CITY OF NEWBERG

STREAM CORRIDORS
as a
GOAL 5 RESOURCE

Prepared for:

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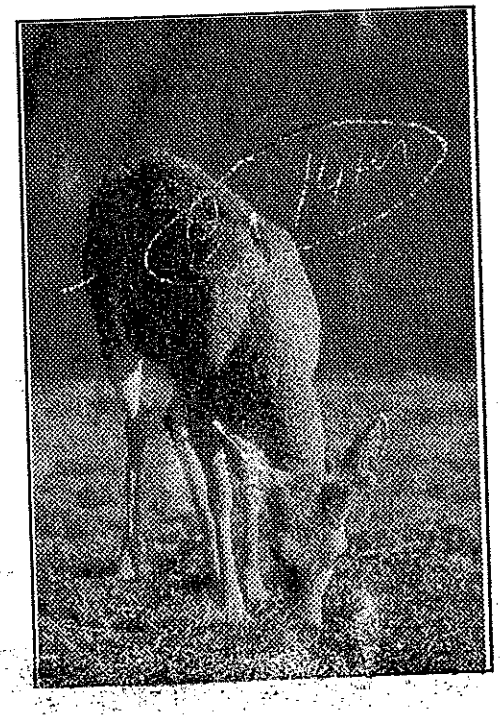

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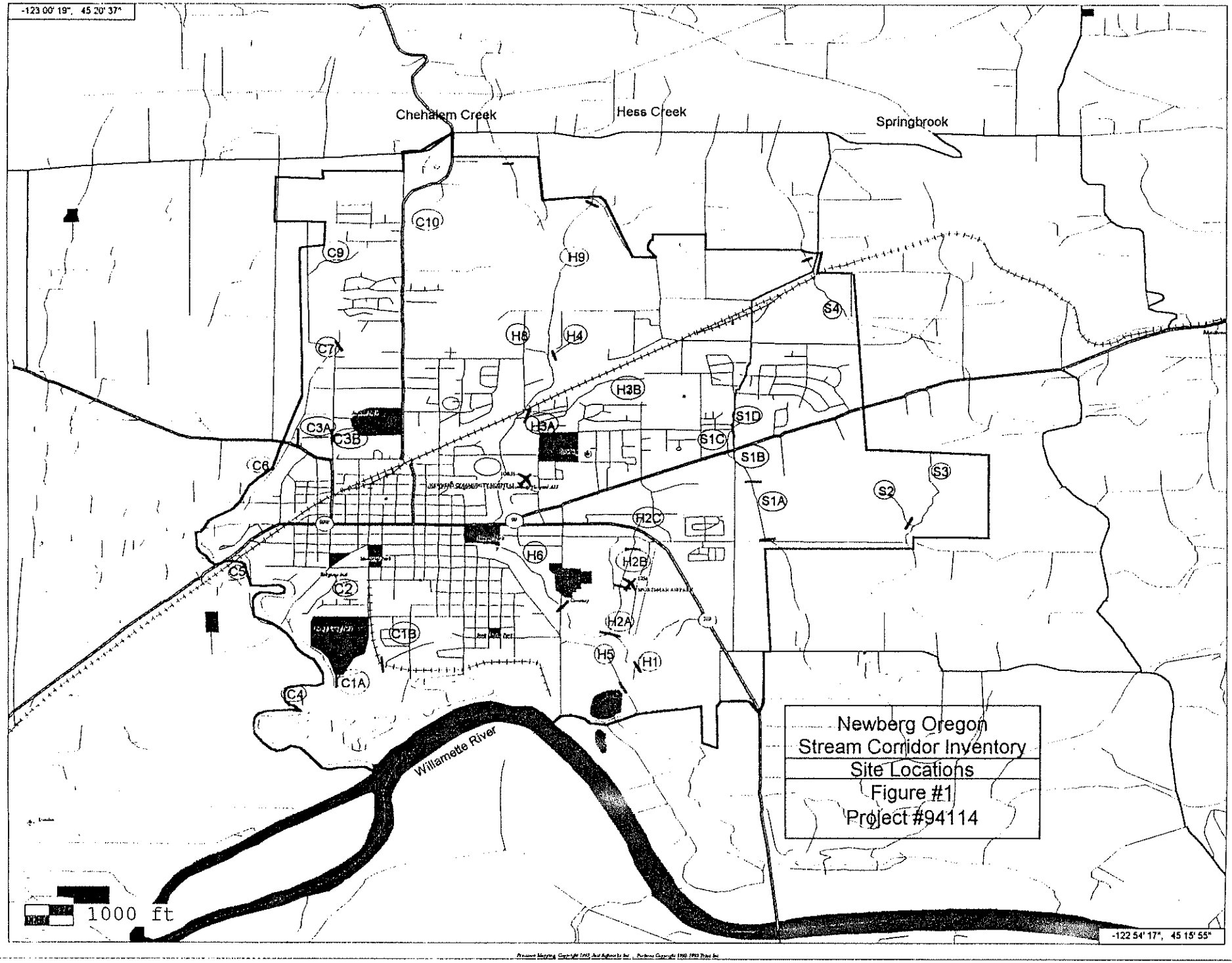
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Chehalem Creek
Hess Creek
Springbrook
C10
C9
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S1A
H2C
H6
H2B
C5
C2
H2A
C1B
H5
H1
C1A
C4
Willamette River
Newberg Oregon
Stream Corridor Inventory
Site Locations
Figure #1
Project #94114
1000 ft
-122 54' 17", 45 15' 55"

TABLE OF CONTENTS

I. INTRODUCTION

In 1993, the Newberg Planning Commission established a committee to begin studying the problems with the General Hazard (GH) zone and Open Space (OS) Comprehensive Plan Designation. The committee was made up of Planning Commission members and interested citizens.

The committee has completed significant efforts in an attempt to develop new protection standards. In 1994, the City was awarded a Department of Land Conservation and Development (DLCD) grant for the purpose of updating Newberg's natural resource inventory and to develop a draft protection plan for riparian areas within Newberg's Urban Growth Boundary and potential Urban Reserve Areas. The City has accepted the state grant and has selected the firm of CDA together with Fishman Environmental Services to inventory the stream corridors and develop protection standards. The City's staff project manager is John Knight. Mr. Knight is the Planning Division Manager within the Newberg Community Development Department.

II. GOAL 5

Goal 5 of the statewide planning goals is entitled "OPENSPACES, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES". The goal is "to conserve open space and protect natural and scenic resources". In order to accomplish this task, the goal identifies measures that each local government must accomplish. Local governments are monitored for compliance with the goals through the acknowledgement processes of the Land Conservation and Development Commission and the Department of Land Conservation and Development.

Goal 5 requires that:

> Programs shall be provided that will (1) insure open space, (2) protect scenic and historic areas and natural resources for future generations, and (3) promote healthy and visually attractive environments in harmony with the natural landscape character. The location of the following resources shall be inventoried:
>
> a. Land needed or desirable for open space; ...
> d. Fish and wildlife habitats;
> e. Ecologically and scientifically significant natural areas, including desert areas;
> f. Outstanding scenic views and sites;
> g. Water areas, wetlands, watersheds and groundwater resources; ...
> l. Potential and approved federal wild and scenic waterways and state scenic waterways.

The statewide goals are administered through the Oregon Administrative Rules (OAR's). The OAR's for Goal 5 begins at citation OAR 660-16-000. The OAR's identify that the inventory process begins with the collection of available data. An inventory must also include a determination of the location, quality, and quantity of resource sites. The OAR's further require that local governments identify

and evaluate conflicts with inventoried resource sites. Conflicts are identified primarily by examining uses allowed in the zoning districts affecting the resource sites. An analysis is conducted where conflicts are identified as having a possible impact on the resource. The analysis evaluates the conflicting economic, social, environmental and energy (ESEE) consequences. Based upon this analysis, the local government may then decide to:

(1) Protect the Resource Site.

(2) Allow Conflicting Uses Fully.

(3) Limit Conflicting Uses.

