City base zones that apply to each of the four identified resource sites. Table 2 provides a list of allowed uses within each of these zones.

Table 1. Zoning by Resource Site

Resource Site	City Zoning
Johnson Creek (Site 28)	OS, R5, and EG1
Linnton (Site 105-A)	RF and R10
Sylvan (Site 111-A)	RF, R20, and R10
Dunthorpe (Site 117-A)	R20 and R10

Table 2 on the following page summarizes proposed uses within each of the zones identified in Table 1. Following Table 2 is a discussion of individual base zones, their general location within each site, allowed uses (including temporary uses) within each zone, and existing uses within each zone.

Table 2. Uses Permitted by City of Portland Zoning

Use Categories	Base Zones					
	OS	RF	R20	R10	R5	EG1
Residential Categories						
Household Living	N	Y	Y	Y	Y	CU
Group Living	N	CU	CU	CU	CU	CU
Commercial Categories						
Retail Sales and Service	CU	N	N	N	N	L/CU
Office	N	N	N	N	N	L
Quick Vehicle Servicing	N	N	N	N	N	Y
Vehicle Repair	N	N	N	N	N	Y
Commercial Parking	N	N	N	N	N	L
Self-Service Storage	N	N	N	N	N	Y
Commercial Outdoor Recreation	CU	N	N	N	N	Y
Major Event Entertainment	N	N	N	N	N	CU
Industrial Categories						
Manufacturing and Production	N	N	N	N	N	Y
Warehouse and Freight Movement	N	N	N	N	N	Y
Wholesale	N	N	N	N	N	Y
Industrial Service	N	N	N	N	N	Y
Institutional Categories						
Basic Utilities	CU	CU	CU	CU	CU	Y/CU
Community Service	CU	CU	CU	CU	CU	L
Parks and Open Areas	L/CU	L/CU	L/CU	L/CU	L/CU	Y
Schools	CU	CU	CU	CU	CU	Y
Colleges	N	CU	CU	CU	CU	Y
Medical Centers	N	CU	CU	CU	CU	Y
Religious Institutions	N	CU	CU	CU	CU	Y
Daycare	CU	L/CU	L/CU	L/CU	L/CU	Y
Other Categories						
Agriculture	Y	Y	Y	CU	N	Y
Aviation and Surface Passenger Terminals	N	N	N	N	N	CU
Detention Facilities	N	N	N	N	N	CU
Mining	CU	CU	N	N	N	N
Radio and Television Broadcast Facilities	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU	Y

Key

Y Permitted subject to the development standards of zone and other regulations of Title 33

L/CU Permitted with certain limitations or as Conditional Use

CU Permitted as Conditional Use

N Prohibited in this zone

Note: Uses prohibited in all of the above zones are not included in this table.

Open Space (OS)

The OS zone is intended to preserve public and private open and natural areas identified in the Comprehensive Plan. Only UIA 18 in Johnson Creek Resource Site 28 is proposed for OS zoning as part of this study. The OS zone will be applied to a property known as the Brunkow property which was recently purchased by the City and a section of the Springwater Corridor Trail. Agriculture, certain park and open area uses, and certain broadcast facilities are allowed by right in the OS zone. Park and open area facilities are generally allowed as conditional uses. Retail sales and service uses are allowed only if they are associated with a park and open area use and then only as conditional uses. Several “institutional” uses are allowed as conditional uses: basic utilities, community service, schools and daycare. Rail lines and utility corridors, mining, and certain broadcast facilities are permitted as conditional uses as well.

Temporary activities are permitted in the OS zone subject to certain conditions. The following temporary activities are permitted: fairs, carnivals and other special events; temporary actions to respond to natural disasters and emergencies; staging areas for public utility installation; and radio frequency transmission facilities.

Existing conflicting uses within the proposed OS land in Johnson Creek are limited to an existing house on the former Brunkow property and the developed facilities associated with the Springwater Corridor Trail.

Residential Forest (RF)

The RF zone is intended for agricultural and forested areas in the City. The RF zone is proposed within the Balch Creek basin in the Sylvan site, and along the Willamette River floodplain in the Linnton site. Agriculture, forestry, and very low-density single-dwelling residences are the primary allowed uses. The maximum density is generally one unit per two acres. Group living, basic utilities, community services, schools, colleges, medical centers and religious institutions, and mining are conditional uses. Parks, open space areas, daycare facilities and broadcast facilities are permitted with certain limitations or as conditional uses.

Under certain conditions, the following temporary activities are allowed in the RF zone: mobile home use during construction; residential sales offices; garage and seasonal outdoor sales; fairs, carnivals and other major public gatherings; show of model homes; temporary actions to respond to natural disasters and emergencies; staging areas for public utility installation; and radio frequency transmission facilities.

Existing conflicting uses within the proposed RF zones include a marina at the Linnton site and low density residential uses at the Sylvan site.

Limited Density Single-dwelling Residential (R20)

The R20 designation is intended for limited residential development in areas with long term service limitations and significant development constraints. The R20 zone is proposed for most of the Dunthorpe site and certain parts of the Sylvan site. Single-dwelling residential is the

primary use. The maximum density is generally 2.2 units per acre. Agricultural uses are allowed by right. Group living, basic utilities, community service facilities, schools, colleges, medical centers, religious institutions, rail lines and utility corridors are conditional uses. Under certain conditions, the same temporary activities described for the RF zone are allowed in the R20 zone.

Existing conflicting uses within the proposed R20 zones include residential and institutional uses at the Dunthorpe site and residential and broadcast facility uses at the Sylvan site.

Limited Density Single-dwelling Residential (R10)

The R10 zone is intended for areas with public services but which are subject to significant development constraints. The R10 zoning is proposed in the northern portion of the Dunthorpe site, certain parts of the Sylvan site, and on the hillside west of St. Helens Road in Linnton. The maximum density is generally 4.4 units per acre. Household living, certain park and open area uses and certain broadcast facilities are permitted by right in the R10 zone. Some parks, open areas and broadcast facilities are permitted subject to limitations or as conditional uses. Group living uses, institutional uses, agriculture and rail lines and utility corridors are permitted as conditional uses. Under certain conditions, the same temporary activities described for the RF zone are allowed in the R10 zone.

Existing conflicting uses within the proposed R10 zones include residential uses at the Dunthorpe, Sylvan, and Linnton sites.

High Density Single-dwelling Residential (R5)

The R5 zone is intended for areas with good public services and no development constraints. Only one area of R5 zoning is proposed as part of this study: this zone applies to the land immediately west of SE 174th Avenue in the Johnson Creek site. The maximum density is generally 8.7 units per acre, although this may be reduced by as much as 75 percent on steep slopes in the Johnson Creek Plan District. Residential, certain park and open area uses, and certain broadcast facilities are permitted by right in the R5 zone. Some parks, open areas and broadcast facilities are permitted subject to limitations or as conditional uses. Group living uses, institutional uses, and rail lines and utility corridors are permitted as conditional uses. Under certain conditions, the same temporary activities described for the RF zone are allowed in the R5 zone.

Existing conflicting uses within the proposed R5 zones include a residence, gun club, and the Sheriff's mounted posse headquarters in the Johnson Creek site.

General Employment 1 (EG1)

The EG1 zone is intended for a variety of employment and business opportunities that are often industrial-related and located in a large building or warehouse type structure. Only one area of EG1 zoning is proposed as part of this study: this zone applies to the land immediately east of SE 174th Avenue in the Johnson Creek site. This zone is generally applied to older developed areas that generally have an existing street system. The lots tend to be smaller than other employment

and industrial zones. Manufacturing and production, warehouse and freight movement, wholesale and industrial services are allowed industrial uses. Quick vehicle servicing, vehicle repair, self-service storage, and commercial outdoor recreation facilities are allowed commercial uses; retail sales and major event entertainment facilities are allowed as conditional uses. Residential uses are also conditional uses. Agricultural uses, rail lines and utility corridors, and most institutional uses are allowed by right. Aviation, surface passenger terminals, and detention facilities are also conditional uses. Radio and television broadcast facilities are permitted with limitations or as conditional uses.

Under certain conditions, the following temporary activities are allowed in the EG1 zone: parking lot sales; seasonal outdoor sales; fairs and carnivals; warehouse sales; temporary actions to respond to natural disasters and emergencies; staging areas for public utility installation; and radio frequency transmission facilities.

Existing conflicting uses within the EG1 zone include residential and manufacturing uses in the Johnson Creek site.

Conflicting Use Impacts

This section provides a review of the impacts of permitted conflicting uses described above on significant resources identified in the Inventory report. Where the same impacts are identified for different conflicting uses, the first impact analysis in the text is referenced and not repeated.

Residential Uses

Residential uses identified in the zoning code include household living and group living. Household living is residential occupancy of a dwelling unit by a household. Group living is different from household living in that it involves occupancy of a structure by a group of people who do not meet the definition of a household. For the purpose of a conflicting uses analysis, both types of residential uses can degrade or destroy natural resources during construction and use of residential structures. This section examines the consequences of housing, for both households and group living situations, on Goal 5 resources.

Housing is permitted in the four residential zones in this study and as a conditional use in the EG1 zone; it is prohibited in the open space zone. In addition to the construction of homes, housing may include the construction of garages and other accessory buildings, access drives, parking areas, landscaped areas, utility connections, and related development.

Preparing land for housing commonly includes removal of vegetation. Removal of vegetative cover eliminates habitat for native wildlife. Lost habitat includes feeding, nesting, perching and roosting places for birds, and loss of feeding, nesting and refuge areas for mammals, reptiles, amphibians, fish and insects. Clearing also removes important structural features of the forest such as multiple layered canopies, snags and downed logs, and large trees. These habitat components are removed and replaced with ecologically barren buildings, fences, lawns, driveways, parking lots and other impervious surfaces.

Forest fragmentation caused by the clearing of vegetation for residential uses increases the isolation of one habitat area from another. This can form barriers to wildlife migration and can limit the genetic exchange among populations. Roads (and roadway traffic) and fences can also form barriers to wildlife migration. As the range of habitat for indigenous wildlife becomes restricted and isolated, opportunities for recruitment from other areas are limited and wildlife populations become vulnerable to disease, predation and local extinction.

Household lights, loud noises and other outdoor human activities disturb the breeding and predator instincts of animals. Activity levels as defined by noise and movement increase from between 10 and 100 times that of normal (natural system) producing disruptions in competition, communication, mating and predation habits of animals, and making it difficult or impossible for native species to exist (Brown 1987). Additionally, household litter and garbage in resource areas degrades habitat values, and household pets can kill or injure native wildlife and compete for limited space. Other detrimental impacts of housing include reduction of open space, and degradation of scenic and recreational values.

The steep slopes within resource areas become susceptible to erosion, slumping and landslides when forest cover is removed and when cuts and fills are made for roads and buildings. Vegetation clearing and site grading activities accelerate soil loss and erosion, and can precipitate landslides and flooding, posing significant hazards to people and property and degrading habitat values. Soil loss and erosion can also result from common construction activities such as vegetation removal, grading and compaction on sites with gentle slopes. These activities can reduce the capacity of soil to support vegetation and absorb groundwater by reducing soil fertility, microorganisms, seeds, and rootstocks, and damaging soil structure.

The construction of homes, roads and other impervious surfaces has adverse consequences beyond those described above. Additional adverse effects of residential development include:

- Erosion, flooding, and landslides
 - Increased storm runoff and peak flows, resulting in soil loss and erosion, bank undercutting and failure, and potential landslides and floods;
 - These above activities can damage soil structure and fertility, degrade or eliminate wildlife habitat, and can result in public safety hazards.
- Alters hydrology
 - Reduced groundwater recharge, altered volumes of water in wetlands and surface drainages contributed by groundwater;
 - This can alter an area's hydrology by lowering surface water levels or groundwater tables and removing a local source of water and moisture essential to the survival of fish, amphibians and aquatic organisms as well as terrestrial animals.
- Increases pollution
 - Oil, gas, tar, antifreeze, and other contaminants from vehicles, heating and cooling systems, and roofs degrade habitat and water quality;
 - Heated runoff from roads and parking lots can cause thermal pollution and have detrimental effects on local fish runs;
 - Pesticides, herbicides, and fertilizers used on residential grounds can pollute ground and surface waters and degrade habitat;
 - Dirt and mud eroded from cultivated land or deposited from vehicles can cause sedimentation of wetlands and streams;
 - Septic drain fields and animal wastes can contaminate ground and surface waters.

Common residential landscaping practices also can have detrimental impacts. The removal of native vegetation and the establishment of lawns and non-native landscape features reduce resource values. They require regular irrigation which reduces drinking water supplies and can exacerbate summer water shortages. Landscape trees, shrubs and groundcover plants often include invasive, non-native species that escape into natural areas and compete aggressively with natives. Ivy, holly and laurel are commonly used in residential landscapes.

The form and layout of residential development can have a great impact on resource values. For example, a clustered R5 development with small lots and alternative housing types and large areas of open space set aside on the site will have fewer impacts than an R10 development that has developed lots covering the entire site.

Commercial Uses

Commercial uses are prohibited except in the OS and EG1 zones in Johnson Creek. The OS zone allows commercial outdoor recreation and retail sales and service associated with park and open space conditional uses. The EG1 zone allows quick vehicle servicing, vehicle repair, self-service storage, and commercial outdoor recreation by right. Office and commercial parking are allowed as limited uses. Retail sales and service and major event entertainment are conditional uses.

Commercial uses have all of the detrimental effects described for residential uses above. However, commercial uses typically require more extensive site clearing and grading, and the detrimental effects of vegetation removal, building construction, and human use are generally much greater than those described for residential uses. In addition, parking lots which are not normally a major impact for housing, are common with commercial uses and substantially increase the detrimental impacts of impervious surfaces (e.g., reduced infiltration and higher runoff, lower groundwater levels, interference with the transfer of air and gases from the soil). Commercial uses also can significantly diminish or destroy open space, scenic, and recreation values. Certain residential impacts such as pet wastes and fertilizers and pesticides from lawn and garden areas may be somewhat reduced, however oil, gasoline, and vehicle related contamination can increase.

Industrial Uses

Industrial uses are prohibited within the planning area except in one location at the Johnson Creek site. The EG1 zone allows four types of industrial uses: manufacturing and production, warehouse and freight movement, wholesale, and industrial service.

These industrial uses have all of the detrimental effects described for commercial uses above. Industrial uses often require complete site clearing and grading, with the retention of few if any natural resources on a site. They therefore can have more severe environmental effects than commercial uses. They have similar or even greater impervious surface impacts as commercial and also can significantly diminish or destroy open space, scenic, and recreational values. In addition, industrial uses often draw substantial amounts of water from wells and public water sources. Extensive use of groundwater can result in draw down of the water table, which in turn can reduce surface water flows in streams and eliminate a water source for wildlife. Industrial

uses may require special permitting and the construction of pollution control devices to ameliorate specific impacts.

Institutional Uses

Institutional uses are limited or conditional uses in both residential and open space zones; most institutional uses are allowed by right in the EG1 zone. In residential zones, eight different categories of institutional uses are permitted, ranging from parks and open areas (with relatively few adverse impacts) to colleges and medical centers (with greater impacts). In the OS zone, colleges, medical centers and religious institutions are prohibited and five institutional categories are permitted. The EG1 zone allows community service as a limited use and certain basic utilities as a conditional use; otherwise, all institutional uses are permitted. Because of the wide range of impacts, the impacts of each category are briefly reviewed below.

Basic utilities are infrastructure services such as water and sewer pump stations, electrical substations, and water towers that need to be located in or near the area where the service is provided. Although operation of existing facilities may have few adverse environmental effects, construction and maintenance practices for new basic utilities have a variety of adverse effects. These activities often create cleared corridors which increase wind and light penetration into forest and other habitats providing opportunities for the establishment of invasive, non-native plant species. Construction often fragments wildlife habitat areas, degrades wetlands and streams, increases stormwater runoff and erosion, and reduces forest cover. Basic utility construction generally has the same effects as those described for housing. Certain types of basic utilities, such as stormwater retention areas, sediment traps, and constructed wetland pollution treatment facilities can have beneficial environmental effects if located without disruption to existing resources. However, replacement of existing resource areas with these facilities can have significant detrimental effects.

Community service uses provide a local service to people of the community (examples include libraries, museums, and community centers). These uses have similar though sometimes fewer adverse impacts as those described for commercial uses.

Parks and open area uses focus on natural areas, community gardens, or public squares. These lands tend to have few structures and include parks, golf courses, cemeteries, recreational trails, and botanical gardens. Parks and open areas construction and maintenance practices can cause erosion and damage vegetation and habitat. Removal of vegetation, creation of impervious surfaces such as roads, parking lots, and tennis courts, and construction of buildings are activities commonly associated with development of parks and open areas. The environmental consequences of these activities are similar to those described for residential uses except that normally a smaller percentage of land area is covered by impervious surfaces. Intensive recreation such as cycling, motoring, and equestrian sports also cause erosion, particularly when they occur off maintained trails. Unleashed domestic animals in parks and open areas can injure or kill wildlife. Most park and open area developments include facilities for at least partial maintenance of normal hydrologic relationships and control of erosion.

Schools, colleges, medical centers, and religious institutions are separate institutional categories but have similar effects. Schools include public and private schools through high school level. Colleges include universities, colleges, and seminaries. Medical centers include hospitals and tend to be located over multiple blocks or in campus settings. Religious institutions provide meeting areas for religious activities and include churches, temples, synagogues, and mosques. Structures and facilities (including parking areas) associated with these uses generally have the effects similar to those described for residential uses. Grounds maintenance has the same effects as those described for parks and open areas.

Daycare includes preschools, nursery schools, and adult daycare programs. Daycare uses are normally small in size and often are contained within other institutional use buildings (e.g., medical centers, religious institutions, and community service providers). When within such existing buildings, daycare impacts are limited to the additional new parking or building facilities required for the use. These new facilities have the same impervious surface and vegetation clearing effects as residential uses. Daycare centers independent of other uses have the same effects as residential uses, except that larger buildings and parking areas increase the adverse effects of impervious surfaces.