The next section discusses the consequences and conflicts which impact stream corridor resource areas through the implementation of existing zoning districts. Site specific assessments have also been conducted to evaluate the location, quality and quantity of resource sites. The evaluation of issues derived from this information and from public input have been used to draft stream corridor delineation boundaries and regulations to further implement the statewide planning goal.

III. SCOPE OF PROJECT

The project scope proposed to develop data using ortho overlay map sets. The City of Newberg furnished two complete ortho overlay sets, prepared from the City's existing map files. These ortho aerial flights were originally flown and mapped in 1984. These maps represented the most current data available at a level of detail showing elevation intervals at 2 feet and an overall scale of 1" = 100'. In order to visually update possible discrepancies, the consultant purchased nine 30" x 30" black and white aerial flight panels at a scale of 1" = 200 '. The aerial photographs were flown in 1994 by WAC Corporation.

The consultant subcontracted the environmental stream assessment to *Fishman Environmental Services (FES)*. FES conducted an inventory of the Newberg area stream corridors and prepared a draft data map delineating the stream corridors based upon assessment criteria and methodology established by the Open Space Committee. Definitions for primary protection areas, secondary protection areas, and contributing areas were agreed upon by the committee before field work began. The detail of this information is found in Appendix A. Field inventory work was separated into resource units defined by reaches of Chehalem, Hess, and Springbrook Creeks and the Willamette River. Data was collected for each resource unit using data sheets. A site summary was also developed for each resource unit.

The Consultant, with the assistance of the City acquired copies of ordinances from other jurisdictions relating to the preservation of open space or stream corridors. The Consultant categorized the different methods used by other jurisdictions to regulate and/or preserve open space areas. The initial evaluation of the various techniques used by other jurisdictions were evaluated based on:

a. The ability of the staff and general public to understand and consistently interpret the regulation.

b. The ease of implementation. This may include a general analysis of the time and expertise necessary to implement the regulation.

c. The overall effectiveness of the regulation to perform its intended function.

d. Known or perceived legal issues.

e. Known factors relating to the cost in which to implement the regulation.

The City's comprehensive plan policies were reviewed and recommendations for amendments are included in this report.

IV. CITIZEN INFORMATION AND PARTICIPATION

The City developed a current list of property owners located within 250 feet of the stream corridors. A notice mailer was sent to the property owners on the mailing list. The notice provided information about the project and identified the need to access the stream corridor areas for the purpose of obtaining field observations. The notice also requested citizen input and involvement.

A second citizen information mailer and notice of a community townhall meeting was sent to those on the property owner list. The townhall meeting was used to:

- Explain the draft land use regulations proposed for protection of resource lands;
- Present the draft stream corridor delineation maps;
- Conduct a question and answer session; and,
- Seek additional citizen involvement.

A public hearing process is proposed to initiate and review proposed open space regulations through a legislative public hearing process. Citizens will be encouraged to attend and participate in the review and adoption process.

Public meetings were held bi-monthly with the Open Space Committee. The City and the Consultant also coordinated efforts with representatives of the Department of Land Conservation and Development (DLCD).

V. CONFLICTING USES

The City of Newberg's Comprehensive Plan was acknowledged in 1981. During the acknowledgment process, the stream corridors were identified as a state Goal 5 resource. The City designed several standards to provide protection of the stream corridors. These regulatory tools included:

1. Comprehensive plan policies.

2. A comprehensive plan map designation called the Open Space (OS) map designation.

3. Two zoning map designations called the General Hazard (GH) and the Flood Hazard (FH) overlay zones.

4. A regulatory standard that prohibits development closer to the stream then the "20% break in slope".

Over the years it has become evident that the protection standards are sometimes un-workable and ineffective. The primary protection standard reads as follows:

> "Section 10-3.566 (1) Requirements for Permit Issuance.
> 1. In order to ensure that adequate and appropriate lands are left in permanent open space, development of a structure must be located at a higher elevation than a line identified as the 20% break in slope, with the exception of a daylight basement or public recreation structure. The 20% break in slope line is determined by identifying that point at which the slope into the drainage ways equals 20% at its highest elevation within the General Hazard boundaries."

There are two primary problems with the implementation of this standard.

The first is that the General Hazard (GH) zoning boundaries and Open Space (OS) Comprehensive Plan designations do not always coincide with the location of steam corridors. In numerous locations the GH zone is off-set or located away from the mapped location of the stream. There is a question whether this regulatory standard can be enforced on lands that are not specifically identified within the GH zone overlay. It is therefore unclear whether the standard provides any protection in these locations (Refer to Figure 1).

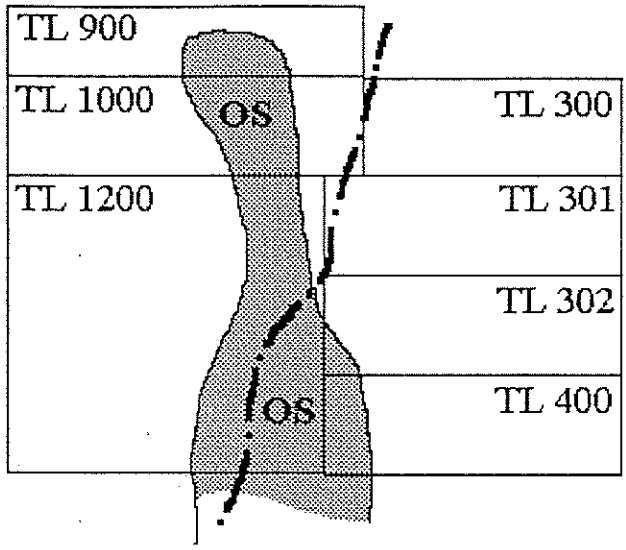
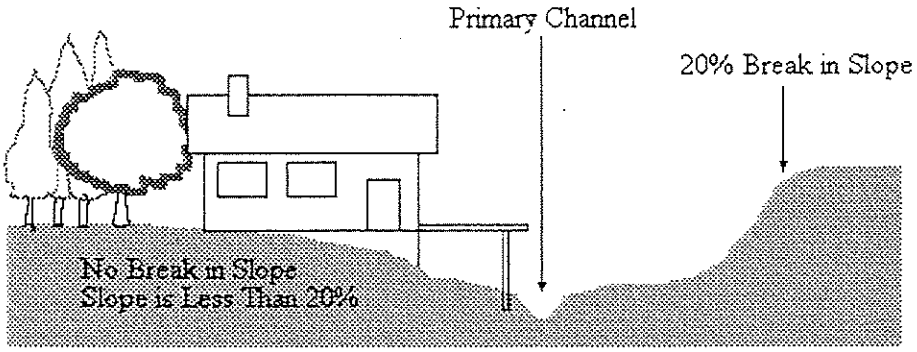


Figure 1

In the Figure above, the mapped location of the stream differs from the location of the OS (Open Space) comprehensive plan designation. The same problem is noted on both the Comprehensive Plan Map and the Newberg Zoning Map.

Secondly, many of the upland areas adjoining the stream corridors have a gradual slope. A "20% break in slope" can not be mapped in locations having slopes less than 20%, and therefore, no stream corridor protection boundary would be delineated in these locations. For example, if all slopes adjoining the stream are between 0 to 19% grade, it may be possible to build a structure right up to the jurisdictional wetland boundary. In many cases this would allow a structure only feet away from the actual stream flow (Refer to Figure 2).



VI. ECONOMIC CONSEQUENCES

Development Costs and Impacts

There are several economic consequences which can been identified where the delineation of specific stream corridor resource boundaries may impact existing permitted uses. These include:

1. The economic costs associated with not being able to obtain the maximum density from a site with protected resource areas.

2. The costs associated with altering future development plans for planned improvements to existing structures.

3. The costs associated with further planning and engineering regulation in order to minimize development impacts on resource areas.