Agriculture

Agriculture is allowed in the OS, RF, R20, and EG1 zones and is a conditional use in the R10 zones. Traditional agriculture uses often require clearing vegetation, plowing fields, and exposing bare soils which cause erosion that degrades water quality and can adversely impact aquatic habitat. The removal of forest cover for farming has the same habitat effects as those for housing but with fewer hydrologic impacts. The conversion of forest to farmland replaces diverse forest plant communities with few, cultivated species. Vegetation acts as a filter, cleansing runoff before it reaches streams or wetlands. Removal of vegetation for agricultural uses eliminates these benefits. Agriculture also commonly (but not always) involves the use of pesticides, herbicides, and fertilizers. These chemicals can contaminate surface and groundwater areas and harm wildlife. Animal fecal contamination can occur as a result of pasture use and can have similar environmental effects.

Agriculture may draw irrigation water from wells. Extensive use of groundwater can result in draw down of the water table, which in turn can reduce surface drainage flows and eliminate a water source for wildlife.

Aviation and Surface Passenger Terminals

Aviation and surface passenger terminals are prohibited within the planning area except as a conditional use in the EG1 zone at the Johnson Creek site. These uses have impacts comparable to those for industrial uses described above. The small, partially developed EG1 lots in Johnson Creek generally preclude development of aviation and surface passenger terminals.

Detention Facilities

As with the aviation and surface passenger terminals, detention facilities are prohibited within the planning area except in the EG1 zone at the Johnson Creek site where they are permitted as a conditional use. These uses have all of the detrimental effects described for industrial uses. Their substantial land area requirements also make detention facilities at the Johnson Creek site unfeasible.

Mining

Mining is a conditional use in the OS and RF zones and is prohibited in all other zones within the planning area. Mining generally has the most severe environmental impacts of all uses within the site. All resources are normally eliminated. Once a mining operation is closed, some restoration of soil, vegetation and other resources may be possible but resources will remain permanently degraded.

As a practical matter, OS and RF-zoned lands within the planning area are either developed or too small to mine. Furthermore, mineral or aggregate resources are considered Goal 5 resources and no existing or potential mineral or aggregate resource mining operations have been identified within the planning area by Multnomah County or the City of Portland (Bureau of Planning 1988).

Radio and Television Broadcast Facilities

Most low powered transmitters such as for cordless telephones and citizen band radios are allowed in all zones. More powerful and larger radio and television broadcast facilities are allowed subject to limitations or as conditional uses within the resource sites. Their effects are generally the same as those of basic utilities, but with less impervious surface and human activity impacts and greater adverse visual impacts.

Rail Lines and Utility Corridors

Rail lines and utility corridors are allowed as conditional uses in all zones. Their effects are the same as basic utilities, except that construction of rail lines often requires substantial excavation and fill to meet 0-3 percent slope standards. Generally, the additional grading results in a greater area of resource disturbance and greater degradation of soil, vegetation and both terrestrial and aquatic habitat resources. In addition, most rail corridors involve extensive chemical vegetation management with a potential for ground and surface water impacts.

Johnson Creek and Skyline Plan Districts

In addition to the base zones described above, the Johnson Creek site is located within the proposed Johnson Creek Basin Plan District. Portions of both the Linnton and the Sylvan sites are located within the proposed Skyline Plan District.

The Johnson Creek Basin Plan District sets out standards that limit tree removal, stormwater discharge, and impervious surface coverage. It also contains provisions that limit housing densities and development impacts on steep slopes, and allows for the transfer of development

rights from constrained sites. These standards help to mitigate some of the adverse effects on resources of the uses described above but not to the extent that they eliminate conflicting uses for identified resources.

The Skyline Plan District contains a development season limitation and certain standards and criteria that apply to portions of the Linnton and the Sylvan sites. These provisions are meant to supplement the City’s environmental regulations. The plan district also allows for the transfer of development rights (TDR) out of sensitive areas to more suitable development sites within the area. The TDRs can provide additional landowner options when development potential on a property is constrained.

Other Uses

There are certain allowed uses that are not assigned to a single category by the City zoning code. These include infrastructure, nonconforming situations, and land divisions, partitions and property line adjustments.

Infrastructure Uses

Infrastructure uses are accessory to urban development and include roads; water, sewer, electric, television lines, and other public and private utilities not described by the zoning code category “basic utilities.” Infrastructure is allowed in all city zones. Some of these uses are regulated city public works and building codes, though the requirements do not relate to the protection of Goal 5 resources. These uses generally have the same impacts as those described for basic utilities above, except that some uses are temporary in nature. Because they are similar to uses in the basic utilities category, infrastructure uses are included in the institutional use designation for the purpose of the following analysis.

Nonconforming Situations

Nonconforming situations are created when zoning or zoning regulations change. As part of the change, existing uses, density, or development might no longer be allowed for new developments. These conditions are allowed to exist under the proposed City zoning. Nonconforming uses can exist in any category or in any zone. The impacts of these uses are described under the applicable land use categories above. An example of a nonconforming use in the planning area is the marina (a commercial outdoor recreation use) at the Linnton site.

Land Divisions, Partitions, and Property Line Adjustments

These are procedures that establish lots or relocate property lines within any zone. While the act of adjusting or creating lot lines does not directly impact resources, the new or modified lots may allow more conflicting uses than the lots from which they were created because of the additional housing or other development that can occur on these lots.

Overview of the Economic, Social, Environmental, and Energy Analysis (ESEE)

Each resource site contains both existing and allowed conflicting uses, as outlined above. To weigh these conflicts, the next step in the Goal 5 process is to evaluate the economic, social, environmental, and energy (ESEE) consequences of resource protection. The following section presents the analysis of the four resource sites within the planning area. The analysis is based on the Goal 5 inventory contained in the Inventory report, and on the conflicting uses and impacts identified in the preceding sections of this report. The analysis for each resource site covers only those portions of each site mapped as having significant resource value. The analysis considers the consequences of allowing, limiting, or prohibiting conflicting uses within each of the four resource sites identified in the inventory.

Overview of Economic Analysis

In order to provide a consistent economic analysis, existing and potential conflicting uses for each site were evaluated according to the standard classification method provided in the Inventory. This ranking of significant Goal 5 resources into A (highest significance), B (highly significant), and C (significant), is shown on Figures 2 through 5. These resource rankings, when combined with the parcel database, allowed determination of the level of resource impact on a parcel by parcel basis. The database is included in the public record for this project and contains:

- total parcel acreage;
- acreage of A-, B-, and C-quality resources by parcel;
- parcel zoning;
- development potential (e.g., housing units for residential land);
- parcel characteristics (e.g., vacant or developed);
- and proposed zoning.

The economic analysis for each parcel, i.e., the comparison of impacts on development and on resource values, was repeated for three development level assumptions: allowing conflicting uses; limiting conflicting uses; and prohibiting conflicting uses. For each development level assumption, the impact on conflicting use development and the impact on the resource were evaluated using a set of standard assumptions and calculations. These assumptions are described in following sections, and the data supporting these evaluations are available at the Bureau of Planning. The summary of each economic evaluation is provided in the tables for each site. Each parcel evaluation (i.e., a particular resource rank area and zoning type), is given one of three assessments: “negative,” “neutral,” or “positive.” A comparison of the different levels of development (“allowing,” “limiting,” and “prohibiting”) for the site provides the basis for the economic impact determination.

The first step of the analysis determines the economic consequences of fully allowing conflicting uses on parcels within the site that contain significant resources. As a result of this action, some or all of the significant resources may be destroyed or degraded and their various resource values would be lost. A determination is made on the type and quantity of values and functions that are at risk with the loss of these resources.

The next step of analysis determines the impact of limiting conflicting uses. In this case, the conflicting uses are not expected to completely destroy or degrade the significant resources within a site. However, in situations where any conflicting use activity would degrade the resource, the economic consequences could be as severe as fully allowing the conflicting use. In other situations, limiting the conflicting uses creates fewer impacts.

The last step of the analysis determines the impact of prohibiting conflicting uses. For this analysis, the acreage and potential number of “units” for each parcel containing resource lands is calculated, based on an assumption of 1600 square feet per “unit”. The acreage of resource land within the parcel is subtracted from the parcel acreage, and the number of units lost is determined by subtraction from the potential maximum number of units for the parcel. The results of these calculations are included in the project database, available at the Bureau of Planning.

Resource Valuation

It is important to carefully separate the economic consequences on conflicting uses that exist due to physical constraints and those associated with protecting significant resources. There are increased costs incurred in the design and construction of any structures and roads where slopes, soils, streams, wetlands, or floodplains are an issue.

In determining the economic consequences of protecting significant resources, it is first necessary to define value with respect to a significant resource. Many of the benefits of environmental policies are not readily apparent in the form of immediate monetary gains. The benefits are found more in an increase in the quality of life than in any increment to a region’s economic output. Environmental features have been shown to increase property values as they provide aesthetic and recreational pleasure and a more livable environment. As a result, properties next to these features have higher property values and produce greater tax revenues.

Environmental resources have “irreversibility” properties. If the resource is not preserved, it is likely to be eliminated with little or no chance of regeneration in any meaningful timeframe if ever. In addition, environmental resources have uncertainty. Since the future is unknown, there is a potential cost if the resource is eliminated and a future choice is foregone. Many environmental resources are considered “positive undepletable externalities” or public goods. If one person increases their consumption of the good, it does not preclude or reduce its availability to others.

Some benefits from significant resources can be found beyond the immediate resource area. For example, the capacity of a wetland to purify surface waters and recharge aquifers may benefit an entire watershed. When benefits occur off-site, wetland owners cannot capture the value of these benefits directly. As a result, the market price per acre of wetland area does not fully reflect a true exchange value relative to other goods. In fact, most environmental resources are not priced because they have no direct market where they are bought and sold like other products. This makes the establishment of value difficult. Therefore, it is necessary to use other methods of identifying value in order to perform economic analysis. Numerous studies and techniques have been used to determine the value of environmental resources in terms of environmental goods (see Appendix A, The Nature of Environmental Goods). Environmental goods include intermediate goods, final goods, and future goods as discussed below.

Intermediate Goods. When environmental resources provide goods or services that are part of a production process and have commercial value, they are considered intermediate goods. These goods include factors that support commercial fisheries, water storage elements, and the assimilation of wastes. Intermediate goods also include environmental resources that contribute to damage prevention such as pollution reduction, water purification, flood control, slope stabilization, and erosion control. An example of an intermediate good is the flood control services provided by the wetland area at the Linnton site. Another example is the mixed conifer/hardwood forest that provides slope stabilization and erosion control services at the Sylvan and Dunthorpe sites.

Final Goods. Environmental resources also provide final goods. These goods include recreational opportunities such as fishing, camping, boating, and bird watching. In addition, the amenities produced by environmental resources (e.g., scenic views, proximity to wildlife habitat, educational opportunities) are reflected in increases in residential property values. Water supply and wildlife habitat are also considered final goods. An example of a final good is the fish and wildlife habitat located along Johnson Creek, in Site 28.

Future Goods. Environmental resources could potentially provide yet undiscovered benefits and/or benefits to future generations in the form of future goods and services. Although there is a high level of uncertainty for future goods, it is important to consider them in determining the resource values. The future presence of fish and wildlife is an example of a future good.

Table 3 classifies the resource values identified in the Inventory report into their respective environmental goods categories. The “decision” and “contributing” factors used to determine the significance of resources based on these values are identified in Appendix F of the Inventory.

Table 3. Environmental Goods Classifications

Resource Value	Nature of the Environmental Good
Fish/Wildlife Habitat	Intermediate Good Final Goods and Services Future Goods and Services
Slope/Soil Stabilization	Intermediate Good
Water Purification	Intermediate Good
Flood Storage and Desynchronization	Intermediate Good
Groundwater Recharge and Discharge	Intermediate Good
Water Supply	Final Good
Heritage	Final Goods and Services Future Goods and Services
Storm Drainage	Intermediate Good
Education	Final Goods and Services Future Goods and Services
Recreation	Final Goods and Services Future Goods and Services
Aesthetics/Scenic Amenity	Final Goods and Services Future Goods and Services
Buffering Land Uses	Intermediate Good

Resource Ranking

In order to help weigh the respective consequences on resources and on conflicting uses, the resource significance factors are used in the evaluation. These factors are classified into A (highest significance), B (highly significant), and C (significant). The A-quality resources are the highest rated within the study area, either through the number of significance factors met, the exceptional value of particular factors, or both. The B-quality resources include high quality forest habitat and riparian resources that generally contain fewer significance factors than A-quality resources. The C-quality resources are significant but may only satisfy one significance factor. The location of A, B, and C-quality resources found within the planning area are shown on the proposed Significant Resource Area Rankings maps (Figures 2 through 5).

Other Development Considerations

For larger parcels that contain significant resources, there is an increase in design costs. To accommodate these increases, Planned Unit Developments (PUDs) allow greater site design flexibility than conventional zoning and subdivision regulations. The intent of a PUD is to:

- Provide flexibility in architectural design, placement, and clustering of buildings; use of open areas and outdoor living areas; provision of circulation facilities and parking; and related site and design considerations;
- Provide for efficient use of public services and improvements;
- Encourage and preserve opportunities for energy efficient development;
- Promote an attractive and safe living environment in residential zones; and
- Encourage the conservation of natural features.

Developers have an opportunity to take advantage of the marketing opportunities made available by the preservation of natural areas, careful integration of residential uses, and an understanding that amenity values can be capitalized into private land values.

Another factor considered during the analysis of conflicting uses is transfer of development rights (TDR). TDR's allow transfer of development rights out of sensitive areas to more suitable development sites outside of resource areas. Housing density at eligible receiving sites can be increased by 50 percent and, under certain conditions, by 100 percent. TDR's can provide additional landowner options when development potential on a property is constrained. The Skyline Plan District and the Johnson Creek Basin Plan District contain provisions for TDR's.

Overview of Social Analysis

The social impact analysis outlines the social consequences of allowing, limiting, or prohibiting conflicting uses for each resource site. The discussion focuses on the following topics: recreational and educational opportunities; housing and employment opportunities; historic, heritage, and cultural values; design, visual variety and impact; screening, and buffering of incompatible uses; and health, safety, and welfare.

Allowing, limiting, or prohibiting conflicting uses can have social consequences in several ways. These include:

- Changes to the value of the site for recreation and education. A large portion of the recreational and educational value of a natural area can be attributed to the existence of wildlife, and other environmental values.
- Changes to the number and nature of housing opportunities. In areas with resource constraints, compact development forms which accomplish the dual objectives of resource conservation and housing development are encouraged. Areas that have not been determined locally to be “needed” for housing may still provide limited infill opportunities.
- Changes to the quantity and nature of employment opportunities.
- Changes to the historic and cultural values of the site.
- Changes to the health, safety, and welfare benefits provided by resources. Resource areas can serve to stabilize slopes, provide flood storage, and contribute to groundwater recharge. Development within a floodplain or steep terrain can lead to greater damage, injury, and/or displacement of existing development during storm events.
- Changes in the ability of natural resources to act as an edge to different land uses, separating and buffering them from each other both visually and by distance. The removal of natural resources can substantially affect the social character of an area and may require major changes in land uses to resolve issues of incompatibility, or the creation of artificial buffers, many of which simply duplicate elements found in natural resource buffers.
- Changes in an area’s scenic qualities. Trees, stream corridors, and certain types of development can add to the scenic qualities of a site (for example by increasing visual variety or enhancing view points and corridors) or detract from the scenic values of a site (placing structures in view corridors or removing scenic natural features such as trees).

In the social analysis, most of the impacts identified in the analysis are not specific to “A,” “B,” and “C” resource rankings. In some cases, it is possible to distinguish heightened social impacts for the stream and riparian resources, for example, that may be classified as A- and B-quality resources. The following analyses focus on how the individual conflicting uses contribute to the changes discussed above to create positive or negative social consequences. Tables that analyze and assess the impacts on the resources and the conflicting uses follow a general discussion of the specific uses and social consequences in each site.

Overview of Environmental Analysis

This environmental analysis is based on the inventory of the location, quantity, and quality of significant resources contained in the Inventory report. Significance factors (see Appendix F in the Inventory report) provided the basis for establishing resource significance as well as for determining relative significance of specific resources. Resources were ranked as A-, B-, or C-quality based on whether they met certain “decision” or “contributing” significance factors. In general, the detrimental environmental consequences of allowing conflicting uses in A-quality resource areas, and the benefits of prohibiting conflicting uses within these same areas, are greater than for B- or C-quality resources. The environmental analysis also references the assessment of land use impacts contained in the Conflicting Use Impacts section of this report.

Overview of Energy Analysis

The energy discussion focuses on the following topics: transportation; infrastructure; and the heating and cooling of structures. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, and prohibiting conflicting use. The consequences on the conflicting uses are discussed based on general land use categories.

Energy expenditures for transportation relate primarily to travel distance from origin to destination, and mode of transportation used. Both variables can be affected by the natural resource situation, both in terms of location and routing. The availability of alternative transportation, such as buses, light rail, and walking and cycling routes can decrease transportation energy consumption.

Energy is a major component of infrastructure development. Locating housing and other development outside of natural resource areas in an efficient manner normally results in less infrastructure needed to serve sewer, water, transportation, and other needs. Development located away from flood and slope hazard areas can eliminate the need for additional construction considerations or hazard control structures.

Energy consumption for the purpose of heating and cooling structures is impacted by resource protection in two ways: building form and presence of vegetation. Development techniques such as clustering buildings away from the resource results in more common wall construction and reduced surface area reducing heat loss and energy consumption. In addition, clustering buildings requires the removal of less vegetation. The presence of vegetation reduces energy demands for cooling in the summer by providing shade on nearby structures. Plants also absorb sunlight and transpire during growing seasons, thus reducing ambient air temperatures. This moderating effect can reduce energy needs for cooling of nearby development. Trees and shrubbery can also act as a windbreak during winter. By slowing or diverting cold winter winds, heat loss in structures from infiltration and convection is reduced, resulting in lower energy needs.

In the energy analysis, unlike the environmental and economic analyses, impacts on the “A,” “B,” and “C” resources are not considered separately. Though resource values are important, the consideration of issues such as infrastructure, transportation, and heating and cooling of structures relates more directly to individual conflicting uses. The following analyses focus on how the individual conflicting uses contribute to the changes discussed above to create positive or negative energy consequences. Tables that analyze and assess the impacts on the resources and the conflicting uses follow a general discussion of the specific uses and social consequences in each site.