4. The economic consequences of further limiting permitted land uses in or adjoining delineated stream corridors.

As noted in previous sections above, the City currently allows the construction of buildings and structures up to the edge of a wetland, provided the slope adjoining the stream is less than 20%. If steam corridors are delineated using a standard other than the slope requirement, there is an assumption that some properties will have a lesser development potential then currently exists. In order to identify the extent of this consequence the Consultant conducted site and topographic mapping observations. Although much of the stream corridors within the Newberg Urban Growth Boundary is bounded by steeper canyons, there were numerous areas abutting the stream corridors where the slopes are less than 20%. These areas were compared to the values identified through resource site assessments and field observations. The data collected through these methods was presented to the Open Space Committee and public meetings to determine ways in which to resolve conflicts with specific sites.

The committee evaluated several types of regulatory standards which could be used to resolve issues arising from the identification of conflicting uses. This evaluation included the following options:

PUD (Planned Unit Development)

Density transfer single family residential.

Density transfer other.

Reduced standards for setback and lot area.

Overlay zone (primary uses of parent zone apply).

New zone (new uses, new density standards).

Greenway and transition zone setback.

The Committee recommended a combination of several standards to resolve the economic consequences. In order to begin addressing ways to resolve the economic conflicts mentioned above and other issues identified as part of the ESEE analysis, a draft ordinance was developed to serve as a beginning point to evaluate the issues.

The first standard was to establish a minimum stream corridor protection distance of 50 feet to the normal high water line. In areas where slopes were less than 20%, this standard could be used. Secondly, the site assessment data sheets were used to evaluate the quality of the steam corridor as a Goal 5 resource based upon the following criteria topics:

- Slope
- Wildlife Habitat
- Riparian Water Quality Protection
- Flood Plain Water Quality Protection
- Natural Condition
- Ecological Integrity

The third conflict resolution was to provide a density bonus for single family residential areas that include stream corridor delineation boundaries. The density bonus was designed to limit the economic impacts on subdivisions by transferring density from the resource areas to developable areas.

The fourth area evaluated for resolution was the regulation of permitted uses. There are numerous areas within the draft regulations where the permit process has been refined to streamline the review of the permit. Examples of the refinements used to mitigate identified conflicts occur later in this report.

Response:

1. *The economic costs associated with not being able to obtain the maximum density from a site with protected resource areas.*

The City's comprehensive plan provides an opportunity to increase densities by transferring development densities to adjoining lands to a maximum of 10% (Open Space, Scenic, Natural Historic and Recreational Resources, Policy (1.)(d.)). The draft language within the ordinance was first written to provide a 10% density bonus to properties impacted by a stream corridor delineation boundary. Through numerous discussions with the Committee, it was determined that additional incentives would be necessary to resolve this conflict. The draft ordinance has since been modified to provide a 20% density bonus for impacted properties. In order to accomplish incorporating this standard into the City's development codes, it would be necessary to amend the Comprehensive Plan

policy which currently limits a density bonus to 10%. The 20% standard was chosen as a compromise between economic impact on development versus the need to resolve this conflict while maintaining the character of the densities contemplated by plan designations.

Response:

2. *The costs associated with altering future development plans for planned improvements to existing structures.*

Through discussions that have occurred at committee meetings, the community open house meeting, letters and other contacts, it was identified that the economic conflicts of imposing a stream corridor boundary could have impacts on proposed future development plans that would otherwise be permitted under current development codes.

There were two significant areas where these conflicts occurred.

a. First, the most common conflict was the expectation that existing homes should be allowed to expand the structures even if the structures are completely within the stream corridor resource boundary.

b. Secondly, examples were presented by George Fox College, identifying that the imposition of a boundary would add significant costs to the anticipated expenses for constructing an addition to their athletic building. The campus of George Fox College is located of both sides of Hess Creek and it's opportunities for expansion are constrained in that the campus is bounded by developed neighborhoods and commercial areas.

The draft ordinance and maps have been revised to address issues (a.) and (b.) above. The proposed ordinance now permits (through a Type-I administrative procedure) the expansion of single family residential structures and private recreational improvements. The expansion is limited to 1000 square feet of coverage in addition to the coverage in existence at the effective date of the ordinance. Expansions of single family structures beyond 1000 square feet or expansions that are proposed to be located closer to the stream can be reviewed through a public hearing process. Commercial, industrial and institutional uses can also be reviewed through the Type III public hearing process. The Type III process has been designed to approve very limited and unique circumstances.

It should be noted that further re-drafting may be appropriate to resolve these conflicts. Further resolution is recommended to address this element of the ESEE analysis as the review process for the draft ordinance proceeds. Several alternatives are available to resolve this issue. They include , but are not limited to:

- Continue to protect the resource to the maximum extent possible.
- List certain commercial, industrial and institutional expansions of existing structures

as a permitted use.

- Adjust the delineated stream corridor boundary such that it does not impact the proposed conflicting use.

Response:

3. *The costs associated with further planning and engineering regulation in order that development impacts are minimized.*

This conflict has had a great deal of discussion. The committee which is made up of both development and environmental interests concluded that administrative paperwork and its associated costs may be better spent enhancing the corridor areas rather than conducting additional study. They also concluded that, at least on larger projects or projects where the Planning Commission requires additional information, a reasonable need for the development of a Stream Corridor Impact Report is appropriate.

The committee has attempted to resolve this conflict by deleting the requirement for a Stream Corridor Impact Report on applications that are processed as an administrative Type I or Type II decision. The language for Type III public hearings has been modified to allow a "wetland enhancement" to be completed in lieu of preparing a Stream Corridor Impact Report. The draft ordinance still allows for the planning commission to require the applicant to prepare a Stream Corridor Impact Report if they deem that additional information is necessary.

Response:

4. *The economic consequences of further limiting permitted land uses in or adjoining delineated stream corridors.*

Testimony was received that the types of land uses permitted within the delineated stream corridor are more limiting than existing codes. More specifically, it has been pointed out that a land use such as a private golf course is not permitted within the draft ordinance. It was explained that golf courses typically use water features in their layout and design. Industrial buildings and institutional buildings were also brought up as uses that should be permitted within the delineated stream corridor. This issue had not been resolved as of the writing of this report. At least two alternatives exist for resolving this matter. They include:

- Add additional land uses, such as golf courses to the uses permitted in a delineated stream corridor.

- Determine that the land uses listed within the draft ordinance provide for the greatest protection of the resource, and that no additional uses be listed.

Property Values

No determination could be made that market values of properties abutting the proposed Stream Corridor Delineation Boundary would be impacted.

With the density transfer option allowing for up to a 20% increase in density, some properties may be able to build at higher densities than was physically possible previously. Conversely, some properties may be further limited in the number and type of permitted uses allowed in the stream corridors. No data was received that would conclude that property values would be impacted by further protecting the stream corridor resource.

Tourism

Tourism is a leading economic industry in Oregon. With the exception of the Willamette River and the Willamette River Greenway, the stream corridors within the Newberg Urban Growth Boundary are not considered to be a tourist destination. The Willamette River is a major tourism destination. Rogers landing boat docks and public park provide public access and boating access for fishing, skiing and recreational opportunities.

The stream corridors other than the Willamette River serve as a significant contribution to the network of open space lands in Newberg. Some areas of the corridors have been placed into public park lands and are used for enjoyment by the general public. Other areas provide unique urban character, a sense of livability, and wildlife habitats, that provide a diverse and attractive setting for visitors. When coupled together with other established tourism attractions such as the Chehalem Valley wineries, open space becomes important to the overall tourism economy.

Several comments were raised through the publis involvement process is the suspicion that the protection of stream corridors will lead to governmental condemnation of private properties for parks and public pedestrian/bicycle paths. There are no mechanisms within the draft documents that support this view. The draft ordinance has been amended to include language that specifically addresses this issue. It reads:

> Section 10.90.010
> The designation of lands within this sub-district is used to provide reasonable regulation of development in or adjacent to stream corridors. This sub-district does not provide for or authorize public access to private properties designated with in this subdistrict. Additionally, the provisions of this sub-district does not provide measures for public acquisition of private property.