RESOURCE SITE 28: JOHNSON CREEK

Summary Information

Resource Site Size:	56 acres
Site Location:	SE 174 th Ave. and Circle Ave.; one part of site (UIA 16) is a 52-acre rectangular area on 174 th with Johnson Creek to the south; a 4-acre area (UIA 18) is at the west end of Circle Ave. and includes Springwater Trail.
Legal Description:	T1S, R3E, Section 56
Quarter Sections:	3547, 3548, and 3647
USGS Quadrangle:	Damascus
Proposed City Zones:	OS, R5, and EG1
Existing Land Uses:	Portland Gun Club, Sheriff’s mounted posse headquarters, Springwater Trail, commercial/wholesale, light industrial (Oberst Recycling), residential

Economic Analysis

This analysis considers the economic consequences of prohibiting, limiting, or allowing conflicting uses within Site 28, Johnson Creek. The site was analyzed to determine the degree of impact on both the conflicting uses and significant resource values. The proposed zoning designations used in this analysis are part of the Multnomah County Functional Plan Compliance project (now in the planning process). Table 4 indicates the existing and potential conflicting uses within each zone.

Table 4. Conflicting Uses by Proposed Zoning Designation

Zone	Existing Conflicting Uses	Potential Conflicting Uses
R5	Gun club, Sheriff’s mounted posse headquarters, residential	residential, broadcast facilities, institutional uses, rail/utility corridors, temporary uses
EG1	commercial/wholesale, light industrial (Oberst Recycling)	commercial, industrial, institutional, residential, rail/utility corridors, broadcast facilities, detention facilities, aviation, agriculture, temporary uses
OS	Springwater Trail	agriculture, institutional, commercial, rail/utility corridors, broadcast facilities, mining, temporary uses

In the resource areas of the Johnson Creek site residential uses are allowed outright in the areas zoned R5 and as a conditional use in EG1. Institutional uses are allowed outright in the EG1 zone, and as conditional uses in R5, and OS. Industrial uses are allowed only in areas zoned EG1. In areas zoned EG1 and OS, commercial uses are allowed with limitations. Agricultural uses area allowed in areas zoned OS and EG1. Broadcast facilities are allowed as limited or

conditional uses in all site zones. Rail line and utility corridor uses are allowed in EG1 and as a conditional use in all other zones. Aviation and surface passenger terminals and detention facilities are conditional uses in EG1 and prohibited elsewhere. Mining is a conditional use in the OS zone. Temporary uses are allowed in all zones; these uses generally do not disturb resource areas, and pre-existing site conditions are normally restored when the temporary activity ends. The site's small lot sizes and existing development pattern preclude development of mining, detention facilities, and aviation and surface passenger terminals.

Within Site 28, the significant resources are divided into three groups, A, B, and C. The A-quality resources are the highest rated within the study area and include Johnson Creek and associated wetlands and riparian habitat. The B-quality resources include high quality forest and upland habitat. The C-quality resources include floodplain areas meeting fewer significance factors than A-and B-quality resources. The ranked resources within Site 28 are summarized in Table 5.

Table 5. Significant Resource Rankings, Acreage, and Locations

Rank	Acres	Resource	Location
A	6.28	Johnson Creek areas that provide fish/wildlife habitat, including habitat for special status species, riparian corridors, seeps, and wetlands	along Johnson Creek corridor
B	2.07	terrestrial habitat, vegetative cover	Johnson Creek floodplain and sloped areas
C	1.38	floodplain	developed floodplain

For this phase of the analysis, the impact of allowing, prohibiting, or limiting conflicting uses is determined for vacant or developed parcels within Site 28 where significant resources are located. Table 6 indicates the impacts on both the significant resources and on the conflicting uses of fully allowing these conflicting uses in the resource areas.

Table 6. Economic Consequences of Allowing Conflicting Uses

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R5	-loss of future capitalized amenity values from water features and vegetation into surrounding residential property values; -potential for major slope destabilization if developed to current zoning standards; and -no loss of units	-major loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation and storage	negative

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on developed parcels	OS	-loss of substantial amenity values from water features and vegetation currently capitalized into surrounding residential property values;	-loss of sediment trapping capacity; -loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation and storage	negative
B-quality resources on vacant parcels	EG1	-no loss of development potential, however, potential destabilization of slopes may accompany development activities	-loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -loss of flood storage; -destabilization of Johnson Creek bank	negative
B-quality resources on developed parcels	OS, EG1	-loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -loss of slope stability; -no loss of new development or redevelopment options (EG1)	-loss of supportive fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
C-quality resources on vacant parcels	EG1	-no loss of development potential	-potential loss of floodplain; -loss of benefits of vegetation	neutral
C-quality resources on developed parcels	R5, EG1	-no loss of development potential	-potential loss of floodplain; -loss of benefits of vegetation	neutral

The economic costs associated with fully allowing conflicting uses within the Johnson Creek site are greatest for the high quality creek, wetland, and forest resources that provide a variety of intermediate goods (alternative substitutes for commercial services). For example, Johnson Creek, its tributaries and associated wetlands provide pollution assimilation/water purification services and flood attenuation and storage functions. In addition, the functions provided by the wetland areas represent a large cost saving over a traditional treatment system. These resources also provide irreplaceable fish and wildlife habitat. Future state and federal determinations regarding special status species may increase the value of these areas with respect to future recovery plans for the region. The economic costs associated with the loss of forested areas include the loss of air conditioning, erosion control and stormwater services, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards increase with development activities and increased soil disturbance in resource areas.

The economic benefits of fully allowing conflicting uses are generally low. Development flexibility is preserved for properties with resources; however, there are added costs of

developing within the resource areas of this site and these costs generally offset any economic benefits of flexibility.

Table 7. Economic Consequences of Limiting Conflicting Uses

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R5	-potential loss of future capitalized amenity values from water features and vegetation into surrounding residential property values; -potential for slope destabilization if developed to current zoning standards; no loss of units	-loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation and storage	negative
A-quality resources on developed parcels	OS	-potential loss of amenity values from water features and vegetation currently capitalized into surrounding residential property values;	-loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation and storage	negative
B-quality resources on vacant parcels	EG1	-no loss of development potential; -improved slope stability	-loss of supportive fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	neutral
B-quality resources on developed parcels	EG1, OS	-improved amenity values from water features and vegetation that capitalizes into surrounding residential property values; -improved slope stability; -no loss of new development or redevelopment options	-loss of supportive fish/wildlife habitat, including endangered species; -loss of water quality benefits of vegetation; -loss of flood storage	neutral
C-quality resources on vacant parcels	EG1	-no loss of development potential	-potential loss some of floodplain values	neutral
C-quality resources on developed parcels	R5, EG1	-no loss of development potential	-potential loss of some floodplain values	neutral

The economic costs associated with limiting conflicting uses within Johnson Creek include a reduction in the pollution assimilation/water purification and flood attenuation and storage functions of Johnson Creek, its tributaries, and associated wetlands. These functions represent a large cost saving over a traditional treatment system. The economic costs associated with the

degradation of forested areas include a reduction in air conditioning, erosion control, stormwater, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards may increase with limited development and disturbance of the soils.

The economic benefits for limiting conflicting uses are low. The total number of developable units is low. Some development flexibility is retained for properties with resources; however, there are added costs of developing within the resource areas and these costs generally offset any economic benefits of flexibility.

Table 8. Economic Consequences of Prohibiting Conflicting Uses

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R5	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -one parcel with potential loss of units is owned by City for conservation purposes	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including special status species, water quality benefits of vegetation, flood attenuation and storage areas	positive
A-quality resources on developed parcels	OS	-amenity values from water features and vegetation fully capitalized into hillside residential property values	-preservation of sediment trapping capacity; storm drainage areas, fish/wildlife habitat, including special status species, water quality benefits of vegetation, flood attenuation and storage areas	positive
B-quality resources on vacant parcels	EG1	-potential for reduced siting flexibility	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation, and flood storage	positive
B-quality resources on developed parcels	EG1, OS	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential for reduced siting flexibility	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation, and flood storage	positive
C-quality resources on vacant parcels	EG1	-potential for siting flexibility limitations for new development	-preservation of floodplain and vegetation	neutral
C-quality resources on developed parcels	R5, EG1	-potential for siting flexibility limitations for new development	-preservation of floodplain and vegetation	neutral

The economic costs associated with prohibiting conflicting uses are relatively low. Full protection of the significant A-quality resources in Site 28 will not reduce development options because the affected parcels are owned by the City or contain sufficient non-resource areas to accommodate allowed development or redevelopment activities.

The economic benefits include the preservation of the high quality aquatic resources along Johnson Creek, its tributaries and associated wetlands that provide pollution assimilation/water purification services and flood attenuation and storage functions. These aquatic resources also provide high quality habitat for fish and wildlife, especially for special status species. Future regulation regarding special status species may increase the value of these areas with respect to future recovery plans for the region. The economic benefits associated with the forested areas include air conditioning, erosion control and stormwater services, wildlife shelter, and air pollution control services for the region. There is additional economic benefit evidenced in the amenity values that capitalize into surrounding residential properties associated with the high quality resources.

Economic Recommendation:

The economic analysis supports prohibiting conflicting uses in A-and B-quality resource areas. Conflicting uses on C-quality resources located in developed floodplain areas may be allowed. This recommendation is the result of the economic analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Social Analysis

Social impact analysis outlines the social consequences of allowing, limiting, or prohibiting conflicting uses. A general discussion of each topic is presented first, followed by a specific site analysis applying these topics in the context of allowing, limiting, or prohibiting conflicting uses. Social impact analysis is summarized for all A, B, and C-qualitylands because of the predominance of regional social values.

Recreational and Educational Opportunities

Recreational opportunities are afforded by natural areas at this site, and include fishing, wildlife viewing, and hiking. Johnson Creek, one of the last free-flowing streams in the Portland Metropolitan Area, flows through the site and provides recreational and educational opportunities. The Springwater Trail, a major component of the 40-Mile Loop, passes through this site. This trail also provides recreational and educational opportunities for pedestrians, bicyclists, and wildlife enthusiasts. Proximity to Powell Butte Nature Park makes this a popular section of the trail. Powell Butte provides similar recreational and educational opportunities, as well as equestrian trails.

Housing Opportunities

Housing opportunities in the Johnson Creek site are generally limited by the availability of buildable land and lots size. The Springwater Trail, the Johnson Creek floodplain, steep streambanks, and wetland conditions limit the likelihood of additional housing opportunities in the resource areas of the site.

Employment Opportunities

Employment opportunities in the Johnson Creek site would be provided by commercial, industrial, institutional, or agricultural development allowed east of NE 174th Avenue in the area zoned EG1. However, employment opportunities in the resources areas of the site are also limited by the same conditions that limit housing opportunities.

Historic, Heritage, and Cultural Values

The floodplain and upland aspects of this site make it ideally suited as a potential prehistoric site, however no confirmed prehistoric sites are known. Hunting and other subsistence activities would have taken place in the upland areas. Erosion and development in the area reduce the likelihood of finding any undisturbed sites.

Euroamerican settlement in the area began in the mid 1800's. The creek influenced much of the development near this site. To avoid the expense of stream crossings, routes were built parallel to the creek. The Springwater Trail, built on an abandon railroad bed, is a reminder of this era. Early farmers took advantage of the stream's flood regime, realizing that the floodwaters provided rich silt for their fields. By the 1930's the creek's history of flooding attracted New Deal funds, and the Works Progress Administration (WPA) cleaned and lined the channel of the creek attempting to reduce flooding. Their efforts to control flooding along the creek failed, as have many efforts since.

Design, Visual Variety and Impact

The natural, semi-rural character of the Johnson Creek basin is accentuated by the creek's riparian vegetation and the wooded slopes of Powell Butte. The presence of the stream and recreation corridor adds to the area's uniqueness. The Multnomah County Centennial Community Plan identifies a major scenic view from Powell Butte overlooking the northeast corner of the site. The view of Johnson Creek, with Mt. Hood in the background contributes to the scenic and environmentally friendly image of the region.

Screening and Buffering

Natural resources, such as those in the Johnson Creek site can act as an edge to different land uses, separating and buffering them from each other both visually and by distance. Forest vegetation at the Johnson Creek site provides a buffer between residential, open space, and industrial uses.

Health, Safety, and Welfare

Erosion is a natural phenomenon in the Johnson Creek site, but when aggravated by the alteration or removal of vegetation, or increased stormwater runoff, could lead to damage, injury, or displacement of people and property. Many of the area's resources function to stabilize streambank slopes and contribute to groundwater recharge. These functions contribute to the health, safety and welfare of the site's residents.

There are several health and welfare benefits provided by forest and riparian vegetation. Studies show that urban forests have an influence in reducing stress-related impacts on health. Exposure to nature has significant “restorative” benefits (Ulrich 1984). In addition, urban forests help reduce air pollution problems and the resulting health impacts (City of Portland Energy Office 1993).

Social Consequences of Allowing Conflicting Uses

Table 9 illustrates the consequences of allowing residential, institutional, industrial, commercial, agricultural, broadcast facilities, rail line and utility corridor development, and temporary uses to occur in the Johnson Creek site. This analysis is based on information presented above.

The consequences on the resource are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories. As noted previously, the site’s small lot sizes and existing development pattern preclude development of mining, detention facilities, and aviation and surface passenger terminals.

Table 9. Social Consequences of Allowing Conflicting Uses

Conflicting Uses	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-damage, injury, and displacement caused by erosion or flooding along Johnson Creek; -decreases screening and buffering benefits; -further reduces the likelihood of finding undisturbed prehistoric sites; -reduces the screening and buffering, health, safety, and welfare benefits; -preserves housing options	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and Johnson Creek bank destabilization -fragmentation and loss of fish and wildlife habitat	negative
Institutional uses	-maintains services to residences; -damage, injury, and displacement during storm events; -decreases screening and buffering benefits; -further reduces the likelihood of finding undisturbed prehistoric sites; increases visual variety; -preserves employment opportunities	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and Johnson Creek bank destabilization -fragmentation and loss of fish and wildlife habitat	negative

Conflicting Uses	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Commercial uses	-provide services to residences; -decreases screening and buffering benefits; -further reduces the likelihood of finding undisturbed prehistoric sites; -preserves employment opportunities	-major increases in vegetation removal and impervious surface coverage degrades water quality and quantity, causes soil erosion and bank destabilization and habitat fragmentation and loss	negative
Industrial uses	-decreases screening and buffering benefits; -degrades scenic qualities; -preserves employment opportunities; -further reduces the likelihood of finding undisturbed prehistoric sites;	-major increases in vegetation removal and impervious surface coverage degrades water quality and quantity, causes soil erosion and bank destabilization and habitat fragmentation and loss	negative
Agricultural uses	-reduces the screening and buffering, health, safety, and welfare benefits; -may increase visual variety; -preserves connection with agricultural history -preserves employment opportunities; -further reduces the likelihood of finding undisturbed prehistoric sites	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Broadcast Facilities	-detracts from the site's scenic qualities; -decreases screening and buffering benefits; -further reduces the likelihood of finding undisturbed prehistoric sites;	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Rail line and utility corridor uses	-decreases screening and buffering benefits -allows expansion of existing utilities	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and Johnson Creek bank destabilization -fragmentation and loss of fish and wildlife habitat	negative

Allowing conflicting uses has a negative impact on all resource quality lands due to a dominance of regional social factors (e.g., parks, open space, water quality). Negative impacts are expected to be strongest on A-and B-quality lands.

Social Consequences of Limiting Conflicting Uses

Table 10 illustrates the consequences of limiting conflicting uses in the Johnson Creek site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 10. Social Consequences of Limiting Conflicting Uses

Conflicting Uses	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -maintains historic character -maintains housing options	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Institutional uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -preserves employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Commercial uses	-supports screening and buffering; -supports health, safety, and welfare benefits; -preserves employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Industrial uses	-supports screening and buffering; -supports health, safety, and welfare benefits; -preserves employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Agricultural uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -preserves connection with agricultural history; -preserves employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive

Conflicting Uses	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Broadcast Facilities	-supports visual variety and impact; -supports screening and buffering	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Rail line and utility corridor uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive

Limiting conflicting uses has generally positive social impact.

Social Consequences of Prohibiting Conflicting Uses

Table 11 illustrates the consequences of prohibiting conflicting uses in the Johnson Creek site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 11. Social Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-enhances recreational and educational values; -supports the historic, heritage and cultural values; -provides visual relief; -retains the screening and buffering benefits; -protects the health, safety and welfare values -limits housing options	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Institutional uses	-may reduce availability of institutional services; -enhances recreational and educational values; -supports the historic, heritage and cultural values; -retains the screening and buffering benefits; -may limit employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Commercial uses	-may reduce availability of commercial services; -supports the historic, heritage and cultural values; -retains the screening and buffering benefits -may limit employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Industrial uses	-retains the screening and buffering benefits; -protects the health, safety and welfare values; -may limit employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Agricultural uses	-retains the screening and buffering benefits; -protects the health, safety and welfare values; -may limit connection with agricultural history -may limit employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Broadcast Facilities	-retains the screening and buffering benefits; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Rail line and utility corridor uses	-retains the screening and buffering benefits; -supports the historic, heritage and cultural values; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive

There are significant social values associated with the character of Johnson Creek, including: recreational and educational opportunities; historic, heritage, and cultural values; values related to visual variety and urban image; screening and buffering values; and health, safety, and welfare values. These values support limiting and in certain cases prohibiting conflicting uses.

Social Recommendation:

The social analysis supports either limiting or prohibiting conflicting uses in resource areas at the Johnson Creek site. This recommendation is the result of the social analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Environmental Analysis

This analysis outlines the environmental consequences of allowing, limiting, or prohibiting conflicting uses within the Johnson Creek site. The Inventory report (published separately) contains a detailed discussion of the environmental values at this site. Significance factors (see Appendix F in the Inventory report) provided the basis for establishing resource significance as well as for determining relative significance of specific resources. Resources were ranked as A-, B-, or C-quality based on whether they met certain “decision” or “contributing” significance factors. In general, the detrimental environmental consequences of allowing conflicting uses in A-quality resource areas, and the benefits of prohibiting conflicting uses within these same areas, are greater than for B- or C-quality resources. The following discussion is based in part on the inventory findings and the impact analysis contained in the Conflicting Use Impacts section of this report.

Environmental Consequences of Allowing Conflicting Uses

Table 12 illustrates the consequences of allowing conflicting uses in the Johnson Creek site. Fully allowing conflicting uses results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Table 12. Environmental Consequences of Allowing Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	OS, R5	-loss of highest quality environmental amenities; -no change in development potential	-major loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	OS, EG1	-loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R5, EG1	-loss of significant environmental amenities; -no change in development potential	-loss significant resources as described in the Conflicting Use Impacts section	negative

Environmental Consequences of Limiting Conflicting Uses

This action conserves certain environmental resources and resource values identified in the site inventory. However, limiting conflicting uses only controls impacts; it does not prevent the degradation and loss of resources and values. The environmental consequences are generally negative except for C-quality resources. Table 13 illustrates the consequences of limiting conflicting uses in the Johnson Creek site.

Table 13. Environmental Consequences of Limiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	OS, R5	-potential loss of highest quality environmental amenities; -no change in development potential	-loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	OS, EG1	-potential loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R5, EG1	-no change in development potential	-potential further degradation of floodplain areas	neutral

Environmental Consequences of Prohibiting Conflicting Uses

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive except for C-quality resources which have been degraded. Table 14 illustrates the consequences of prohibiting conflicting uses in the Johnson Creek site.

Table 14. Environmental Consequences of Prohibiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	OS, R5	-protection of highest quality environmental amenities; -may limit development flexibility	-protection of highest quality resources as described in the Conflicting Use Impacts section	positive
B-quality resources	OS, EG1	-protection of high quality environmental amenities; -may limit development flexibility	-protection of high quality resources as described in the Conflicting Use Impacts section	positive
C-quality resources	R5, EG1	-may limit development flexibility	-some protection of degraded floodplain areas	neutral

Environmental Recommendation:

The environmental analysis supports prohibiting conflicting uses in A- and B-quality resource areas at the Johnson Creek site. The C-quality resources are partly developed floodplain areas where conflicting uses may be limited. This recommendation is the result of the environmental analysis only. Conflicts between this recommendation and the economic, social, and energy recommendations will be resolved in the Conflict Resolution section.

Energy Analysis

This analysis outlines the energy consequences of allowing, limiting, or prohibiting conflicting uses. The relatively small and sparsely populated Johnson Creek site is only 56 acres; therefore the site's energy impacts are relatively minor. The energy discussion will focus on the following topics: transportation; infrastructure; and the heating and cooling of structures. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, and prohibiting conflicting use. The consequences on the conflicting uses are discussed based on general land use categories

Transportation

Energy expenditures for transportation relate primarily to travel distance from origin to destination, and mode of transportation used. Both variables can be affected by natural resource protection.

Transportation at the Johnson Creek site involves moving people between homes, employment, commercial areas, and other services. The site is located within five miles of major employment and service areas in Southeast Portland and Gresham. Automobiles are the primary means of transportation in and out of the area and though convenient, they generally are not energy efficient.

The availability of mass transit is limited to one busline along Powell Valley Road to the north of the site. Roads are generally narrow and lack sidewalks, thus discouraging walkers and bicyclists. The Springwater Trail, which passes through the site, however, provides significant alternative transportation options.

The availability of natural resources at the Johnson Creek site, such as the riparian vegetation and stream, provide opportunities for wildlife observation, recreation, and education to area residents. The Springwater Trail and nearby Powell Butte offer a variety of such amenities within walking distance of many of the area's homes. Because resources are close to users and accessible via alternative transportation along the Springwater Trail, limited transportation energy is used in reaching them. The protection of natural resources at this site could reduce energy consumption in this respect.

Infrastructure

Locating housing and other development outside of natural resource areas in an efficient manner normally results in less infrastructure needed to serve sewer, water, transportation, and other needs. Development located away from flood and slope hazard areas can eliminate the need for additional construction considerations or hazard control structures. A major component of infrastructure development is energy. Because of the relatively small size of the site and limited remaining development potential, energy effects are limited.

Heating and Cooling of Structures

Energy consumption for the purpose of heating and cooling structures is impacted by resource protection in two ways: building form and presence of vegetation.

Protection of the Johnson Creek site’s resource could be accomplished through the use of development techniques such as clustering buildings away from the resource. This type of development results in more common wall construction and reduced surface area reducing heat loss and energy consumption. In addition, clustering buildings requires the removal of less vegetation. The presence of vegetation reduces energy consumption.

Trees and riparian vegetation at the Johnson Creek site reduce energy demands for cooling in the summer by providing shade on nearby structures. Plants also absorb sunlight and transpire during growing seasons, thus reducing ambient air temperatures. This moderating effect can reduce energy needs for cooling of nearby development. Trees and shrubbery can also act as a windbreak during winter. By slowing or diverting cold winter winds, heat loss in structures from infiltration and convection is reduced, resulting in lower energy needs.

Energy Consequences of Allowing Conflicting Uses

Table 15 illustrates the energy consequences of allowing residential, institutional, industrial, commercial, agricultural, broadcast facilities, and rail line and utility corridor development to occur within significant resource areas of Johnson Creek. This analysis is based on information presented above. The consequences on the resources are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 15. Energy Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-requires additional land preparation and infrastructure development increasing energy consumption; -reduces or eliminates energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative
Institutional uses	-reduces transportation energy demand; -increase infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Commercial	-reduces transportation energy demand; -increase infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative
Industrial	-increases transportation energy consumption; -requires additional land preparation and infrastructure development increasing energy consumption	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative
Agricultural uses	-limits energy expenditures required to transport agricultural products	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative
Broadcast Facilities	-may require additional infrastructure development and land preparation; -may reduce or eliminate energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative
Rail line and utility corridor uses	-Springwater Trail provides a means of alternate transportation that reduces energy consumption	for new development: -degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	Negative

Energy Consequences of Limiting Conflicting Uses

Table 16 illustrates the energy consequences of limiting conflicting uses within significant resource areas of Johnson Creek. The energy consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 16. Energy Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-may require additional land preparation and infrastructure development increasing energy consumption; -maintains vegetation heating and cooling benefits	-limits habitat fragmentation and loss -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	Positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Institutional uses	-reduces transportation energy demand; -increases infrastructure development energy expenditure; -maintains energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	Positive
Commercial Uses	-reduces transportation energy demand; -increase infrastructure development energy expenditure; -maintains energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	Positive
Industrial Uses	-increases transportation energy consumption; -may require additional land preparation and infrastructure development increasing energy consumption; -maintains vegetation heating and cooling benefits	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	Positive
Agricultural uses	-reduces energy expenditures required to transport agricultural products	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	Positive
Broadcast Facilities	-may require additional infrastructure development and land preparation; -reduces impact on energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	Positive
Rail line and utility corridor uses	-supports alternate transportation along Springwater Trail that reduces energy consumption	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance	Positive

Energy Consequences of Prohibiting Conflicting Uses

Table 17 illustrates the energy consequences of prohibiting conflicting uses within significant resource areas of Johnson Creek. The energy consequences on the resource are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 17. Energy Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-reduces heating and cooling energy consumption; -reduces infrastructure development energy expenditure -may limit urban housing opportunities	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Institutional uses	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Commercial uses	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Industrial uses	-reduces transportation energy consumption; -reduces heating and cooling energy consumption; -reduces infrastructure development energy expenditure	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Agricultural uses	-supports heating and cooling benefits of vegetation -may increase energy expenditures required to transport agricultural products	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Broadcast Facilities	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive
Rail line and utility corridor uses	-supports alternate transportation along Springwater Trail that reduces energy consumption -limits redevelopment options	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	Positive

The retention of natural resources at the Johnson Creek site can reduce heating and cooling related energy needs both within the site and in the surrounding community. Conservation or protection of resources can also reduce infrastructure related energy use to the extent that future land uses can locate on portions of the site away from resource areas. Resource conservation or protection can enhance the attractiveness of walking and bicycle routes, particularly along the Springwater Trail, decreasing automobile use, and decreasing transportation-related energy use.

Resource protection can also reduce the distance local residents must travel to reach recreational opportunities, thus decreasing energy use.

The effect of resource protection on energy use related to both infrastructure and transportation depends primarily on whether a proposed use will be required to locate elsewhere due to resource protection. At the Johnson Creek site, such relocation will generally not be necessary, and conflicting uses can readily be accommodated within the site outside of resource areas. Therefore, either limiting or prohibiting conflicting uses at the Johnson Creek site would have positive energy consequences.

Energy Recommendation:

The energy analysis supports limiting or prohibiting conflicting uses at the Johnson Creek site. Conflicting uses on the site's disturbed floodplain areas (designated C-quality resources) have no energy values; allowing conflicting uses may be appropriate. This recommendation is the result of the energy analysis only. Conflicts between this recommendation and the economic, social, and environmental recommendations will be resolved in the Conflict Resolution section.

RESOURCE SITE 105-A: LINNTON

Summary Information

Resource Site Size:	40 acres
Site Location:	On both sides of NW St. Helens Road, between Harborton Drive and Newberry Road intersections; Miller Creek flows through site past Fred’s Marina to Multnomah Channel near junction with Willamette River.
Legal Description:	T2N, R1W, Sections 33, 34
Quarter Sections:	1716, 1717
USGS Quadrangle:	Linnton
Proposed City Zones:	RF, R10
Existing Land Uses:	Residential, marina uses

Economic Analysis

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Site 105, Linnton. The site was analyzed to determine the degree of impact on both the conflicting uses and significant resource values. The proposed zoning designations used in this analysis are part of the Multnomah County Functional Plan Compliance project (now in the planning process). Table 18 indicates the existing and potential conflicting uses within each zone.

Table 18. Conflicting Uses by Proposed Zoning Designation

Zone	Existing Conflicting Uses	Potential Conflicting Uses
RF	marina	residential, agricultural, institutional, mining, broadcast facilities, rail line and utility corridors, temporary uses
R10	residential	residential, institutional, agriculture, broadcast facilities, rail line and utility corridors, temporary uses

The Linnton site is predominantly a residential community with an existing outdoor commercial use (Fred’s Marina) located within the resource area in the RF zone. Residential uses are allowed by right in RF and R10 zones, as is agriculture in the RF zone. Institutional uses, broadcast facilities, rail line and utility corridor, mining (in RF), and agriculture (in R10) allowed as conditional uses. Temporary uses are allowed in all zones; these uses generally do not disturb resource areas, and pre-existing site conditions are normally restored when the temporary activity ends. Due to the extensive wetlands in the RF floodplain area and the small, steeply sloping parcels on the R10 uplands, agriculture, mining, and additional rail lines, and utility corridors are not viable uses within the resource areas of this site.

Within Site 105, A-quality resources are the highest rated within the study area and include Miller Creek, Multnomah Channel, and associated wetlands, tributaries, and riparian habitats. The B-quality resources include high quality forest and upland habitat. The C-quality resources include upland habitat areas meeting fewer significance factors than A- and B-quality resources. The ranked resources within Site 105 are summarized in Table 19:

Table 19. Significant Resource Rankings, Acreage, and Locations

Rank	Acres	Resource	Location
A	18.51	Miller Creek, Willamette tributaries, bottomland wetlands, Multnomah Channel, terrestrial/aquatic habitat	along creeks, ravines, and lowland areas
B	0.49	upland habitat; vegetative cover on hillside slopes	upland forest on steep east-facing slopes
C	3.32	tree and shrub cover and floodplain	near Marina Drive, St. Helens Road

For this phase of the analysis, the impact of allowing, prohibiting, or limiting conflicting uses is determined for vacant or developed parcels within Site 105 where significant resources are located. Table 20 indicates the impacts on both the significant resources and on the conflicting uses of fully allowing these conflicting uses in the resource areas.

Table 20. Economic Consequences of Allowing Conflicting Uses

Resource/Location	Conflict-ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10	-loss of substantial amenity values from water features and vegetation that capitalizes into nearby residential property values; -slope stability; -no loss of units or development potential	-loss of sediment trapping capacity; -loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
A-quality resources on developed parcels	R10, RF marina	-loss of substantial amenity values from water features and vegetation that capitalizes into surrounding residential property values; -loss of slope stability; -no loss of units or potential redevelopment	-loss of sediment trapping capacity; -loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -major loss of flood attenuation/storage (RF)	negative

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
B-quality resources on vacant parcels	R10	-loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -loss of slope stability -no loss of development potential	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
B-quality resources on developed parcels	R10	-loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -loss of slope stability -no loss of development potential	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
C-quality resources on vacant parcels	R10	-limited loss of vegetation amenities	-limited loss of vegetation	neutral
C-quality resources on developed parcels	R10, RF	-limited loss of vegetation amenities	-limited loss of vegetation	neutral

The economic costs of fully allowing conflicting uses within a resource site are greatest for the high quality aquatic resources that provide a variety of intermediate goods (alternative substitutes for commercial services) within Site 105. For example, the approximately 14 acres of wetland area near the confluence of Miller Creek and Multnomah Channel provide pollution assimilation/water purification services and flood attenuation and storage functions. In addition, the functions provided by the wetland areas represent a large cost saving over a traditional treatment system provided commercially. These resources also provide high quality fish and wildlife habitat. Future state and federal determinations regarding special status species may increase the value of these areas with respect to future recovery plans for the region. The economic costs associated with the loss of forested areas include the loss of air conditioning, erosion control and storm water services, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards increase with development activities and increased soil disturbance in resource areas.

The economic benefits of fully allowing conflicting uses in the site's significant resource areas are generally low. Development flexibility is preserved for properties with resources; however, there are added costs of developing within the resource areas of this site and these costs generally offset any economic benefits of flexibility.

Table 21. Economic Consequences of Limiting Conflicting Uses

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10	-loss of substantial amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited reduction in slope stability; -no loss of units or development potential	-loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
A-quality resources on developed parcels	R10, RF marina	-loss of substantial amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited reduction of slope stability; -no loss of units or potential redevelopment	-loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; - loss of water quality benefits of vegetation; -loss of flood attenuation/storage (RF)	negative
B-quality resources on vacant parcels	R10	-limited loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited loss of slope stability; -no loss of units or potential redevelopment	-limited loss of fish/wildlife habitat, including special status species; -limited loss of water quality benefits of vegetation; -limited loss of flood storage	neutral
B-quality resources on developed parcels	R10	-limited loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited loss of slope stability; -no loss of units or potential redevelopment	-limited loss of fish/wildlife habitat, including special status species; -limited loss of water quality benefits of vegetation; -limited loss of flood storage	neutral
C-quality resources on vacant parcels	R10	-limited loss of some amenity of vegetation -no loss of units or potential redevelopment	-limited loss of vegetation	neutral
C-quality resources on developed parcels	R10, RF	-limited loss of some amenity of vegetation -no loss of units or potential redevelopment	-limited loss of vegetation	neutral

The economic costs associated with limiting conflicting uses remain significant for the high quality aquatic resources that provide a variety of intermediate (alternative substitutes for commercial services) goods within Site 105. The wetland and floodplain areas of the site provide pollution assimilation/water purification services for all the waters flowing into the

bottomland. These resources also provide high quality habitat for the fish and wildlife. The economic costs associated with the degradation of forested areas include the reduction in air conditioning, erosion control, stormwater, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards may increase with limited development and disturbance of the soils. Limiting conflicting uses can reduce the magnitude of these costs. In cases where small disturbance results in irreversible damages, the costs remain high.

The economic benefits of conflicting uses in significant resource areas are low. Some development flexibility is retained for properties with resources; however, there are added costs of developing within the resource areas and these costs generally offset any economic benefits of flexibility.

Table 22. Economic Consequences of Prohibiting Conflicting Uses

Resource/ Location	Conflicting uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -loss of flexibility for development	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including endangered species, water quality benefits of vegetation, and flood attenuation/storage	positive
A-quality resources on developed parcels	R10, RF marina	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -loss of flexibility for redevelopment options	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including endangered species, water quality benefits of vegetation, and flood attenuation/storage	positive
B-quality resources on vacant parcels	R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential loss of flexibility for development	-preservation of wildlife habitat, water quality benefits of vegetation; and erosion control	neutral
B-quality resources on developed parcels	R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential loss of redevelopment options	-preservation of wildlife habitat, water quality benefits of vegetation, and erosion control	neutral
C-quality resources on vacant parcels	R10	-potential loss of units	-limited slope stabilization due to vegetative cover	negative
C-quality resources on developed parcels	R10, RF	-potential loss of redevelopment potential	-protection of disturbed floodplain area	negative

The economic costs associated with prohibiting conflicting uses are low except for 14-acre lowland site. Prohibiting conflicting uses on the A-quality resources in the RF zone may reduce development options; however, state and federal regulations and major additional development costs associated with development in the wetlands already limit development feasibility. Other parcels at this site contain sufficient non-resource areas to accommodate allowed development or redevelopment activities.

The economic benefits include the preservation of the high quality resource values on the bottomland areas and creek ravines. These areas currently provide pollution assimilation/water purification services and high quality fish and wildlife habitat, especially for special status species. This value is expected to increase with future recovery plans. The economic benefits associated with the forested areas include the air conditioning, erosion control and storm water services, wildlife shelter, and air pollution control services for the region. The amenity values associated with hillside scenic views remain capitalized into surrounding residential properties.

Economic Recommendation:

The economic analysis supports prohibiting conflicting uses in A-quality resource areas in Linnton and limiting conflicting uses in B-quality resource areas. For C-quality resources located on sparsely vegetated slopes and the disturbed floodplain areas, conflicting uses may be allowed consistent with site development constraints. This recommendation is the result of the economic analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Social Analysis

This analysis outlines the social consequences of allowing, limiting, or prohibiting conflicting uses. The discussion will focus on the following topics: recreational and educational opportunities; historic, heritage, and cultural values; visual variety and impact; urban design and image of the city; screening and buffering of incompatible uses; and health, safety, and welfare. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, or prohibiting conflicting uses.

Recreational and Educational Opportunities

One of the country's largest urban parks, Forest Park borders the site to the southwest. Trail access to the park is available at the end of Creston Road at the base of Firelane 12. Fred's Marina provides limited access for recreational boating on the Multnomah Channel and Willamette River. Access to the channel and Forest Park provides educational and recreational benefits for the residents of the region. The existence of wildlife, fish, vegetation, and other natural area attributes in Forest Park and along Multnomah channel contributes to the educational value of this site.