Infrastructure and Flood Control

Limiting development within the stream corridors will lessen impacts associated with erosion, stream turbidity, water level and manmade obstructions. Flood control measures are costly and these costs will be increased in situations where flooding has been worsened, or where engineering alternatives

exist to protect structures within the corridors.

Summary

The economic consequences are both positive and negative. In most situations, the draft ordinance and map can be modified to resolve the conflicts that have been identified. Further resolution is necessary of lands located between Hwy 99W and Fulton Streets relating to the expansion of the George Fox College Athletic Building, and the type of land uses permitted in the delineated stream corridors.

VII. SOCIAL CONSEQUENCES

Recreational and Educational Opportunities

The stream corridors within the Newberg Urban Growth Boundary provide significant opportunity for recreation and educational opportunities. George Fox College, the Newberg School District and Chehalem Valley Park and Recreation District use portions of these corridors for recreational and educational purposes. These opportunities have increased due to the efforts of these groups. If all further protection of the streams were eliminated, certain public and quasi-public lands would still be retained in open space. However, disappearance of the nature, character and resource value of privately owned Goal 5 resource lands would significantly reduce the recreational and educational opportunities within Newberg. Impacting any portion of the stream corridor may result in impacts (water quality, turbidity, habitat and scenic values) both up and down stream.

Urban Design and Community Identity

Preservation of the stream corridors within the Newberg Urban Growth Boundary will maintain one of the community's most significant natural topographical and scenic resources. These stream corridors have historically traversed the urban framework with natural riparian open space. This resource has significant value in creating a sense of place and a sence of livability. The mature wooded landscape provides shade, comfortable living environments and provides balance to the built urban city. Typical development practices clear and re-shape the natural setting to make way for new development. In doing so, much of the original character of the area is lost forever. The preservation of these areas will maintain a threshold level of natural character within the community and will protect some of the area's unique qualities.

Visual Differences

Development of many areas, including Newberg, is typically done by developing grid streets, uniform patterns of buildings, and commercial strips that cannot be distinguished from one city to another. Oregon is expected to see significant growth over the next 15 years. Growth is also expected to remain high in Newberg over this period of time. The preservation of the natural stream corridors will provide visual variety which will shape the visual appearance of the community to be different

from other communities. Encouraging development to take advantage of the natural topographic character of the City will create unique urban designs and discourage typical "cookie-cutter" appearances and development practices.

Buffering and Screening

The location of the stream corridors within the City provides natural buffers and screening between land uses. There are many locations where these corridors serve as important visual separations. Examples where important land uses are visually separated by the corridor include: residential neighborhood and a cemetery; residential neighborhoods and industry; and residential property and the airport. The location of these corridors visually break the appearance of size of the community by buffering and screening the urban development on the other side. This feature will continue to contribute to the community's small town immage.

Health, Safety and Welfare

Protecting the corridors will aid in the protection of the general public from flooding and natural disasters. Continued degradation of the corridors will effect the water quality of the stream which could bring health risks from higher concentrations of contamination.

In contrast with protecting the corridors, testimony was received that the corridors attract nuisances, vandalism, trespass and crime. No data was received to evaluate the validity of this issue. The draft ordinance was amended to identify that the protection standards "does not provide for or authorize public access to private properties designated with this subdistrict". Adopting the inventory and draft ordinance will not increase public ownership of properties abutting stream corridors, and therefore, the proposed stream corridor protection measures should not contribute to problems such as nuisances, vandalism, trespass and crime.

Summary

Protection of the stream corridors will generally result in positive benefits. Preserving these areas in their natural state will provide continued opportunity for recreation and education. These corridor areas provide visual variety, unique urban character and screen the harsh boundaries of incompatible land uses. Since the level of protection proposed in this analysis does not include the public acquisition of the stream corridors, the possibilities of crime and vandalism will not be worsened by the adoption of preservation measures.

VIII. ENVIRONMENTAL CONSEQUENCES

Water Quality and Quantity

Water quality and quantity is affected from development disturbances in stream corridor areas. Left in their natural state, stream corridors and the riparian vegetation:

Reduce the speed of water flow into the stream.

Allow for water to be absorbed in the soil structures and ground water reservoir.

Reduces surface run-off.

Reduces the erosive effects of surface water movement.

Provides for greater bank stabilization.

Traps sediments.

Filters water by allowing sediment, oils, herbicides and other chemicals to be absorbed.

Reduces flooding and water surges.

Maintains natural water temperatures.

Development disturbances of stream corridors will adversely impact water quality of the adjoining streams and increase water flow. An increase in water quantity usually corresponds to a decrease in water quality and turbidity. Development impacts decrease the water available in natural underground reservoirs and increase storm water run-off. Stream flows will be subject to greater water surges and higher winter flow. In summer months the underground water reservoirs can become depleted earlier because of the limited re-charge occurring in the winter. Summer water levels of creek areas will become lower on streams where the underground water reservoir becomes depleted. Water quality in the winter months is worsened by the effects of increased storm water run-off. Likewise, water quality in the summer months can be worsened by lowering the natural stream flows, thereby increasing the percentage of contaminants.

Fish and Wildlife Habitat

It is becoming increasingly more clear that wetland areas provide important ecosystems within the urban framework and support a network of habitat areas that are needed to maintain larger numbers of habitat species. According to a 1985 study, 236 animal species are reported to use coastal, riparian, or wetland areas in western Oregon and Washington as there primary breeding or feeding habitats (Brown, E.R., (ed). 1985. Riparian Zones and Freshwater Wetlands. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington, Part 1-Chapter Narratives. pp. 57-80).

Since fish and wildlife habitats are sensitive in nature, any human related intrusion into these areas can have devastating effects on the nesting, breeding or feeding of these species. The alteration of the natural buffer vegetation is of significant concern as dense natural vegetation discourages human disturbances. Vegetation also provides cover for wildlife movement out of view from adjoining land. Other conflicting disturbances include the intensity of land use and the corresponding increase in

noise, light, density, pollution, storm water run-off, siltation, dogs, dumping of debris, and trampling.

Newberg has four primary wetland corridors. They include the Willamette River, Chehalem Creek, Hess Creek and Springbrook Creek. Water volumes vary in each of the four river and stream corridors. Other than the Columbia, the Willamette River is the largest of the rivers in the western regions of Oregon. Chehalem Creek is the largest of the streams located within the Newberg Urban Growth Boundary, followed by Hess Creek and then the upper reaches of Springbrook Creek. Of the three stream (creek) corridors, all have perennial water courses. Intermittent tributaries contribute to the wetland corridors of each of the three streams.

The City has completed an inventory of fish and wildlife species (City of Newberg, Inventory of Natural and Cultural Resources, 1981). The inventory has been made part of the background documents that were used to develop the City's comprehensive plan. Over 29 species of mammals; 54 species of birds; 23 species of amphibians and reptiles; and, 15 species of fish are identified as "COMMONLY SEEN SPECIES" or "OCCASIONALLY SEEN" species within the Newberg Planning Area. The inventory identifies that Hess Creek, Chehalem Creek and the floodplain of the Willamette River are "currently the major habitats of fish and wildlife in Newberg".

Water is the most important ingredient in maintaining fish and wildlife habitat. Water exists in many forms including streams, ponds, wetlands and groundwater. Impacts which negatively affects the quality and quantity of water will likewise affect the ability to sustain fish and wildlife habitats.

The removal of vegetation within stream corridors reduces habitat nesting and shelter sites and increases disturbances to water quality and quantity. The natural life cycle of indigenous plants and trees assists in stabilizing habitat values by providing food, cover, nesting, insulation and shade. The food chain of the stream corridor habitat begins with natural vegetation such as algae, which is eaten by macro-invertebrates, which is eaten by fish, which in turn is eaten by birds such as hawks and herons. Similarly, decomposing vegetation, grasses and other vegetation serve as food for beetles, other insects and small mammals. In turn, these provide food for birds, coyotes and other species.

Human disturbances, including flood lighting, noise, dogs, and fences impact migration routes and nesting and feeding opportunities causing degradation of the overall habitat values.