Housing Opportunities

Housing opportunities in the Linnton site are limited to the area of the site south of Highway 30. Opportunities for housing are constrained by the physical site limitations, limited availability of vacant lots, and water supply infrastructure limitations. Because of the relatively small size of the site and limited remaining development potential, housing opportunities are very limited.

Employment Opportunities

Employment opportunities in the Linnton site are limited to institutional and agricultural uses. The small size of the site and limits imposed by lot size further reduce the likelihood of job opportunities within the site. The existing marina provides limited employment opportunities. Because of the relatively small size of the site and limited remaining development potential, employment opportunities are limited.

Historic and Cultural Values

Before the arrival of Euroamerican settlers in the Portland area, the Willamette River functioned as a major commerce and transportation route and it is likely that Native Americans used the Linnton site (Ellis 1992). Prehistoric upland sites, though unusual, have been reported in the Tualatin Mountains west of Linnton. The lowland areas along Multnomah Channel provided resources such as wapato and other food plants, fish, and game animals. Hunting and other subsistence activities would also have taken place in the upland areas. Erosion, extensive logging, and development in the area reduce the likelihood of finding any undisturbed sites.

Links to the Euroamerican settlement that followed are more evident. Roads carved over the Tualatin Mountains provided a direct link to the Willamette for products from the Tualatin Valley. The area still straddles vital transportation corridors. Early commerce in the area consisted of lumber mills, dairies, and small farms. Through the years other industries such as smelters, canneries, and more lumber mills operated in Linnton. The second growth forest that overlooks the Linnton site is a reminder of Linnton's timber heritage.

Design, Visual Variety and Impact

The hillside residences and wooded bottomlands of the Linnton site provide a visual contrast to the industrial belt to the south, and the transportation corridor, consisting of St. Helens Road and the Burlington Northern rail line, that runs through the site. Forest Park provides a dramatic backdrop to the site. The river confluence and several distant Cascade Range Mountains can be viewed from the uplands.

Scenic attributes in and near the Linnton site contribute to the environmentally friendly image of the region. Views of the forested Tualatin Mountains, considered an outstanding scenic backdrop (Multnomah County, West Hills Rural Area Plan) and the riparian vegetation along Multnomah Channel contribute to the rural feel of the site. The Willamette River Scenic Waterway, identified by the City of Portland and the State of Oregon, extends into Multnomah Channel and includes the reach in the Linnton site.

Screening and Buffering

Natural resources, such as the forest and riparian vegetation at the Linnton site can act as an edge to different land uses, separating and buffering them from each other both visually and by distance. Site vegetation and topography help to buffer the residential community from nearby industrial areas and the busy arterial highway.

Health, Safety, and Welfare

Erosion is a natural phenomenon, but when aggravated by the alteration or removal of vegetation, or increased stormwater runoff, it can lead to damage, injury, or displacement of people and property. The site's forest resources function to stabilize slopes. These functions contribute to the health, safety, and welfare of the site's residents.

The wetlands and riparian corridors at the Linnton site serve an important role in storing runoff from the uplands and from the river itself during flood events. Flood storage areas help protect the public from flood damage.

There are several health and welfare benefits provided by forest and riparian vegetation. Studies show that urban forests have a clear role to play in reducing stress-related impacts on health. Exposure to nature has significant “restorative” benefits (Ulrich 1984). In addition, urban forests help reduce air pollution problems and the resulting health impacts (City of Portland Energy Office 1993).

Social Consequences of Allowing Conflicting Uses

Table 23 illustrates the consequences of allowing residential, institutional, and marina development to occur in Linnton. This analysis is based on information presented above.

The consequences on the resource are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories. As noted previously, the site's small lot sizes, existing development pattern, and extensive wetlands preclude development of agriculture and mining. The extensive wetlands and steep terrain also limit the probability of additional rail lines and utility corridors within resource areas.

Table 23. Social Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	- increases damage, injury, and displacement caused by erosion or flooding; -decreases screening and buffering benefits; -reduces health, safety, and welfare benefits; -preserves housing opportunities; -further reduces likelihood of finding prehistoric sites	- increases impervious surfaces; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Institutional uses	-provide services and employment opportunities; -could lead to greater damage, injury, and displacement during storm events; -decreases screening and buffering benefits; -further reduces likelihood of finding prehistoric sites	- increases impervious surfaces; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Broadcast facilities	- increases damage, injury, and displacement caused by erosion or flooding; -decreases screening and buffering benefits; -may impact scenic qualities; -further reduces likelihood of finding prehistoric sites	-degrades water quality and quantity; -habitat fragmentation and loss	negative
Marina uses	-maintains the site's scenic qualities; -provides recreational benefits -decreases screening and buffering benefits; -preserves employment opportunities	-increases impervious surface area; - degrades water quality and quantity; -habitat fragmentation and loss	negative

Social Consequences of Limiting Conflicting Uses

The Table 24 illustrates the consequences of limiting conflicting uses in the Linnton site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 24. Social Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-supports visual variety; -supports screening and buffering; -supports some health safety and welfare benefits -maintains historic character; -preserves housing opportunities	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive or neutral
Institutional uses	-supports visual variety; -supports screening and buffering; -supports services and employment opportunities	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive or neutral
Broadcast facilities	-limits damage, injury, and displacement caused by erosion or flooding; -supports screening and buffering benefits	-conserves water quality and quantity; -controls habitat fragmentation and loss	positive or neutral
Marina uses	-would not preclude maintenance of existing facilities; supports employment opportunities	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive or neutral

Social Consequences of Prohibiting Conflicting Uses

Table 25 illustrates the consequences of prohibiting conflicting uses in the Linnton site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 25. Social Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-enhances the recreational and educational values; -supports the historic, heritage and cultural values; -provides visual relief; -retains the screening and buffering benefits; -protects the health, safety and welfare values -potential loss of housing options	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	neutral
Institutional uses	-reduces availability of institutional services needed by residents; -enhances the recreational and educational values; -supports the historic, heritage and cultural values; -retains screening and buffering benefits; -protects the health, safety and welfare values	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Broadcast facilities	-limits damage, injury, and displacement caused by erosion or flooding; -supports screening and buffering benefits	-conserves water quality and quantity; -controls habitat fragmentation and loss	positive
Marina uses	-retains the screening and buffering benefits; -protects the health, safety and welfare values; -limits development of marina-related recreation	-conserves the functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive

There are significant social values associated with the character of Linnton, including: recreational and educational opportunities; historic and cultural values; values related to visual variety and image; values related to the utilization of river resources; screening and buffering values; and health, safety, and welfare values. These values support limiting, and in some cases, prohibiting conflicting uses.

Social Recommendation:

The social analysis supports limiting or prohibiting conflicting uses at the Linnton site. This recommendation is the result of the social analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Environmental Analysis

This analysis outlines the environmental consequences of allowing, limiting, or prohibiting conflicting uses within the Linnton site. The Inventory report (published separately) contains a detailed discussion of the environmental values at this site. Significance factors (see Appendix F in the Inventory report) provided the basis for establishing resource significance as well as for determining relative significance of specific resources. Resources were ranked as A-, B-, or C-quality based on whether they met certain “decision” or “contributing” significance factors. In general, the detrimental environmental consequences of allowing conflicting uses in A-quality resource areas, and the benefits of prohibiting conflicting uses within these same areas, are greater than for B- or C-quality resources. The following discussion is based in part on the inventory findings and the impact analysis contained in the Conflicting Use Impacts section of this report.

Environmental Consequences of Allowing Conflicting Uses

Table 26 illustrates the consequences of allowing conflicting uses in the Linnton site. Fully allowing conflicting uses results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Table 26. Environmental Consequences of Allowing Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R10 marina	-loss of highest quality environmental amenities; -no change in development potential	-major loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	R10	-loss of high quality environmental amenities;	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	RF, R10	-loss of significant environmental amenities; -no change in development potential	-loss significant resources as described in the Conflicting Use Impacts section	negative

Environmental Consequences of Limiting Conflicting Uses

This action conserves certain environmental resources and resource values identified in the site inventory. However, limiting conflicting uses only controls impacts; it does not prevent the degradation and loss of resources and values. The environmental consequences are generally negative except for C-quality resources. Table 27 illustrates the consequences of limiting conflicting uses in the Linnton site.

Table 27. Environmental Consequences of Limiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R10 marina	-potential loss of highest quality environmental amenities; -no change in development potential	-loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	R10	-potential loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	RF, R10	-no change in development potential	-potential further degradation of floodplain areas	neutral

Environmental Consequences of Prohibiting Conflicting Uses

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive except for C-quality resources which have been degraded. Table 28 illustrates the consequences of prohibiting conflicting uses in the Linnton site.

Table 28. Environmental Consequences of Prohibiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R10 marina	-protection of highest quality environmental amenities; -may limit development flexibility	-protection of highest quality resources as described in the Conflicting Use Impacts section	positive
B-quality resources	R10	-protection of high quality environmental amenities; -may limit development flexibility	-protection of high quality resources as described in the Conflicting Use Impacts section	positive
C-quality resources	RF, R10	-may limit development flexibility	-some protection of degraded floodplain areas	neutral

Environmental Recommendation:

The environmental analysis supports prohibiting conflicting uses on A- and B-quality resource areas at the Linnton site. The C-quality resources include filled floodplain areas and degraded vegetated slopes that support limiting conflicting uses. This recommendation is the result of the environmental analysis only. Conflicts between this recommendation and the economic, social, and energy recommendations will be resolved in the Conflict Resolution section.

Energy Analysis

This analysis outlines the energy consequences of allowing, limiting, or prohibiting conflicting uses. The discussion will focus on the following topics: transportation; infrastructure; and the heating and cooling of structures. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, and prohibiting conflicting use. The consequences on the conflicting uses are discussed based on general land use categories.

Transportation

Energy expenditures for transportation relate primarily to travel distance from origin to destination, and mode of transportation used. Both variables can be affected by natural resource protection.

In an area such as the Linnton site, transportation involves moving people between homes, employment, commercial areas, and other services. Linnton is located within seven miles of several major employment areas including Downtown and North Portland. Automobiles are the primary means of transportation in and out of the area. Automobiles, though convenient, are generally not energy efficient. The Linnton site's roads are generally narrow, lack sidewalks, and some are not paved. The low traffic volume and short distances generally encourage walking or bicycling within the site. One bus line (Tri-Met Bus No.17) serves the area, connecting Portland with Sauvie's Island along St. Helens Road (Highway 30), with a bus stop near Harborton Road.

A Burlington Northern rail line transects the site. Though railroads are more energy efficient than cars, the line travels through and does not stop at the site. Therefore, resource protection or development in this site is not likely to influence railroad use and energy consumption.

The availability of natural resources such as forest and riparian habitat at the Linnton site provides opportunities for wildlife observation, recreation, and education to area residents. The proximity to Forest Park and the Multnomah Channel offers a variety of such amenities. Because resources are close to users, limited transportation energy is used in reaching them. In this respect the protection of natural resources at this site could reduce, although minimally, energy used for transportation. For those attracted from outside of the area by those amenities, resource protection might increase energy consumption by creating destinations only practically reached by automobile.

Infrastructure

Locating housing and other development outside of natural resource areas in an efficient manner normally results in less infrastructure needed to serve sewer, water, transportation, and other needs. Development located away from flood hazard areas and steep slopes can eliminate the need for additional construction considerations or hazard control structures.

A major component of infrastructure development is energy. The area south of Highway 30 in the Harborton Drive area of the Linnton site current water supply infrastructure is at capacity. New residential development is unlikely until substantial capital improvements are made to the feeder lines that serve the area. In the event that new development occurs minor infrastructure connections would be made thus requiring, although minimal, the consumption of energy.

Heating and Cooling of Structures

Energy consumption for the purpose of heating and cooling structures is impacted by resource protection in two ways: building form and presence of vegetation.

Building form can be used to accomplish resource protection through the use of development techniques such as clustering buildings away from the resource. Less vegetation is removed and the vegetation's temperature moderating benefits are retained, reducing energy consumption. This type of development not only reduces the area of disturbance it also results in more common wall construction and reduced building surface area, reducing heat loss and energy consumption.

Forest and riparian vegetation at the Linnton site provide shade on nearby homes and buildings in the summer, reducing energy demands for cooling. Plants also absorb sunlight and transpire during growing seasons, reducing ambient air temperatures. This moderating effect can reduce energy needs for cooling of nearby structures. Trees and shrubbery can also act as a windbreak during winter. By slowing or diverting winter winds, structural heat loss from infiltration and convection is reduced, resulting in lower energy needs.

Energy Consequences of Allowing Conflicting Uses

Table 29 illustrates the energy consequences of allowing residential, institutional, broadcast facilities, and marina uses to occur within significant resource areas of the Linnton site. This analysis is based on information presented above. The consequences on the resources are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 29. Energy Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-requires additional land preparation and infrastructure development increasing energy consumption; -reduces or eliminates energy benefits related to heating and cooling	-habitat fragmentation and loss; -vegetation removal; -soil and slope disturbance; -water quality degradation	negative

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Institutional uses	-reduces transportation energy demand; -increases infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-habitat fragmentation and loss -removes vegetation; -disturb soils and slopes; -degrade water quality	negative
Broadcast facilities	-increases infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-habitat fragmentation and loss -removes vegetation; -disturb soils and slopes; -degrade water quality	negative
Marina uses	-increases infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling; -reduces transportation energy demand	-habitat fragmentation and loss -removes vegetation; -disturb soils and slopes; -degrade water quality	negative

Energy Consequences of Limiting Conflicting Uses

Table 30 illustrates the energy consequences of limiting conflicting uses within significant resource areas of the Linnton site.

Table 30. Energy Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-limits additional land preparation and infrastructure development reducing energy consumption; -maintains vegetation heating and cooling benefits	-limits habitat disturbance; -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	positive
Institutional uses	-reduces transportation energy demand; -reduces infrastructure development energy expenditure; -maintains energy benefits related to heating and cooling	-limits habitat disturbance; -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	positive
Broadcast facilities	-increases infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-limits habitat disturbance; -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Marina uses	-reduces infrastructure development energy expenditure	-limits habitat disturbance; -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	positive

Energy Consequences of Prohibiting Conflicting Uses

Table 31 illustrates the energy consequences of prohibiting conflicting uses within significant resource areas of the Linnton site.

Table 31. Energy Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-reduces heating and cooling energy consumption; -reduces infrastructure development energy expenditure	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Institutional uses	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Broadcast facilities	-reduces infrastructure development energy expenditure; -increases energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Marina uses	-reduces infrastructure development energy expenditure	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive

The retention of natural vegetation at the Linnton site can reduce heating and cooling related energy needs both within the site and in the surrounding community. Conservation or protection of resources can also reduce infrastructure-related energy use to the extent that future land uses can locate on portions of the site away from resource areas. Resource conservation or protection reduce the distance local residents must travel to reach recreational opportunities, thus decreasing energy use.

The effect of resource protection on energy use related to both infrastructure and transportation depends primarily on whether a proposed use will be required to locate elsewhere due to resource protection. At the Linnton site, other constraints such as steep slopes and extensive wetlands limit the amount of conflicting uses that can be accommodated within site making such relocation a minor consideration. Resource conservation or protection at the Linnton site would have positive energy consequences.

Energy Recommendation:

The energy analysis supports limiting or prohibiting conflicting uses at the Linnton site. Filled floodplain areas and unvegetated upland slopes (some of the designated C-quality resource areas) have no energy value and do not warrant protection. This recommendation is the result of the energy analysis only. Conflicts between this recommendation and the economic, social, and environmental recommendations will be resolved in the Conflict Resolution section.

RESOURCE SITE 111-A: SYLVAN

Summary Information

Resource Site Size:	626 acres
Site Location:	Site is located near Skyline Blvd. north of Highway 26; Washington-Multnomah County line forms west boundary of three areas, other areas are unincorporated islands within the Portland Urban Service Boundary.
Legal Description:	T1N, R1W, Section 25, 36; T1N, R1E, Section 31; T1S, R1E, Sections 5, 6
Quarter Sections:	2821, 2921, 2922, 3021, 3022, 3024, 3123, 3124, 3125, 3223, 3224, 3225
USGS Quadrangles:	Linnton, Portland
Proposed City Zones:	RF, R20, R10
Existing Land Uses:	Residential, agriculture, TV and radio transmission facilities

Economic Analysis

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Site 111, Sylvan. The site was analyzed to determine the degree of impact on both the conflicting uses and significant resource values. The proposed zoning designations used in this analysis are part of the ongoing Multnomah County Functional Plan Compliance project. Table 32 indicates the existing and potential conflicting uses within each zone.

Table 32. Conflicting Uses by Proposed Zoning Designation

Zone	Existing Conflicting Uses	Potential Conflicting Uses
RF	residential, agriculture	residential, agricultural, institutional, mining, broadcast facilities, rail lines and utility corridors, temporary uses
R10	residential, agriculture	residential, institutional, agriculture, broadcast facilities, rail lines and utility corridors, temporary uses
R20	residential, broadcast facilities	residential, institutional, agriculture, broadcast facilities, rail lines and utility corridors, temporary uses

The site is composed of a mixture of medium to low density residential uses with limited agricultural, and broadcast facility uses. The site includes relatively large tracts of undeveloped forestland. Other uses allowed by proposed zoning include: mining (conditional use in RF), and institutional and rail line and utility corridor uses (allowed as a conditional use in all zones). Temporary uses are allowed in all zones; these uses generally do not disturb resource areas, and pre-existing site conditions are normally restored when the temporary activity ends. Multnomah County or the City of Portland (Bureau of Planning 1988) do not identify the RF-zoned lands

within this site as existing or potential Goal 5 mineral or aggregate resource mining sites; mining is therefore not addressed in this analysis. Rail lines are also not addressed due to steep hillsides in much of the area.

Within Site 111, A-quality resources include Balch Creek, Sylvan Creek, Cedar Mill Creek, Johnson Creek (west), Golf Creek, and associated tributaries, wetlands, and riparian habitats. The B-quality resources include high quality forest and upland habitat. The C-quality resources include upland habitat areas meeting fewer significance factors than A-and B-quality resources. The ranked resources within Site 111 are summarized in Table 33.

Table 33. Significant Resource Rankings, Acreage, and Locations

Rank	Acres	Resource	Location
A	112.8	Balch Creek, Sylvan Creek, Cedar Mill Creek, Johnson Creek (west), Golf Creek and their tributaries, associated wetlands and riparian corridors	west hills slopes and ravines near ridge line
B	170.63	terrestrial habitat, forest vegetation	steep and/or forested upland slopes
C	62.69	vegetative cover	upland slopes near ridge lines

For this phase of the analysis, the impact of allowing, prohibiting, or limiting conflicting uses is determined for vacant or developed parcels within Site 111 where significant resources are located. Table 34 indicates the impacts on both the significant resources and on the conflicting uses of fully allowing these conflicting uses in the resource areas.

Table 34. Economic Consequences of Allowing Conflicting Use

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	RF, R20, R10	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability; -high engineering and construction costs	-loss of sediment trapping capacity; loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
A-quality resources on developed parcels	RF, R20, R10	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability; -high engineering and construction costs	-loss of sediment trapping capacity; loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
B-quality resources on vacant parcels	RF, R20, R10	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability; -high engineering and construction costs	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
B-quality resources on developed parcels	RF, R20, R10	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability; -high engineering and construction costs	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
C-quality resources on vacant parcels	RF, R20, R10	-limited loss of amenity values; -limited engineering and construction costs	-loss of benefits of vegetation and supportive wildlife habitat	negative
C-quality resources on developed parcels	RF, R20, R10	-limited loss of amenity values -limited engineering and construction costs	-loss of benefits of vegetation and supportive wildlife habitat	negative

The economic costs of fully allowing conflicting uses within a resource site are greatest for the high quality stream and wetland resources that provide a variety of intermediate goods (alternative substitutes for commercial services) within Site 111. For example, the areas along Sylvan Creek, Balch Creek, Cedar Mill Creek, Johnson Creek, Gold Creek, their tributaries and associated wetlands provide high quality fish and wildlife habitat. These water features and associated riparian areas provide pollution assimilation/water purification services and flood attenuation and storage functions. The functions provided by the wetland areas represent a large cost saving over a traditional treatment system. Future state and federal determinations regarding special status species may increase the value of these areas with respect to future recovery plans for the region. The economic loss from removing forested areas include increased flood damage, the loss of air conditioning, erosion control and storm water services, wildlife shelter, and air pollution control services for the region. Vegetation clearing and development in the site's steep sloped areas will increase storm runoff peaks and the dangers of flooding and may destabilize slopes and increase damage costs associated with landslide hazards.

The economic benefits for fully allowing conflicting uses are low for most of the parcels zoned RF, R10, and R20. Development flexibility is preserved for properties with resources; however, there are added costs to developing within the steep resource areas of this site and these costs generally offset the economic benefits of flexibility. There may be substantial economic benefit gained by siting new development out of the steep areas to avoid future landslide or losses due to erosion.

Table 35. Economic Consequences of Limiting Conflicting Use

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	RF, R20, R10	-limited loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -some loss of slope stability; -high engineering and construction costs	-loss of sediment trapping capacity; -loss of storm drainage areas; - loss of fish/wildlife habitat, incl. special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation/ storage	negative
A-quality resources on developed parcels	RF, R20, R10	-limited loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability; -moderate engineering and construction costs	-loss of sediment trapping capacity; -loss of storm drainage areas; -loss of fish/wildlife habitat, incl. special status species; -major loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
B-quality resources on vacant parcels	RF, R20, R10	-most amenity values retained; -loss of slope stability; -moderate engineering and construction costs	-limited loss of fish/wildlife habitat; -loss of water quality benefits of vegetation; -loss of flood alternation	neutral
B-quality resources on developed parcels	RF, R20, R10	-most amenity values retained; -loss of slope stability; -moderate engineering and construction costs	-limited loss of fish/wildlife habitat; -loss of water quality benefits of vegetation; -loss of flood alternation	neutral
C-quality resources on vacant parcels	RF, R20, R10	-amenity values retained; -limited engineering and construction costs	-limited loss of benefits of vegetation	neutral
C-quality resources on developed parcels	RF, R20, R10	-amenity values retained; -limited engineering and construction costs	-limited loss of benefits of vegetation	neutral

The economic costs of limiting conflicting uses within Site 111 include some loss of intermediate goods such as irreplaceable, high quality fish and wildlife habitat associated with the site's streams and tributaries. These water features and associated riparian areas provide pollution assimilation/water purification services and flood attenuation and storage functions. The economic values at risk in forested areas include the loss of flood control, air conditioning, erosion control and storm water services, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards would increase with development activities and increased disturbance of the soils. Limiting conflicting uses may reduce the magnitude of these costs. In cases where small disturbances result in irreversible damages, the costs remain high.

The economic benefits for limiting conflicting uses are low for most of the parcels zoned RF, R20, or R10. Some development flexibility is retained for properties with resources; however,

there are added costs of developing within the resource areas and these costs generally offset any economic benefits of flexibility.

Table 36. Economic Consequences of Prohibiting Conflicting Uses

Resource/ Location	Conflicting uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	RF, R20, R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential loss of units (on two RF parcels)	-preservation of sediment trapping capacity, storm drainage areas, high quality fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood attenuation/storage	positive (neutral in RF)
A-quality resources on developed parcels	RF, R20, R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -loss of flexibility for new development and redevelopment options	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood attenuation/storage	positive
B-quality resources on vacant parcels	RF, R20, R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -loss of flexibility for new development	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood storage	positive
B-quality resources on developed parcels	RF, R20, R10	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -loss of development flexibility	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation, and loss of flood storage	positive
C-quality resources on vacant parcels	RF, R20, R10	-amenity values retained from vegetative cover; -loss of flexibility for new development	-preservation of benefits of vegetation	neutral or negative
C-quality resources on developed parcels	RF, R20, R10	-amenity values retained from vegetative cover; -loss of development flexibility	-preservation of benefits of vegetation	negative

The economic costs associated with prohibiting conflicting uses are low for most of the parcels zoned RF, R10, and R20. Prohibiting conflicting uses in the A-quality resources in the RF zone reduces development options; for the two parcels fully within this area, the development potential can be captured through the use of transferable development rights. Development within A- and B-quality resources is highly constrained by engineering requirements to design around steep slopes, unstable soils, active waterways, and wetland areas that significantly limit development feasibility. Other parcels at this site contain sufficient non- or lower quality resource areas to accommodate limited development or redevelopment activities.

The economic benefits associated with prohibiting conflicting uses include the preservation of the high quality stream, wetland, and riparian resources. As discussed previously, these resources provide a variety of intermediate goods. Future state and federal determinations regarding special status species may increase the value of these resources with respect to future recovery plans for the region. Prohibiting conflicting uses also contributes to the damage costs avoided. Prohibiting development in C-quality resource areas may have some negative impact because of the loss of flexibility and number of units; many of the resource amenities could be retained with appropriate siting and design.

Economic Recommendation:

The economic analysis supports prohibiting conflicting uses on A-quality resources in Sylvan and limiting conflicting uses on B- and C-quality resources. Limitations in these resource areas may affect siting and design but not the overall number of units. This recommendation is the result of the economic analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section

Social Analysis

The following social analysis will focus on several topics: recreational and educational opportunities; historic, heritage, and cultural values; visual variety and impact; urban design and image of the city; screening and buffering of incompatible uses; and health, safety, and welfare. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, or prohibiting conflicting uses.

Recreational and Educational Opportunities

Recreational opportunities afforded by large natural areas, such wildlife viewing, and hiking are important. No significant park resources are located on the site; however, Forest Park, Hoyt Arboretum, and the Audubon Society Wildlife Sanctuary provide nearby recreational and educational opportunities. Portions of the site are within 1,000 feet of Forest Park.

Housing Opportunities

Housing opportunities in the Sylvan site are constrained primarily by physical site limitations.

Employment Opportunities

Employment opportunities in the Sylvan site are limited to institutional and agricultural uses. Institutional uses are likely to require new development, and are constrained only by physical site limitations.

Historic, Heritage, and Cultural Values

The Sylvan site is believed to have been used by Native Americans prior to the European-American settlement (Ellis 1992). Dense forests similar to those of the sylvan site provided an important source of wood for tools, canoes, and shelter construction for Native Americans. Erosion, extensive logging, and settlement in the area reduce the likelihood of finding any undisturbed sites. No archeological sites are known within resource areas.

For Euroamerican settlers the Tualatin Mountains created a barrier to trade between the Willamette and Tualatin Valleys. The early roads, such as Barnes Road and portions of what is now known as Sunset Highway/Canyon Road, were carved out to connect the two valleys and still serve as major transportation corridors. The area also provided logs to the rapidly growing timber industry of the region during the later part of the Nineteenth Century.

Design, Visual Variety and Impact

The forested character of the Sylvan site has been identified as a valuable attribute to be preserved (Multnomah County Sylvan Rural Area Plan). The site's rugged topography, large lots, and Douglas fir forests provide visual variety. Winding roads cross the slopes, ridges, ravines, and forest areas of the Tualatin Mountains which provide visual relief from the grids and linear alignment of the region's cities and highways.

Scenic attributes in and near the Sylvan site contribute to the environmentally friendly and scenic image of the region. The east face of the Tualatin Mountains is considered an outstanding scenic backdrop for downtown (Multnomah County Sylvan Rural Area Plan) and NW Skyline Boulevard is identified as a scenic corridor (City of Portland Scenic Resources Protection Plan).

Screening and Buffering of Incompatible Uses

Natural resources, such as the forest and ravines in the Sylvan site act as an edge to different land uses, separating and buffering them from each other both by distance and visually.

Health, Safety, and Welfare

Erosion is a natural phenomenon in the Sylvan site, but when aggravated by the alteration or removal of vegetation, cut slopes for roads and buildings, or increased stormwater runoff, could lead to damage, injury, or displacement of people and property may result. Many of the area's resources function to stabilize slopes and contribute to groundwater recharge. Forested slopes are an effective means of reducing peak runoff flows and associated flood damage to residential areas, streets, roads, bridges, and utility services. These functions contribute to the health, safety, and welfare of the Sylvan site's residents.

There are several health and welfare benefits provided by forest vegetation. Studies show that urban forests have a clear role to play in reducing stress-related impacts on health. Exposure to nature has significant "restorative" benefits (Ulrich, 1984). In addition, urban forests help reduce air pollution problems and the resulting health impacts (City of Portland Energy Office, 1993).

Social Consequences of Allowing Conflicting Uses

Table 37 illustrates the consequences of allowing residential , institutional, agricultural, broadcast facilities, rail line and utility corridor development to occur in the Sylvan site. The consequences on the resource are based on functional categories. It is assumed that rail corridors will not be developed through the area due to engineering constraints. The consequences on the conflicting uses are based on general land use categories.

Table 37. Social Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-damage, injury, and displacement caused by erosion or flooding; -decreases screening and buffering benefits; -reduces the screening and buffering, health, safety, and welfare benefits; -preserves housing options	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and bank destabilization -fragmentation and loss of fish and wildlife habitat	negative
Institutional uses	-supports providing services and employment opportunities; -damage, injury, and displacement during storm events; -decreases screening and buffering benefits; increases visual variety	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and bank destabilization -fragmentation and loss of fish and wildlife habitat	negative
Agricultural uses	-reduces the screening and buffering, health, safety, and welfare benefits; -may increase visual variety; -preserves employment opportunities	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Broadcast facilities	-decreases screening and buffering benefits	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Utility corridor uses	-decreases screening and buffering benefits -allows expansion of existing utilities	-limited vegetation removal and increased impervious surfaces degrade water quality and quantity -limited soil erosion and bank destabilization -potential fragmentation and loss of fish and wildlife habitat	negative

Social consequences of allowing conflicting uses will be moderately to significantly negative for all uses and all resource land classifications (A, B, and C). Specific site constraints (e.g., slope, channel, soil stability) will place some limitations on nearly all conflicting uses.

Social Consequences of Limiting Conflicting Uses

The Table 38 illustrates the consequences of limiting conflicting uses in the Sylvan site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 38. Social Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -maintains historic character -preserves housing options	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Institutional uses	-supports services and employment opportunities; -supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Agricultural uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -preserves employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Broadcast facilities	-supports visual variety and impact; -supports screening and buffering	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Utility corridor uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive

Limiting conflicting uses will have moderately to significantly positive social impacts for all uses. This will occur because both local and regional social values can be preserved. These positive benefits are expected to be higher for C-quality resources and lower for A-quality resources where natural constraints and strongly negative resource impacts reduce the social benefit of any development.

Social Consequences of Prohibiting Conflicting Uses

Table 39 illustrates the consequences of prohibiting conflicting uses in the Skyline site.

Table 39. Social Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-enhances recreational and educational values; -supports the historic, heritage and cultural values; -provides visual relief; -retains the screening and buffering benefits; -protects the health, safety and welfare values -potential loss of housing opportunities (transfer options are available)	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Institutional uses	-may reduce availability of institutional services and employment opportunities; -enhances recreational and educational values; -supports the historic, heritage and cultural values; -retains the screening and buffering benefits	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Agricultural uses	-retains the screening and buffering benefits; -protects the health, safety and welfare values; -may reduce employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Broadcast facilities	-retains the screening and buffering benefits; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Utility corridor uses	-retains the screening and buffering benefits; -supports the historic, heritage and cultural values; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive

Prohibiting conflicting uses on all resource lands (A, B, and C) will produce mixed social consequences, i.e., it will preserve regional social values at the expense of local and neighborhood values. For all quality types there will be overall resource protection, hence the net impact is positive.

Social Recommendation:

The social analysis supports limiting or prohibiting conflicting uses on all quality levels of resources at the Sylvan site. Allowing conflicting uses results in negative impacts to regional and local social values. This recommendation is the result of the social analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Environmental Analysis

This analysis outlines the environmental consequences of allowing, limiting, or prohibiting conflicting uses within the Sylvan site. The Inventory report (published separately) contains a detailed discussion of the environmental values at this site. Significance factors (see Appendix F in the Inventory report) provided the basis for establishing resource significance as well as for determining relative significance of specific resources. Resources were ranked as A-, B-, or C-quality based on whether they met certain “decision” or “contributing” significance factors. In general, the detrimental environmental consequences of allowing conflicting uses in A-quality resource areas, and the benefits of prohibiting conflicting uses within these same areas, are greater than for B- or C-quality resources. The following discussion is based in part on the inventory findings and the impact analysis contained in the Conflicting Use Impacts section of this report.

Environmental Consequences of Allowing Conflicting Uses

Table 40 illustrates the consequences of allowing conflicting uses in the Sylvan site. Fully allowing conflicting uses results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Table 40. Environmental Consequences of Allowing Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R20, R10	-loss of highest quality environmental amenities; -no change in development potential	-major loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	RF, R20, R10	-loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R20, R10	-loss of significant environmental amenities; -no change in development potential	-loss significant resources as described in the Conflicting Use Impacts section	negative

Environmental Consequences of Limiting Conflicting Uses

Table 41 illustrates the consequences of limiting conflicting uses in the Sylvan site. This action conserves certain environmental resources and resource values identified in the site inventory.

However, limiting conflicting uses only controls impacts; it does not prevent the degradation and loss of resources and values. The environmental consequences are generally negative except for C-quality resources.

Table 41. Environmental Consequences of Limiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R20, R10	-potential loss of highest quality environmental amenities; -no change in development potential	-loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	RF, R20, R10	-potential loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R20, R10	-no change in development potential	-potential further degradation of floodplain areas	neutral

Environmental Consequences of Prohibiting Conflicting Uses

This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive. Table 42 illustrates the consequences of prohibiting conflicting uses in the Sylvan site.

Table 42. Environmental Consequences of Prohibiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	RF, R20, R10	-protection of highest quality environmental amenities; -may limit development flexibility	-protection of highest quality resources as described in the Conflicting Use Impacts section	positive
B-quality resources	RF, R20, R10	-protection of high quality environmental amenities; -may limit development flexibility	-protection of high quality resources as described in the Conflicting Use Impacts section	positive
C-quality resources	R20, R10	-may limit development flexibility	-some protection of degraded floodplain areas	neutral

Environmental Recommendation:

The environmental analysis supports prohibiting conflicting uses in A-and B-quality resource areas in the Sylvan site. Significant C-quality resources warrant limiting conflicting uses. This recommendation is the result of the environmental analysis only. Conflicts between this recommendation and the economic, social, and energy recommendations will be resolved in the Conflict Resolution section.

Energy Analysis

This analysis outlines the energy consequences of allowing, limiting, or prohibiting conflicting uses. The discussion will focus on the following topics: transportation; infrastructure; and the heating and cooling of structures. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, and prohibiting conflicting use. The consequences on the conflicting uses are discussed based on general land use categories. Rail lines are not addressed due to the steep topography, although the MAX Light Rail passes underground through a portion of this site.

Transportation

Energy expenditures for transportation relate primarily to travel distance from origin to destination, and mode of transportation used. Both variables can be affected by natural resource protection. For ridge-top sites, this may be offset by the energy requirements to reach higher elevations.

At the Sylvan site, transportation involves moving people between homes, employment, commercial areas, and other services. The site is located within approximately five miles of several major employment areas including downtown Portland and Beaverton. Automobiles are the primary means of transportation in and out of the area. Automobiles, though convenient, are generally not energy efficient. The availability of mass transit and alternative transit options are limited in the site. Roads are generally narrow and lack sidewalks, thus discouraging walkers and bicyclists. One busline (Bus No.20) serves the area, connecting Portland with the Tualatin Valley along NW Cornell Road.

The availability of natural resources, such as forests and streams, in the Sylvan site provides opportunities for wildlife observation, recreation, and education to area residents. The proximity of Forest Park, Washington Park, and the Audubon Society Wildlife Sanctuary offer a variety of such amenities. Because resources are close to users, limited transportation energy is used in reaching them. The protection of natural resources at this site could reduce energy consumption in this respect.

Infrastructure

Locating housing and other development outside of natural resource areas in an efficient manner normally results in less infrastructure needed to serve sewer, water, transportation, and other needs. A major component of infrastructure development is energy. Development located away from slope or flood hazard areas can eliminate the need for additional construction considerations or hazard control mechanisms, therefore reducing related energy expenditures.