Summary

Serious environmental consequences exist if the resource values of stream corridors in the Newberg Urban Growth Boundary are degraded. These include negative impacts to water quality, increases in stream flow in winter months, storm water surges, and degradation of fish and wildlife habitats. Stream corridor protection measures would limit conflicting uses.

IX. ENERGY CONSEQUENCES

Transportation and Infrastructure

Transportation and infrastructure provide the necessary linkages for access, sewer, potable water, cable, phone, electricity, natural gas and others. To require that these utilities be prohibited in stream corridor areas would create significant difficulties in urban design, significantly increase public costs and increase travel times. Stream corridors in Newberg presently provide routes for gravity flow waste water systems. Other services including roads and utilities, traverse the stream corridors in order to provide orderly development of buildable lands. The committee has identified that the conflicts arising from prohibiting utilities in these areas outweighs the disturbances caused by permitting these impacts. These services are listed as a permitted use within the resource areas of stream corridors. In order to lessen impacts caused by the development of new transportation and infrastructure systems within the stream corridor areas, regulation has been developed which proposes to require these improvements to be processed through the City's Conditional Use Permit, public hearing process. In doing so, the City will be able to ensure that disturbances are minimized.

Summary

Transportation and infrastructure improvements should be permitted in locations which implement the City's comprehensive plan and in locations which minimize the disturbance to stream corridor resource areas. The conflicts that would arrive from prohibiting these utilities would increase public costs, travel time, and create inefficient development patterns.

CITY OF NEWBERG

STREAM CORRIDOR INVENTORY & ASSESSMENT

Fishman Environmental Services
FES #94114

City of Newberg Stream Corridor Inventory and Assessment

INTRODUCTION

The City of Newberg received a Department of Land Conservation and Development (DLCD) grant for the purpose of conducting a stream corridor inventory and assessment and developing a draft protection plan to protect stream corridor resources. Christie Galen, Fishman Environmental Services, conducted the stream corridor inventory portion of this project. Clay Moorhead, Project Management Consulting Services, developed protection standards.

STUDY AREA

The study area for this project is the City of Newberg's Urban Growth Boundary (UGB). The UGB is nestled between the southern flanks of the Chehalem Mountains and the Willamette River. Three streams flow from the base of the mountains to the Willamette: Chehalem Creek on the western boundary, Hess Creek in the center, and Springbrook Creek near the eastern boundary. These stream corridors contain most of the remaining natural areas within the UGB. Other open space is dominated by agricultural uses such as filbert orchards, ryegrass fields, and pastures. Consequently stream corridors in the study area provide important wildlife habitat, water quality protection, and aesthetic values.

METHODOLOGY

The field inventory was conducted between January and March 1995. Stream reaches and resource boundaries were identified based on changes in vegetation and land uses, and major barriers such as railroad lines or transportation corridors. Each resource site was labeled with an alphabetical-number. The letter refers to the stream (C=Chehalem, H=Hess, S=Springbrook) and the number refers to a reach or tributary. For example C-2 is a tributary of Chehalem Creek; H-5 is a reach of Hess Creek. Each site was surveyed from at least one observation point; however, data was often collected from multiple points or the entire reach was walked.

Standardized Stream Reach Assessments

Standardized data sheets were completed in the field for each site and compiled as final Stream Reach Assessments. Stream Reach Assessments include site location and mapping information, general site descriptions, dominant vegetation, environmental values ratings, contributing features, impacts, and dominant adjacent land use (Appendix A). Site locations are mapped in Figure 1.

Some headings and abbreviations used on the assessment sheets require further descriptions or definitions:

FP Width is an abbreviation for floodplain width. The floodplain width is approximate and measured from orthophotoquads. For Hess Creek, it is based on the one hundred year floodplain mapped on Flood Insurance Rate Maps (FEMA, 1982). For Springbrook and Chehalem Creeks it is based on the distance between the two lower breaks in slope on either side of the streams or estimated in the field.

RFZ is an abbreviation for riparian function zone. The riparian function zone includes the stream or river and its adjacent lands that perform the following functions: 1) provide organic material that can be used as food or cover for aquatic organisms; 2) provide shade to reduce aquatic temperature fluctuations; 3) reduce bank erosion; 4) provide food and cover for terrestrial organisms; 5) provide water quality protection through physical, chemical and biological interaction with contaminants originating in adjacent areas above the top of hillslope (Meehan 1991; McDonald et al 1991). The width of the riparian function zone is approximate and measured from orthophotoquads.

MAP NO. refers to the orthophotoquad map number where the site is located (Smith, 3/30/84; scale 1 inch = 100 feet).

AERIAL refers to the aerial photographs (WAC 3/27/94; scale 1 inch = 200 feet) where the site is located. The study area includes six aerial photographs: NW, Middle-west, SW, Center-N, Center, Center-S, NE, Middle-east, and SE.

ADJACENT LAND USE refers to the dominant land use surrounding the RFZ.

CONTRIBUTING FEATURES: includes forest habitat adjacent or close to stream corridors that contributes to wildlife habitat, recreation, or aesthetic values of stream corridor; educational opportunities; recreational trails; uniqueness.

IMPACTS: livestock, domestic animals, agricultural practices, noxious weeds, noise, unnatural odors, garbage, yard debris...

Descriptions of Environmental Values and Rating Criteria

The assessment also included a rating of environmental values. Due to budget constraints, environmental values were selected that could be assessed from aerial photographic interpretation with a limited amount of field observations. These attributes included erosion potential, wildlife habitat, riparian water quality protection, floodplain water quality protection, natural condition, and ecological integrity. Each attribute was rated Low, Medium, or High, according to rating criteria developed for each attribute. A table listing site values is located in Appendix A. A description of

each value and an explanation of assessment criteria follow:

Erosion Potential (EP) - Several soil types in the Newberg area have the potential for severe erosion problems. The steeper the slope the greater the potential for erosion and degradation of downstream waters.

High -	Slopes are greater than 20%.
Medium -	Slopes are between 8%-20%.
Low -	Slopes are less than 8%.

Wildlife Habitat (WH) - evaluates habitat diversity. Areas with permanent or seasonal water, diverse vegetation and structure, and interspersion of vegetation communities rate high compared to areas without water, low structural diversity, and/or single type plant communities. Wildlife habitat value also increases with the size of the site and linkage to other open space habitat.

High -	Water; diverse cover types and food resources, connectivity to other wildlife habitat; size of riparian area is wide enough to offer escape, nesting and foraging cover.
Medium -	Some disturbance to plant community, some disruption of travel corridors, somewhat less diversity in plant cover and structure.
Low -	Limited water (runoff); limited plant diversity, riparian area greatly altered from natural conditions, disjunct travel corridors to other habitat areas. (ie. agricultural field, lawn)

Riparian Water Quality Protection (R-WQ) - evaluates the potential of the RFZ to protect water quality. Riparian zones adjacent to streams that are greater than 50 ft. wide, well- vegetated, and with a well-established duff layer, maximize water quality protection from surface water runoff; well-vegetated slopes also minimize erosion. Agricultural fields that have been plowed to within a few feet of the stream, or lawns that have been developed to the top of bank reduce the water quality protection potential of the riparian zone. Where groundcover has been trampled and soils compacted by livestock or bike trails, the absence of leaf litter, moss, and organic debris will allow erosion to move soil downslope to the stream (Booth, 1991; Woodward, 1991).

High -	Riparian vegetation is intact, multilayered, and organic duff on ground is thick.
Medium -	Riparian vegetation is disturbed but present, more open and less dense or wide; organic duff is thin or patchy; English ivy, Himalayan blackberry with native canopy species.
Low -	Riparian vegetation is limited or mowed; organic duff on ground is absent.

Floodplain Water Quality (FP-W) - evaluates the potential of the resource area to reduce the impacts

that excess nutrients and sediments in runoff water will have on downstream waters. In wetlands maximum nutrient and sediment uptake occurs when the flood plain consists of more than 70% wetland vegetation and a size greater than 5 acres (Roth et al, 1993).

High -	Broad Floodplain; wetland vegetation well structured and dense enough to absorb nutrients and collect sediments. (> 25 ft wide)
Medium -	Narrow Flood Plain (5-25 ft wide)
Low -	Limited Flood Plain (< 5 ft wide)

Natural Condition (NC) - evaluates the conditions of surrounding land use and its impact on the stream corridor. Stream corridors surrounded by open space provide better wildlife habitat, aesthetics, and often greater water quality protection than stream corridors surrounded by dense development with its associated noise, unnatural odors, runoff and other pollutants that drain into the stream.

High -	Natural Conditions; open space adjacent to resource.
Medium -	Shares characteristics of both high and low ratings.
Low -	Numerous houses adjacent to resource, excessive garbage, and/or active livestock grazing.

Ecological Integrity (EI) - evaluates the condition of site vegetation. If vegetation is dominated by a mixture of native species with limited invasive species influence, it rates high. Sites with mostly native species and with invasive species that could be removed rate medium. Sites strongly impacted by invasive species (Himalayan blackberry, reed canarygrass, English ivy) rate low.

High -	Vegetation dominated by native species
Medium -	Shares characteristics of both high and low ratings
Low -	Vegetation dominated by non-native invasive species

Cartography

Two types of resources were mapped: the RFZ (primary protection area) and contributing features (secondary protection area). The RFZ boundary was usually mapped as the top of hillslope at the upper break in slope above 20% slope. In reaches or portions of reaches where adjacent slopes were less than 20%, the RFZ was mapped as 100 feet centered on the centerline of the stream. Contributing features included floodplain, potential wetlands, and forests in the vicinity of the RFZ. Both types of resources were mapped on orthophotoquads (David Smith, 3/30/84; scale 1 inch = 100 ft.). Where land use conditions had significantly changed since 1984, they were mapped on clear acetate overlays over more recent aerial photographs (WAC, 3/27/94; scale 1 inch = 200 feet).

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Roth, Emily, R. Olsen, P. Snow, R. Sumner. December 1993. *Oregon Freshwater Wetland Assessment Methodology.* Ed. by S.G. McCannell. Oregon Division of State Lands. Salem, Oregon.

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Stream Corridor Delineation, Exceptions and Standards

A Draft Ordinance

10.90.010 Purpose

The purpose of this sub-district is to ensure that adequate land shall be retained in permanent open space use and that natural and scenic resources are protected. The boundaries of this sub-district are also intended to protect, conserve, enhance and maintain the Willamette River Greenway. The designation of lands within this sub-district is used to provide reasonable regulation of development in or adjacent to steam corridors. This sub-district does not provide for or authorize public access to private properties designated with this sub-district. Additionally, the provisions of this sub-district does not provide measures for the public acquisition of private property.

10.90.020 Development Prohibited Within Delineated Stream Corridors - Undisturbed Corridor Required.

Development of property located within a Delineated Stream Corridor shall not be permitted except as authorized within Sections 10.90.050 through 10.90.070.

Except as authorized by this Chapter, the Delineated Stream Corridor shall be left in a natural state, allowed to return to a natural state, or ecologically enhanced.

10.90.030 Delineated Stream Corridor.

The Delineated Stream Corridor is described by boundary lines delineated on the Delineated Stream Corridor Maps. The Delineated Stream Corridor designation shall be used to protect stream corridors and associated wetlands, wildlife habitat and steep slope hazard areas where a Goal 5 ESEE (Economic, Social, Environment and Energy Consequences) analysis has been completed.

10.90.040 Determination of Need for Stream Corridor Impact Report, Type I Process.

The manager shall make a determination as to whether a proposed development application would impact a Delineated Stream Corridor through the Type I procedure. The development of structures and improvements shall be scaled using information from the Delineated Stream Corridors Maps. Development proposals which alter a Delineated Stream Corridor shall

require a Stream Corridor Impact Report.

10.90.050 General Exemptions

A. Type I Process. A Stream Corridor Impact Report shall not be required for exceptions listed in this Section. The following are exemptions to the provisions of Chapter 10.90, and shall be processed as a Type I decision.

a. Emergencies that threaten the public health, safety and welfare;

b. Structures, yards, gardens or other activities that lawfully were in existence prior to (*effective date)* that do not meet the requirements of this Chapter. These uses shall be treated as pre-existing non-conforming uses.

c. The expansion or alteration of an existing single family residential structure or private recreational improvement provided that:

1. Outside Corridor Delineation Boundary. No portion of the alteration or improvement is located within the Delineated Stream Corridor; or

2. Inside Corridor Delineation Boundary. The expansion or alteration of a portion of a single family structure located within a Delineated Stream Corridor (including decks and patios), where such is located no closer to the stream or wetland area than the existing structure or improvement. The coverage of all structures within the Delineated Stream Corridor Boundary shall not be increased by more than 1000 square feet of the coverage in existence as of *(effective date)*.

3. A stream corridor or wetland enhancement to be completed in conjunction with the expansion or alteration.

NOTE: The expansion or alteration of a single family structure where such is located closer to the stream or wetland area than the existing structure or improvement, or where such exceeds 1000 square feet in area shall be processed under Section 10.90.070.

The City will make available a brochure designed to inform citizens on the values of open space, wetlands and stream corridor restoration and protection.

d. The following agricultural activities lawfully in existence as of *(effective date)*:

1. Mowing of hay, grass or grain crops;

2. Tilling, discing, planting, seeding, harvesting and related activities for pasture, food crops or business crops, provided that no additional lands within the Stream Corridor is converted to these uses;

e. Normal and routine maintenance of existing irrigation, drainage ditches, ponds and water treatment facilities;

f. Normal and routine maintenance of streets and utilities;

g. Normal and routine maintenance of any public improvement, or public recreational area or pathway.

h. Measures to remove or abate hazards and nuisances.

i. Stream corridor enhancements.

B. Type III Process. The installation, construction or relocation of the following improvements shall be processed as a Type III Conditional Use Permit and requires a Stream Corridor Impact Report:

a. streets;

b. sidewalks;

c. bicycle and pedestrian paths;

d. water systems;

e. waste water systems;

f. storm water systems;

g. public improvements; and,

h. public or private utilities.

10.90.060 Public Agency and Utility Exception - Type III Process.

If the application of this Chapter would prohibit a development proposal by a public agency or public utility, the agency or utility may apply for an exception pursuant to this Section. The public agency or utility shall apply through the Type III land use permit process for any development that is not authorized by Section 10.90.050.

The public agency or utility shall prepare an application, including a Stream Corridor Impact

Report, which details the basis for the request based upon the following criteria:

A. There is no other practical alternative to the proposed development;

B. The proposal includes measures which minimizes the impacts on the Stream Corridor.

10.90.070 Reasonable Use Exception.

If an application of this Chapter would deny all reasonable use of the property, development may be allowed which is consistent with the general purposes of this Chapter and the public interest.

An application for a reasonable use exception only applies to development which impacts a Delineated Stream Corridor.

A. Type II Process. An application for a reasonable use exception in a R-1 (Low Density Residential) or R- 2 (Medium Density Residential) zoning district shall be processed through the Type II land use permit process. The Manager may authorize a reasonable use exception for the purpose of constructing one single family dwelling provided the following criteria is met:

a. The lot was created prior to (*effective date),* and

b. No more than one single family house is permitted on the property which shall occupy a coverage area not to exceed 1,500 square feet in area, and

c. The single family structure shall be placed in a location which complies with setback requirements of this code, and shall be sited in a location which minimizes impacts to those necessary to allow for the reasonable use of the property.

B. Type III Process Required For Certain Land Uses.

a. An application for a Reasonable Use Exception involving Type III land uses procedures shall: require a Stream Corridor Impact Report; or, in lieu of preparing a Stream Corridor Impact Report, the applicant may propose a stream corridor or wetland enhancement to be completed in conjunction with the proposed development. The enhancement shall increase the values and quality of the remaining stream corridor lands located on the lot. Applicants choosing to develop a stream corridor or wetland enhancement may still be required to prepare a Stream Corridor Impact Report where further information is required by the hearing body.