Heating and Cooling of Structures

Energy consumption for the purpose of heating and cooling structures is impacted by resource protection in two ways: building form and presence of vegetation.

Resource protection is accomplished through development techniques such as clustering of buildings away from the resource. This type of development results in more common wall construction and reduced surface area reducing heat loss and energy consumption. In addition, clustering buildings requires the removal of less vegetation. The presence of vegetation reduces energy consumption.

Trees at the Sylvan site provide shade on nearby homes and buildings in the summer, reducing energy demands for cooling. Plants also absorb sunlight and transpire during growing seasons, reducing ambient air temperatures. This moderating effect can reduce energy needs for cooling of nearby development. Trees and shrubbery can also act as a windbreak during winter. By slowing or diverting winter winds, heat loss in structures from infiltration and convection is reduced, resulting in lower energy needs. This effect is offset to some degree by the higher elevations of the Sylvan site, and somewhat cooler temperatures, compared with nearby lowland sites.

Energy Consequences of Allowing Conflicting Uses

Table 43 illustrates the energy consequences of allowing residential, institutional, agricultural, radio frequency transmission, and rail line and utility corridor development to occur within significant resource areas of the Sylvan site. This analysis is based on information presented above. The consequences on the resources are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 43. Energy Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-reduces transportation energy demand; -requires additional land preparation and infrastructure development increasing energy consumption; -reduces or eliminates vegetation benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Institutional uses	-reduces transportation energy demand; -increase infrastructure development energy expenditure; -reduces or eliminates vegetation benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Agricultural uses	-limits energy expenditures required to transport agricultural products	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Broadcast facilities	-may require additional infrastructure development and land preparation; -may reduce or eliminate energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Utility corridor uses	-may reduce or eliminate energy benefits related to heating and cooling	for new development: -degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative

Energy impacts of allowing conflicting uses in significant resource areas are related primarily to general vegetation cover and location. Overall impact is expected to be negative due to loss of vegetation protection and higher infrastructure costs of development in steep and higher elevation zones.

Energy Consequences of Limiting Conflicting Uses

Table 44 illustrates the energy consequences of limiting residential, institutional, and railroad and utility corridor development within significant resource areas of Sylvan site. This analysis is based on the introductory information presented above. The energy consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 44. Energy Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-may require additional land preparation and infrastructure development increasing energy consumption; -maintains vegetation heating and cooling benefits	-limits habitat fragmentation and loss -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	neutral to positive
Institutional uses	-reduces transportation energy demand; -increases infrastructure development energy expenditure; -maintains energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	neutral to positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Agricultural uses	-reduces energy expenditures required to transport agricultural products	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	neutral to positive
Broadcast facilities	-may require additional infrastructure development and land preparation; -reduces impact on energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	neutral to positive
Utility corridor uses	-route selection may require higher energy costs for construction	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance	neutral

Energy impacts of limiting conflicting uses in significant resource areas depends primarily on location and topography. Impacts of limiting conflicting uses on A-and B-quality resource areas is expected to be neutral to positive because the infrastructure costs may balance the benefits from thermal screening. For C-quality resource areas, the infrastructure cost add-ons should be lower, but so will the benefits since these sites are often near ridgetops.

Energy Consequences of Prohibiting Conflicting Uses

Table 45 illustrates the energy consequences of prohibiting residential, institutional, and radio and television facility development within significant resource areas of the Sylvan site. This analysis is based on the introductory information presented above. The energy consequences on the resource are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 45. Energy Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-reduces heating and cooling energy consumption; -reduces infrastructure development energy expenditure -may limit urban housing opportunities	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Institutional uses	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Agricultural uses	-supports heating and cooling benefits of vegetation -may increase energy expenditures required to transport agricultural products	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Broadcast facilities	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Utility corridor uses	-route selection may require higher energy costs for construction	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive

The retention of natural vegetation in the Sylvan site can reduce heating and cooling related energy needs both within the site and in the surrounding communities. Conservation or protection of resources can also reduce infrastructure related energy use to the extent that future land uses can locate on portions of the site away from resource areas. Resource protection can also reduce the distance local residents must travel to reach recreational opportunities, thus decreasing energy use.

The effect of resource protection on energy use related to both infrastructure and transportation depends primarily on whether a proposed use will be required to locate elsewhere due to resource protection. At the Sylvan site, such relocation will generally not be necessary, and could readily be accommodated within the site on non-resource lands.

Energy Recommendation:

The energy analysis supports limiting or prohibiting conflicting uses at the Sylvan site. This recommendation is the result of the energy analysis only. Conflicts between this recommendation and the economic, social, and environmental recommendations will be resolved in the Conflict Resolution section.

RESOURCE SITE 117-A: DUNTHORPE

Summary Information

- Resource Site Size:** 660 acres
- Site Location:** Between the Willamette River and Tryon Creek State Park; boundaries are Lewis and Clark College/ Riverview Cemetery (north), Willamette River (east), the county line at Iron Mountain Road (south), and Terwilliger Blvd. (west).
- Legal Description:** T1S, R1E, Sections 26, 27, 33, 34
- Quarter Sections:** 4030, 4031, 4130, 4131, 4230, and 4231
- USGS Quadrangle:** Lake Oswego
- Proposed City Zones:** R20, R10
- Existing Land Uses:** Residential, institutional (school, botanical garden, cemetery, rail line (Willamette Trolley))

Economic Analysis

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Site 117, Dunthorpe. The site was analyzed to determine the degree of impact on both the conflicting uses and significant resource values. The proposed zoning designations used in this analysis are part of the ongoing Multnomah County Functional Plan Compliance project. Table 46 indicates the existing and potential conflicting uses within each zone.

Table 46. Conflicting Uses and Area by Proposed Zoning Designation

Zone	Existing Conflicting Uses	Potential Conflicting Uses
R10	residential	residential, institutional, agriculture, broadcast facilities, rail lines and utility corridors, temporary uses
R20	residential, agriculture, institutional	residential, institutional, agriculture, broadcast facilities, rail lines and utility corridors, temporary uses

The Dunthorpe site is predominately a residential community with scattered institutional uses such as a public school, botanical garden, and cemetery. Residential uses are allowed outright under proposed R20 and R10 zoning. Agriculture is allowed by right in the R20 zone and as a conditional use in R10. Institutional, broadcast facilities, and rail line and utility corridors are allowed as conditional uses. Temporary uses are allowed in all zones; these uses generally do not disturb resource areas, and pre-existing site conditions are normally restored when the temporary activity ends.

Within Site 117, A-quality resources include the streams and ravines flowing to the Willamette River and Tryon Creek, and the rock cliffs above the Willamette River. The B-quality resources include high quality forest and upland habitat. C-quality resources include upland habitat areas meeting fewer significance factors than A-and B-quality resources. The ranked resources within Site 117 are summarized in Table 47.

Table 47. Significant Resource Rankings, Acreage, and Locations

Rank	Acres	Resource	Location
A	20.58	Streams, tributaries, and ravines, rock outcroppings, high quality terrestrial/aquatic habitat	along stream corridors and southern part of Willamette River
B	47.42	habitat areas, riparian corridors, vegetative cover on hillsides	riparian areas
C	31.19	vegetative cover, floodplain	hillside slopes and Willamette River floodplain

This analysis considers the economic consequences of prohibiting, limiting or allowing conflicting uses within Site 117, Dunthorpe. The site was analyzed to determine the degree of impact on both the conflicting uses and significant resource values. Table 48 indicates the impacts on both the significant resources and on the conflicting uses of fully allowing these conflicting uses in the resource areas.

Table 48. Economic Consequences of Allowing Conflicting Use

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of sediment trapping capacity; loss of storm drainage areas; -major loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
A-quality resources on developed parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of sediment trapping capacity; loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
B-quality resources on vacant parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
B-quality resources on developed parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood storage	negative
C-quality resources on vacant parcels	R20	-limited loss of amenity values along Terwilliger -retains development flexibility	-limited loss of benefits of vegetation	negative (neutral for Willamette lowlands)
C-quality resources on developed parcels	R20	-limited loss of amenity values along Terwilliger -retains development flexibility	-loss of benefits of vegetation; -loss of developed floodplain	negative (neutral for Willamette lowlands)

The economic costs of fully allowing conflicting uses within a resource site are greatest for the high quality stream and cliff resources that provide a variety of intermediate goods (alternative substitutes for commercial services) within the site. For example, the areas along streams and tributaries provide pollution assimilation/water purification services and flood attenuation and storage functions. These resources also provide high quality, irreplaceable fish and wildlife habitat. Future state and federal determinations regarding special status species may increase the value of these areas with respect to future recovery plans for the region. The economic costs associated with the loss of forested areas include the loss of air conditioning, flood and erosion control and storm water services, wildlife shelter, and air pollution control services for the region. The damage costs associated with landslide hazards increase with development activities and increased soil disturbance in resource areas.

The economic benefits for fully allowing conflicting uses are relatively low as the parcels zoned R10 and R20 contain non-resource areas available for development activities. Development flexibility is preserved for properties with resources; however, there are added costs of developing within the resource areas of this site due to natural conditions such as slopes, embankments, and waterways. These costs generally offset any economic benefits of flexibility. Uncontrolled development in resource areas also increases the risk of landslide activity and flooding.

Table 49. Economic Consequences of Limiting Conflicting Uses

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of sediment trapping capacity; loss of storm drainage areas; -loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
A-quality resources on developed parcels	R10, R20	-loss of capitalized amenity values from water features and vegetation into surrounding residential property values; -loss of slope stability	-loss of sediment trapping capacity; -loss of storm drainage areas; loss of fish/wildlife habitat, including special status species; -loss of water quality benefits of vegetation; -loss of flood attenuation/storage	negative
B-quality resources on vacant parcels	R10, R20	-limited loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited loss of slope stability; -no loss of units or potential redevelopment	-limited loss of fish/wildlife habitat, including special status species; -limited loss of water quality benefits of vegetation; -limited loss of flood storage	neutral
B-quality resources on developed parcels	R10, R20	-limited loss of amenity values from water features and vegetation that capitalizes into surrounding residential property values; -limited loss of slope stability; -no loss of units or potential redevelopment	-limited loss of fish/wildlife habitat, including special status species; -limited loss of water quality benefits of vegetation; -limited loss of flood storage	neutral
C-quality resources on vacant parcels	R20	-limited loss of amenity values along Terwilliger only -no loss of units or potential redevelopment	-loss of benefits of vegetation; -loss of floodplain	neutral
C-quality resources on developed parcels	R20	-limited loss of amenity values -no loss of units or potential redevelopment	loss of benefits of vegetation; -loss of floodplain	neutral

The economic costs associated with allowing even limited conflicting uses remain greatest for the high quality stream and riparian resources that provide a variety of intermediate goods within Site 117. The site’s streams and tributaries provide pollution assimilation/water purification services and flood attenuation and storage functions. These resources also provide irreplaceable fish and wildlife habitat. Limiting conflicting uses can reduce the magnitude of these costs.

The economic benefits associated with limiting conflicting uses are low to medium as the parcels zoned R10 and R20 contain non-resource areas available for development activities. Some development flexibility is retained for properties with resources; however, there are added costs and risks of developing within the resource areas and these costs generally offset any economic benefits of flexibility. The net impact for B- and C-quality resource lands is expected to be neutral, and requires evaluation on a case by case basis.

Table 50. Economic Consequences of Prohibiting Conflicting Use

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources on vacant parcels	R10, R20	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential loss of flexibility for new development	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood attenuation/storage	positive
A-quality resources on developed parcels	R10, R20	-amenity values from water features and vegetation fully capitalized into hillside residential property values; -potential loss of flexibility for new development or redevelopment options	-preservation of sediment trapping capacity, storm drainage areas, fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood attenuation/storage	positive
B-quality resources on vacant parcels	R10, R20	-amenity values from water features and vegetation fully capitalized into hillside residential property values, particularly at a Tryon Creek tributary; -potential loss of flexibility for new development	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood storage	neutral (positive at Tryon Creek tributary)
B-quality resources on developed parcels	R10, R20	-amenity values from water features and vegetation fully capitalized into hillside residential property values particularly at a Tryon Creek tributary; -potential loss of units and loss of flexibility for new development and redevelopment	-preservation of fish/wildlife habitat, including special status species, water quality benefits of vegetation and flood storage	neutral (positive at Tryon Creek tributary)

Resource/ Location	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
C-quality resources on vacant parcels	R20	-no loss of limited amenity values -potential loss of units	-preservation of benefits of vegetation	negative
C-quality resources on developed parcels	R20	-potential loss of units and flexibility	-preservation of benefits of vegetation	negative

The economic costs associated with prohibiting conflicting uses are low for parcels zoned RF and R20 with A-and B-quality resources because most parcels in Site 117 contain sufficient non-resource areas to accommodate allowed development or redevelopment activities. Development within A-and B-quality resources is highly constrained by engineering requirements to design around steep slopes, unstable soils, active waterways, and wetland areas that significantly limit development feasibility. Other parcels at this site contain sufficient non- or lower quality resource areas to accommodate limited development or redevelopment activities.

The economic benefits associated with prohibiting conflicting uses include the preservation of the high quality stream and cliff resources that provide a variety of intermediate goods within Site 117. These areas currently provide pollution assimilation/water purification services and high quality fish and wildlife habitat, especially for special status species. This value is expected to increase with future recovery plans. The economic benefits associated with the forested areas include the air conditioning, erosion control and storm water services, wildlife shelter, and air pollution control services for the region. The amenity values associated with hillside scenic views remain capitalized into surrounding residential properties.

Economic Recommendation:

The economic analysis supports prohibiting conflicting uses of A- and certain B- (Tryon Creek tributary) quality resources in Dunthorpe and limiting conflicting uses for other B-quality resources and certain C-quality resources. Conflicting uses may be allowed for C-quality resources in the developed areas of the floodplain. This recommendation is the result of the economic analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section

Social Analysis

This analysis outlines the social consequences of allowing, limiting, or prohibiting conflicting uses in the Dunthorpe site. The discussion will focus on the following topics: recreational and educational opportunities; historic, heritage, and cultural values; visual variety and impact; urban design and image of the city; screening and buffering of incompatible uses; and health, safety, and welfare. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, or prohibiting conflicting uses.

Recreational and Educational Opportunities

The Dunthorpe site provides educational and recreational benefits for the residents of the area. Bishop's Close, built in the 1890s and restored in the 1980s, is an historic estate surrounded by park-like formal gardens originally designed by noted landscape designer, John Olmsted. The Berry Botanical Garden consists of native and cultivated plants in a sylvan setting, providing opportunities for plant and wildlife viewing. Interpretive signs and educational materials are available at both sites.

The Willamette River, located along the eastern boundary of this site, provides important recreational opportunities, such as fishing, boating, wildlife viewing, and hiking. However, public access to the Willamette is limited. This stretch of the river is also favored for its abundance of wildlife and aesthetic beauty.

Housing Opportunities

Housing opportunities in the Dunthorpe site are primarily constrained by the physical site limitations and limited availability of vacant lots.

Employment Opportunities

Employment opportunities in the Dunthorpe site are limited to institutional and agricultural uses. Daycare uses, a possible employment opportunity, are normally small in size and are often contained within other buildings. Other institutional employment opportunities may be contained in existing structures and are otherwise constrained only by physical site limitations.

Historic, Heritage, and Cultural Values

Before the arrival of Euroamerican settlers in the Portland area, the Willamette River functioned as a major commerce and transportation route. It is likely that Dunthorpe was used by Native Americans prior to the first European-American record. No specific prehistoric sites are documented in the Dunthorpe site. Erosion, extensive logging, and development in the area reduce the likelihood of finding any evidence of Native American activities, particularly transitory activities such as food gathering, hunting and fishing.

Since Euroamerican settlement in 1850 Dunthorpe has served as a residential area and a transportation corridor. Some of the early homes still survive notably Bishop's Close. Trails originally carved to connect the Tualatin Valley and the Willamette River exist today as roads. Military Road for example is so named because of its past use as a route for the military between the two valleys.

The Willamette Shore Trolley, built in 1887 by Southern Pacific Railroad, presents a window to Dunthorpe's railway past. This historic line carried passengers between Lake Oswego and Portland. Today vintage railcars still travel the line on a limited schedule.

Design, Visual Variety and Impact

The large lots and Douglas fir forests that dominate much of Dunthorpe create a rural atmosphere with proximity to downtown Portland. Winding roads criss-cross the sloping ridges and ravines that extend through the site. This terrain and the cliffs along the Willamette River contribute to Dunthorpe's visual diversity. The pastoral character and waterfront residences of Dunthorpe help to provide a sense of definition, and uniqueness.

Screening and Buffering

Natural resources, such as the trees and ravines in the Dunthorpe site, can act as an edge to different land uses and neighborhoods, separating and buffering them from each other both visually and by distance. The natural buffers support the country-like character of the Dunthorpe community.

Health, Safety, and Welfare

Residential, institutional, or radio frequency transmission development in the Dunthorpe site increases impervious surface area, which may increase stormwater runoff beyond what the area's infrastructure is designed to handle. Many of the area's resources function to stabilize slopes and contribute to groundwater recharge. These functions contribute to the health, safety and welfare of Dunthorpe's residents.

There are several health and welfare benefits provided by forest and riparian vegetation. Studies show that urban forests have a clear role to play in reducing stress-related impacts on health (Ulrich 1984). In addition, urban forests help reduce air pollution problems and the resulting health impacts (City of Portland Energy Office, 1993).

Social Consequences of Allowing Conflicting Uses

The Table 51 illustrates the consequences of allowing residential, institutional, agricultural, broadcast facilities, and rail and utility corridor development to occur in the Dunthorpe site. This analysis is based on the introductory information presented above.

The consequences on the resource are based on functional categories described above. The consequences on the conflicting uses are based on general land use categories.