The following uses shall be processed through the Type III land use permit process and shall be subject to conditions as may be established by the hearing body:

1. A use other than single family dwellings; or

2. The expansion or alteration of a single family structure or duplex where such is located closer to the stream or wetland area than the existing structure or improvement; or

3. The expansion or alteration of a single family structure or duplex where the coverage of all structures within the Delineated Stream Corridor Boundary is increased by more than 1000 square feet of the coverage in existence as of *(effective date)*.

b. The hearing body may authorize a reasonable use exception provided the following criteria are met:

1. Application of this Chapter would deny all reasonable use of the property; and,

2. There is no other reasonable use with less impact on the Stream Corridor; and,

3. The proposal does not pose an unreasonable threat to the public health safety or welfare on or off the development proposal site; and,

4. Any alterations to a Delineated Stream Corridor shall be the minimum necessary to allow for the reasonable use of the property.

10.90.80 Variances to Chapter 10.90.

An applicant who seeks a variance to the standards of this Chapter other than a Section 10.90.70 Reasonable Use Exception, shall pursue relief by means of an application for a variance as provided in Chapter 10.24.

10.90.090 Density Transfer.

For development proposal on lands which contain Delineated Stream Corridors, a transfer of density shall be permitted within the development proposal site.

A. The following formula shall be used to calculate the density that shall be permitted for single family lots on the property:

a. Step 1. Calculate Expected Maximum Density. The Expected Maximum Density (EMD) is calculated by dividing the acreage of the property by the density permitted within the Newberg Comprehensive Plan.

b. Step 2. The density that shall be permitted on the property shall be calculated by multiplying the EMD obtained in Step 1 based upon the following table:

Single Family Lot
Density Transfer Table

Percent of Site Not In Delineated Stream Corridor			*Allowable Density as a Percent of EMD*
80	-	100 %	100 %
70	-	79 %	90 %
60	-	69 %	80 %
50	-	59 %	70 %
40	-	49 %	60 %
30	-	39 %	50 %
20	-	29 %	40 %
10	-	19 %	30 %
1	-	9 %	20 %

The density credit can only be transferred within the development site. To accommodate the transfer of density, the minimum lot size required for single family dwellings shall be waived. The types of residential uses and other applicable standards permitted in the zone shall remain the same.

B. The following standards shall be applicable for multi-family uses on the property:

a. 100% of the EMD (refer to Subsection A above) is permitted on a property containing Delineated Stream Corridors.

b. An application for a development proposal shall comply with applicable standards and criteria of the Newberg Development Code.

C. All other uses shall comply with the applicable standards and criteria of the Newberg Development Code.

10.90.100 Procedure for Amending the Delineated Stream Corridor.

A. Type II Process. The manager may authorize an amendment to the Delineated Stream Corridor Boundary by a maximum of 20 feet provided the applicant demonstrates that the following standards are met:

a. The Delineated Stream Corridor Boundary is not reduced to less than 50 feet to the edge of a wetland or 100 year flood elevation, whichever is higher; and,

b. The lands to be eliminated do not contain sloped areas in excess of 15 %; and

c. The lands to be eliminated do not significantly contribute to the protection of the remaining Stream Corridor for water quality, storm water control and wildlife habitat.

d. A Stream Corridor Impact Report which complies with the provisions of this Chapter is provided.

In order that the Planning Commission can be kept informed of the decisions of the Manager as it relates to Type II amendments to the Delineated Stream Corridor Boundary, the Manager shall forward a copy of any decision made through this procedure to the Planning Commission. The Planning Commission may elect to review the cumulative decisions of the Manager for the purpose of evaluating administrative interpretations of this ordinance.

B. Type III Process. The applicant may propose to amend the Delineated Stream Corridor Boundary through a Type III quasi-judicial zone change proceeding. In addition to the criteria for a zone change, the applicant shall submit reports and information which meet the provisions of OAR 660 relating to the ESEE (Economic, Social, Environmental and Energy) analysis. The hearing body may amend the Delineated Stream Corridor Boundary where findings can be made that the application complies with the applicable zone change criteria and satisfies the requirements of OAR 660 relating to the ESEE analysis.

10.90.110 Stream Corridor Impact Report.

A Stream Corridor Impact Report is a report which analyzes impacts of development within Delineated Stream Corridors base upon the requirements of this Section. The Manager shall consult with a professional with appropriate expertise to evaluate the methodology of the report in order to properly evaluate the conclusions reached in a report prepared under this Section. If outside consulting services are required to review the methodology of the report, the cost of such review shall be paid by the applicant on an actual cost basis, not to exceed $500.00.

A. Application Requirements. In addition to required materials for the Site Design Review application, an environmental report must be submitted. The environmental report shall be conducted and prepared by experienced professionals who are knowledgeable and qualified to complete such a report. The qualifications of the person or persons preparing

each element of the analysis shall be included with the report. The environmental report shall include the following:

a. Physical Analysis. The analysis shall include, at a minimum, a description of the soil types, geology, and hydrology of the site plus related development limitations. The analysis shall include development recommendations including grading procedures, soil erosion control measures, slope stabilization measures, and methods of mitigating hydrologic impacts. For projects which affect wetlands, an inventory and delineation of the wetland shall be provided.

b. Ecological Analysis. The analysis shall include, at a minimum, an inventory of plant and animal species occurring on the site, a description of the relationship of the plants and animals with the environment, and recommended measures for minimizing the adverse impacts of the proposed development on unique features of the ecosystem; including but not limited to migratory and travel routes of wildlife.

B. Report Criteria. The following standards shall apply to the issuance of permits requiring a Stream Corridor Impact Report:

a. Where possible, the applicant shall avoid impact altogether;

b. The impact is minimized by limiting the degree or magnitude of the action, by using appropriate technology, or by taking affirmative steps to avoid, reduce or mitigate impacts;

c. The impacts will be rectified by repairing, rehabilitating, restoring or mitigating Delineated Stream Corridors that can be recovered on the site.

d. The existing ecosystem shall be protected or enhanced, with consideration given to the following:

1. Wildlife travel and migratory routes shall not be severed; and

2. Native vegetation shall be utilized for landscaping.

3. The stream bed shall not be unnecessarily altered.

e. The fill shall primarily consist of natural materials such as earth or soil aggregate, including sand, gravel, rock, and concrete. Culverts, bridges, reinforced retaining walls, or other similar structures which require man-made structural materials shall be permitted.

f. The amount of fill used shall be the minimum necessary to provide the transportation facility or utility system. To minimize the amount of fill, the side slopes

shall be graded at a slope which is steeper than four horizontal to one vertical. A bridge shall be considered as an alternative to filling.

g. If the fill or grading is within a flood plain, the proposed action shall not change the general direction, velocity, or elevation of future floodwaters.

h. The proposed fill or grading shall not increase existing hazardous conditions or create new hazardous conditions related to geology, hydrology, or soil erosion.

i. Stream turbidity shall not be significantly increased by any change in a watercourse that results from the fill. Measures shall be taken to minimize turbidity during construction.

Newberg Comprehensive Plan Policies

This section evaluates the consistency of the City's Comprehensive Plan Policies as it relates to the new data collected as part of this study and evaluation of Newberg stream corridors.

The following Goals and Policies found within the Newberg Comprehensive Plan are applicable to the review and establishment of proposed Stream Corridor sub-district overlay zone.

G. OPEN SPACE, SCENIC, NATURAL HISTORIC AND RECREATIONAL RESOURCES

GOALS:

1. To ensure that adequate land shall be retained in permanent open space use and that natural, scenic and historic resources are protected.