Table 51. Social Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-damage, injury, and displacement caused by erosion or flooding; -decreases screening and buffering benefits; -reduces the screening and buffering, health, safety, and welfare benefits; -preserves housing options; -supports residential history of the site	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and bank destabilization -fragmentation and loss of fish and wildlife habitat	negative
Institutional uses	-maintains services and employment opportunities -damage, injury, and displacement during storm events; -decreases screening and buffering benefits; increases visual variety; -supports education and recreation opportunities at Berry Botanical garden	-vegetation removal and increased impervious surfaces degrade water quality and quantity -soil erosion and bank destabilization -fragmentation and loss of fish and wildlife habitat	negative
Agricultural uses	-reduces the screening and buffering, health, safety, and welfare benefits; -may increase visual variety; -maintains employment opportunities	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Broadcast facilities	-detracts from the site's scenic qualities; -decreases screening and buffering benefits	-removal of vegetation; -degrades water quality and quantity; -habitat fragmentation and loss	negative
Rail line and utility corridor uses	-permits operation and maintenance of the existing utilities and the Willamette Shore Trolley line that transects the site enhancing historical values; -decreases screening and buffering benefits;	-vegetation removal increases and increased impervious surface area impacts water quality and quantity; -habitat fragmentation and loss	negative

Social Consequences of Limiting Conflicting Uses

The Table 52 illustrates the consequences of limiting conflicting uses in the Dunthorpe site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 52. Social Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -maintains historic character -preserves housing options	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Institutional uses	-supports services and employment opportunities; -supports educational and recreational values of botanical garden; -supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Agricultural uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits; -supports employment opportunities	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Broadcast facilities	-supports visual variety and impact; -supports screening and buffering	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive
Rail line and utility corridor uses	-supports visual variety and impact; -supports screening and buffering; -supports health, safety, and welfare benefits -would not preclude maintenance of existing facilities; -supports historic values of Willamette Shore Trolley	-conserves functional value of resources; -reduces impact on water quality; -limits habitat fragmentation and loss	positive

Social Consequences of Prohibiting Conflicting Uses

Table 53 illustrates the consequences of prohibiting conflicting uses in the Dunthorpe site. The consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 53. Social Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-enhances recreational and educational values; -supports the historic, heritage and cultural values; -provides visual relief; -retains the screening and buffering benefits; -protects the health, safety and welfare values -potential loss of housing opportunities (transfer options are available)	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Institutional uses	-may reduce availability of institutional services and employment opportunities; -enhances recreational and educational values; -supports the historic, heritage and cultural values; -retains the screening and buffering benefits	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Agricultural uses	-retains the screening and buffering benefits; -protects the health, safety and welfare values; -may reduce employment opportunities	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Broadcast facilities	-retains the screening and buffering benefits; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive
Rail line and utility corridor uses	-retains the screening and buffering benefits; -supports the historic, heritage and cultural values; -protects the health, safety and welfare values	-protects the functional value of resources; -preserves water quality; -preserves fish and wildlife habitat	positive

Social Recommendation:

There are significant social values associated with the character of Dunthorpe, including: recreational and educational opportunities; historic, heritage, and cultural values; values related to visual variety and urban image; screening and buffering values; and health, safety, and welfare values. These values support limiting, and where housing and service benefits can be maintained, prohibiting conflicting uses. Conflicting uses may be allowed on disturbed floodplain resource lands. This recommendation is the result of the social analysis only. Conflicts between the different elements of this recommendation and the economic, environmental, and energy recommendations will be resolved in the conflict resolution section.

Environmental Analysis

This analysis outlines the environmental consequences of allowing, limiting, or prohibiting conflicting uses within the Dunthorpe site. The Inventory report (published separately) contains a detailed discussion of the environmental values at this site. Significance factors (see Appendix F in the Inventory report) provided the basis for establishing resource significance as well as for determining relative significance of specific resources. Resources were ranked as A-, B-, or C-quality based on whether they met certain “decision” or “contributing” significance factors. In general, the detrimental environmental consequences of allowing conflicting uses in A-quality resource areas, and the benefits of prohibiting conflicting uses within these same areas, are greater than for B- or –C-quality resources. The following discussion is based in part on the inventory findings and the impact analysis contained in the Conflicting Use Impacts section of this report.

Environmental Consequences of Allowing Conflicting Uses

Table 54 illustrates the consequences of allowing conflicting uses in the Dunthorpe site. Fully allowing conflicting uses results in the loss of significant environmental resources and resource values identified in the site inventory. The environmental consequences are negative.

Table 54. Environmental Consequences of Allowing Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	R10, R20	-loss of highest quality environmental amenities; -no change in development potential	-major loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	R10, R20	-loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R20	-loss of significant environmental amenities; -no change in development potential	-loss significant resources as described in the Conflicting Use Impacts section	negative

Environmental Consequences of Limiting Conflicting Uses

Table 55 illustrates the consequences of limiting conflicting uses in the Dunthorpe site. This action conserves certain environmental resources and resource values identified in the site inventory. However, limiting conflicting uses only controls impacts; it does not prevent the degradation and loss of resources and values. The environmental consequences are generally negative except for C-quality resources.

Table 55. Environmental Consequences of Limiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	R10, R20	-potential loss of highest quality environmental amenities; -no change in development potential	-loss and degradation of highest quality resources as described in the Conflicting Use Impacts section	negative
B-quality resources	R10, R20	-potential loss of high quality environmental amenities; -no change in development potential	-loss and degradation of high quality resources as described in the Conflicting Use Impacts section	negative
C-quality resources	R20	-no change in development potential	-potential further degradation of floodplain areas	neutral

Environmental Consequences of Prohibiting Conflicting Uses

Table 56 illustrates the consequences of prohibiting conflicting uses in the Dunthorpe site. This action protects significant environmental resources and resource values identified in the site inventory. The environmental consequences are positive.

Table 56. Environmental Consequences of Prohibiting Conflicting Uses

Resource	Conflict- ing uses	Impact on conflicting uses	Impact on significant resources	Impact Assessment
A-quality resources	R10, R20	-protection of highest quality environmental amenities; -may limit development flexibility	-protection of highest quality resources as described in the Conflicting Use Impacts section	positive
B-quality resources	R10, R20	-protection of high quality environmental amenities; -may limit development flexibility	-protection of high quality resources as described in the Conflicting Use Impacts section	positive
C-quality resources	R20	-may limit development flexibility	-some protection of degraded floodplain areas	neutral

Environmental Recommendation:

The environmental analysis supports full protection of A-and B-quality resources at the Dunthorpe site. Significant C-quality resources warrant limited protection. This recommendation is the result of the environmental analysis only. Conflicts between this recommendation and the economic, social, and energy recommendations will be resolved in the Conflict Resolution section.

Energy Analysis

This analysis outlines the energy consequences of allowing, limiting, or prohibiting conflicting uses in the Dunthorpe site. The discussion will focus on the following topics: recreational and educational opportunities; historic, heritage, and cultural values; visual variety and impact; urban design and image of the city; screening and buffering of incompatible uses; and health, safety, and welfare. A general discussion of these topics is presented first, followed by an analysis applying these topics in the context of allowing, limiting, or prohibiting conflicting uses.

Transportation

Energy expenditures for transportation relate primarily to travel distance from origin to destination, and the mode of transportation used. Both variables can be affected by natural resource protection.

In a residential area such as Dunthorpe, transportation involves moving people between homes, employment, commercial areas, and other services. Automobiles are the primary means of transportation in and out of Dunthorpe. Automobiles, though convenient, are generally not energy efficient. The availability of mass transit and alternative transit options are limited in Dunthorpe. Roads are narrow and lack sidewalks, thus discouraging walkers and bicyclists. Two bus lines (Bus Nos. 35 and 36) serve the area, connecting Portland with Lake Oswego along Riverside Drive (Highway 43). Bus No. 39 provides service between Portland and Lewis and Clark College, which is located northwest of Dunthorpe. The Willamette Shore Trolley provides service between Lake Oswego and downtown Portland on a limited basis, and is used during some special events to reduce automobile traffic.

Because Dunthorpe is located within five miles of several major employment areas including downtown Portland, transportation energy costs between home and work may be lower than in other Portland suburbs (assuming levels of automobile use are constant). If resource conservation were to limit additional housing in Dunthorpe, and such housing was replaced farther from employment and services, transportation energy consumption would increase.

The availability of natural resources such as forests and streams in Dunthorpe provides opportunities for wildlife observation, recreation, and education purposes to area residents. Tryon Creek State Park, Bishop's Close, and Berry Botanic Garden offer a variety of such amenities a short distance from many Dunthorpe homes. Because resources are close to users, limited transportation energy is used in reaching them. The protection of natural resources at this site could reduce energy consumption in this respect.

Infrastructure

Locating housing and other development outside of natural resource areas in an efficient manner normally results in less infrastructure needed to serve sewer, water, transportation, and other needs. Energy use is a major component of infrastructure development. Development located away from flood and slope hazard areas can eliminate the need for additional construction considerations or hazard control structures.

Heating and Cooling of Structures

Energy consumption for the purpose of heating and cooling structures is impacted by resource protection in two ways: building form and presence of vegetation.

The presence of vegetation reduces energy consumption. Resource protection is accomplished through development techniques such as clustering of buildings away from the resource. This type of development results in more common wall construction and reduced surface area reducing heat loss and energy consumption. In addition, clustering buildings requires the removal of less vegetation.

Dunthorpe’s trees provide shade on nearby homes and buildings in the summer, reducing energy demands for cooling. Plants also absorb sunlight and transpire during growing seasons, reducing ambient air temperatures. This moderating effect can reduce energy needs for cooling of nearby development. Trees and shrubbery can also act as a windbreak during winter. By slowing or diverting winter winds, heat loss in structures from infiltration and convection is reduced, resulting in lower energy needs.

Energy Consequences of Allowing Conflicting Uses

Table 57 the energy consequences of allowing residential, institutional, agricultural, broadcast facilities, and rail line and utility corridor development to occur within significant resource areas of Dunthorpe. This analysis is based on information presented above. The consequences on the resources are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 57. Energy Consequences of Allowing Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-requires additional land preparation and infrastructure development increasing energy consumption; -reduces or eliminates energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Institutional uses	-reduces transportation energy demand; -increase infrastructure development energy expenditure; -reduces or eliminates energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Agricultural uses	-limits energy expenditures required to transport agricultural products	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Broadcast facilities	-may require additional infrastructure development and land preparation; -may reduce or eliminate energy benefits related to heating and cooling	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative
Rail line and utility corridor uses	-Willamette Shore Trolley provides a means of alternate transportation that reduces energy consumption	-degrades habitat -removes vegetation; -disturbs soils and slopes; -degrades water quality	negative

Energy Consequences of Limiting Conflicting Uses

Table 58 illustrates the energy consequences of limiting conflicting uses within significant resource areas of Dunthorpe. The energy consequences on the resource are based on functional categories. The consequences on the conflicting uses are based on general land use categories.

Table 58. Energy Consequences of Limiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-may require additional land preparation and infrastructure development increasing energy consumption; -maintains vegetation heating and cooling benefits	-limits habitat fragmentation and loss -limits vegetation removal; -limits soil and slope disturbance; -reduces water quality degradation	positive
Institutional uses	-reduces transportation energy demand; -increases infrastructure development energy expenditure; -maintains energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	positive
Agricultural uses	-reduces energy expenditures required to transport agricultural products	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	positive
Broadcast facilities	-may require additional infrastructure development and land preparation; -reduces impact on energy benefits related to heating and cooling	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance; -reduces water quality degradation	positive

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Rail line and utility corridor uses	-supports operation of Willamette Shore Trolley that reduces energy consumption	-limits habitat fragmentation and loss -limits vegetation removal; -limits soils and slopes disturbance	positive

Energy Consequences of Prohibiting Conflicting Uses

Table 59 illustrates the energy consequences of prohibiting conflicting uses within significant resource areas of Dunthorpe. The energy consequences on the resource are discussed based on functional categories. The consequences on the conflicting uses are discussed based on general land use categories.

Table 59. Energy Consequences of Prohibiting Conflicting Uses

Conflicting Use	Impact on conflicting uses	Impact on significant resource	Impact Assessment
Residential uses	-reduces heating and cooling energy consumption; -reduces infrastructure development energy expenditure -may limit urban housing opportunities	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Institutional uses	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Agricultural uses	-supports heating and cooling benefits of vegetation -may increase energy expenditures required to transport agricultural products	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Broadcast facilities	-reduces infrastructure development energy expenditure; -supports energy benefits related to heating and cooling	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive
Rail line and utility corridor uses	-limits expansion/redevelopment of Willamette Shore Trolley line	-protects fish and wildlife habitat; -protects vegetation, soils, slopes, and water quality	positive

The retention of natural vegetation in Dunthorpe can reduce heating and cooling related energy needs both within the site and in the surrounding community. Conservation or protection of resources can also reduce infrastructure related energy use to the extent that future land uses can locate on portions of the site away from resource areas. Resource conservation or protection can enhance the attractiveness of walking and bicycle routes, decreasing automobile use, and

decreasing transportation related energy use. Resource protection can also reduce the distance local residents must travel to reach recreational opportunities, thus decreasing energy use.

The effect of resource protection on energy use related to both infrastructure and transportation depends primarily on whether a proposed use will be required to locate elsewhere due to resource protection. In Dunthorpe, development can readily be accommodated within the site and such relocation will not be necessary. Resource conservation or protection in Dunthorpe therefore would have positive energy consequences.

Energy Recommendation:

The energy analysis supports limiting or prohibiting conflicting uses at the Dunthorpe site. Conflicting uses on the site's disturbed floodplain areas (some designated C-quality resources) have no energy values; allowing conflicting uses may be appropriate. This recommendation is the result of the energy analysis only. Conflicts between this recommendation and the economic, social, and environmental recommendations will be resolved in the Conflict Resolution section.

CONFLICT RESOLUTION

The important natural resources and resource values within the planning area are documented in the Inventory report. Table 60 lists the resource site, the resources and location, and the recommendations for each of the four ESEE factors considered. “Prohibit” designates a decision to prohibit conflicting uses, “limit” indicates limit conflicting uses, and “allow” indicates allow conflicting uses fully. The final column lists the proposed decisions for resources within each site.

Table 60. Conflict Resolution Summary Table

Site	Resources/Location	Economic	Social	Environ.	Energy	Decision
Johnson Creek	A-quality resources on vacant parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	A-quality resources on developed parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	B-quality resources on vacant parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	B-quality resources on developed parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	C-quality resources on vacant parcels	Allow	Limit or Prohibit	Limit	Allow	Allow
	C-quality resources on developed parcels	Allow	Limit or Prohibit	Limit	Allow	Allow
Linnton	A-quality resources on vacant parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	A-quality resources on developed parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	B-quality resources on vacant parcels	Limit	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit
	B-quality resources on developed parcels	Limit	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit
	C-quality resources on vacant parcels	Allow	Limit or Prohibit	Limit	Allow	Limit (Allow outside floodplain and unvegetated upland)
	C-quality resources on developed parcels	Allow	Limit or Prohibit	Limit	Allow	Limit (Allow outside floodplain and unvegetated upland)

Site	Resources/Location	Economic	Social	Environ.	Energy	Decision
Sylvan	A-quality resources on vacant parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	A-quality resources on developed parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	B-quality resources on vacant parcels	Limit	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit
	B-quality resources on developed parcels	Limit	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit
	C-quality resources on vacant parcels	Limit	Limit or Prohibit	Limit	Limit or Prohibit	Limit
	C-quality resources on developed parcels	Limit	Limit or Prohibit	Limit	Limit or Prohibit	Limit
Dunthorpe	A-quality resources on vacant parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	A-quality resources on developed parcels	Prohibit	Limit or Prohibit	Prohibit	Limit or Prohibit	Prohibit
	B-quality resources on vacant parcels	Limit (Prohibit at Tryon tributary)	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit (Prohibit at Tryon tributary)
	B-quality resources on developed parcels	Limit (Prohibit at Tryon tributary)	Limit or Prohibit	Prohibit	Limit or Prohibit	Limit (Prohibit at Tryon tributary)
	C-quality resources on vacant parcels	Limit (Allow at disturbed floodplain)	Limit (Allow at disturbed floodplain)	Limit	Allow	Limit (Allow at disturbed floodplain)
	C-quality resources on developed parcels	Limit (Allow at disturbed floodplain)	Limit (Allow at disturbed floodplain)	Limit	Allow	Limit (Allow at disturbed floodplain)

ACTIONS

The primary Goal 5 implementing measure applied by the City of Portland is overlay zoning. The City applies environmental overlay zones to significant resources that are found to warrant limited or full protection. The environmental overlay zones protect identified resources and resource values from adverse impacts and provide a mechanism through which conflicts between resources and human uses can be resolved.

The City has two environmental overlay zones: environmental conservation (denoted “c” on zoning maps) and environmental protection (“p”). The environmental conservation zone is applied to resources where the decision is to limit conflicting uses. The environmental protection zone is applied to resources where the decision is to prohibit conflicting uses. No environmental overlay is proposed where the decision is to allow conflicting uses.

The environmental protection zone is applied to significant resource areas that are in need of full protection according to the inventory and analysis findings. Generally, the protection zone is applied to high quality wetlands, creeks and ravines, high quality habitat areas for sensitive wildlife, and other resources which provide highly significant values based on the decision factors described in the Inventory. The protection zone insures that connected natural systems such as stream corridors and associated wetland and floodplain areas are fully protected. The application of this zone also protects neighborhoods from hazards such as landslides and flooding, and retains the natural character, and key unique features, of each of the four resource sites.

The City’s Skyline Plan District contains regulations within the Balch Creek Subdistrict and the Northwest Hills Subdistrict that allow for the transfer of density off-site to designated receiving areas. The Skyline Plan District—with the Balch Creek subdistrict—will be extended to Skyline Blvd. in the Sylvan Resource Site #111, so that properties within the Balch Creek Watershed that are placed entirely within a protection zone will have the transfer of development rights option.

The environmental conservation zone is applied to areas that, while not as highly rated as protection zone areas, provide significant values that warrant protection. These areas are generally able to support certain levels of development provided impacts are controlled. The conservation zone balances resource-use conflicts in these areas.

Table 61. Area of Environmental Overlay Zones

Resource Site	Area of Environmental Conservation Overlay Zone	Area of Environmental Protection Overlay Zone
Site 28: Johnson Creek	2.83 Acres	6.95 Acres
Site 105-A: Linnton	1.90 Acres	18.50 Acres
Site 111-A: Sylvan	204.67 Acres	117.60 Acres
Site 117-A Dunthorpe	75.88 Acres	32.33 Acres

The adopted environmental overlay zones for the four resource sites are shown in Appendix B and on the Official City Zoning Maps.