3. To protect, conserve, enhance and maintain the Willamette River Greenway.

POLICIES:

1. Open Space & Natural Resources Policies

d. The dedication of easements for public use of drainageways should be encouraged when properties are either developed or redeveloped. Development densities that would normally be allocated to portions of property in the drainageways may be transferred to adjoining areas up to a maximum increase of 10 percent.

e. The floodplains and natural drainageway areas in Newberg should be preserved with a largely open character to provide a basic open space framework for the community. The capacities of these areas shall be maintained to provide a natural storm water and natural drainage system, as well as to continue to provide a natural habitat for local fish and wildlife. Natural drainageways should be kept in open space uses. Bicycle and pedestrian pathways might be included in these areas. Care should be taken to minimize disturbances in these often erosive and steep areas. All uses should be compatible with the specific sites.

h. The City shall classify wetlands as 1-B resources under Statewide Planning Goal 5. State and federal requirements shall apply to these areas. The City shall conduct a wetlands inventory prior to the completion of the next periodic review.

5. Willamette River Greenway Policies

a. Newberg will encourage the protection, conservation, enhancement and maintenance of the Willamette River Greenway.

b. Newberg recognizes the importance of the Willamette River as a regional resource which should be maintained for its natural, scenic, economic, recreational, agricultural and historic value.

m. New development within the floodplain shall conform to General Hazard and Flood Hazard regulations.

Each of the goal and policy statements is addressed through the following discussion. One modification to the City's Comprehensive Plan Policies is recommended to provide greater flexibility in of setting density of lands intended to be preserved under this ordinance.

G. OPEN SPACE, SCENIC, NATURAL HISTORIC AND RECREATIONAL RESOURCES

GOALS:

1. To ensure that adequate land shall be retained in permanent open space use and that natural, scenic and historic resources are protected.

RESPONSE:

The proposed ordinance will provide an additional tool for the City to ensure that adequate land shall be retained in permanent open space use and that natural, scenic and historic resources are protected, by establishing specific boundaries and land use regulation which limits the impact to stream corridor areas.

3. To protect, conserve, enhance and maintain the Willamette River Greenway.

RESPONSE:

The proposed ordinance will assist in the protection, conservation, enhancement and maintenance of the Willamette River Greenway.

POLICIES:

1. Open Space & Natural Resources Policies

d. The dedication of easements for public use of drainageways should be encouraged when properties are either developed or redeveloped. Development densities that would normally be allocated to portions of property in the drainageways may be transferred to adjoining areas up to a maximum increase of 10 percent.

RESPONSE:

The proposed new land use regulations do not preclude the City from encouraging or requiring the dedication of easements if authorized under the provisions of other development regulations currently in place. This policy is inconsistent with the ESEE conflict resolution relating to "Economy" consequences. The Open Space Committee has recommended that in or to mitigate economic consequences, the reference to "a maximum increase of 10 percent" should be either deleted, or amended to read "a maximum increase of 20 percent".

e. The floodplains and natural drainageway areas in Newberg should be preserved with a largely open character to provide a basic open space framework for the community. The capacities of these areas shall be maintained to provide a natural storm water and natural drainage system, as well as to continue to provide a natural habitat for local fish and wildlife. Natural drainageways should be kept in open space uses. Bicycle and pedestrian pathways might be included in these areas. Care should be taken to minimize disturbances in these often erosive and steep areas. All uses should be compatible with the specific sites.

RESPONSE:

The proposed new land use regulations will provide further measures to preserve the largely open character of open space areas. In doing so, the capacities of these areas for natural storm water detention and absorption will be enhanced; the natural habitat will receive greater protection and disturbances to slopes will be minimized. The proposed regulations are consistent with goal.

h. The City shall classify wetlands as 1-B resources under Statewide Planning Goal 5. State and federal requirements shall apply to these areas. The City shall conduct a wetlands inventory prior to the completion of the next periodic review.

RESPONSE:

The scope of this project did not include the specific delineation of wetlands. Wetlands are included within the stream corridor delineation boundaries. Lands within these boundaries have been inventoried for their value as a Goal 5 resource. Using the ESEE analysis, certain protections have been recommended. The adoption of these proposed land use regulations are consistent with this policy, although further inventory may be required to satisfy this policy.

5. Willamette River Greenway Policies

a. Newberg will encourage the protection, conservation, enhancement and maintenance of the Willamette River Greenway.

RESPONSE:

The proposed new land use regulations will provide additional standards for the review and evaluation of permitted uses, and will regulate, restrict or prohibit certain conflicting uses. The proposed new land use regulations assist in the implementation of this policy.

b. Newberg recognizes the importance of the Willamette River as a regional resource which should be maintained for its natural, scenic, economic, recreational, agricultural and historic value.

RESPONSE:

The proposed ESEE analysis supports this policy and provides new land use regulations to assist in the implementation of this policy.

m. New development within the floodplain shall conform

RESPONSE:

This policy should be amended to allow other forms of land use implementation. The proposed new land use regulations would replace the General Hazard regulation along stream corridors. A Comprehensive map amendment is recommended to replace portions of the General Hazard (GH) designation with the provisions of a stream corridor delineation and implementing regulations. This policy should be amended to reflect the completion of a stream corridor inventory and protection measures. It is proposed that this policy be amended to read as follows:

m. New development within the floodplain shall conform to General Hazard, Flood Hazard, and stream corridor protection regulations.

Two Comprehensive Plan Policies have been identified as needing amendment. The amendments are consistent with the provisions of Goal 5 and are reflective of new data, inventories and citizen involvement resulting from the stream corridor evaluation.. The policies with recommended amendments are as follows:

1. ***Open Space & Natural Resources Policies***

   d. The dedication of easements for public use of drainageways should be encouraged when properties are either developed or redeveloped. Development densities that would normally be allocated to portions of property in the drainageways may be transferred to adjoining areas up to a maximum increase of 20 percent.

2. ***Willamette River Greenway Policies***

   m. New development within the floodplain shall conform to General Hazard, Flood Hazard, and stream corridor protection regulations.

STREAM REACH ASSESSMENT

SITE NO. C1-A	STREAM: Tributary of Chehalem Creek	% SLOPE: ≈ 44%	FP WIDTH: < 5 ft	RFZ: (ft) ≈ 250
MAP NO. G 14, F 14	LOCATION: Between railroad line and mouth		AERIAL: SW	DATE: 2-28-95
OBSERVATION POINT: Ewing Young Park		ADJACENT LAND USE: Agricultural		

GENERAL DESCRIPTION: C1-A, a tributary to Chehalem Creek, is located between the railroad line and its confluence with Chehalem Creek south of Ewing Young Park. Dominant land use surrounding this reach is agricultural land (hazelnut & undeveloped). Hillslope vegetation is dominated by mature Douglas fir and big leaf maple, Himalayan blackberry and sword fern. Trails from the park connect to a trail on the hillslope which leads to Chehalem Creek. A small forested wetland mosaic dominated by black cottonwood is contiguous with this reach and contributes to wildlife habitat, water quality protection, and wetlands. Impacts to this reach include the dominant invasive blackberry that smothers the slopes and a remnant garbage dump that is eroding into the stream.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* big leaf maple	red elderberry	
* Douglas fir	* sword fern	
* Himalayan blackberry	English ivy	
western hazelnut	scouring horsetail	
snowberry		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover; adjacent open space
3. RIPARIAN WQ PROTECTION	M	duff is patchy
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain
5. NATURAL CONDITION	H	surrounded by agricultural land
6. ECOLOGICAL INTEGRITY	M	canopy diverse native mature trees; understory Himalayan blackberry

CONTRIBUTING FEATURES: Recreation: trails and public access at Ewing Young Park (Frontier Lane). Forest habitat (wetland mosaic) with black cottonwood trees and small shallow scattered pondings is located on northeast end adjacent to railroad line and contributes to water quality protection and wildlife habitat.

IMPACTS: Remnants of old dump are eroding into the stream from the north slope near park. Himalayan blackberry is ubiquitous.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C1-B	STREAM: Tributary of Chehalem Creek	% SLOPE: ≈ 34%	FP WIDTH: < 5 ft	RFZ: (ft) 200 - 300
MAP NO. G 13, 14	LOCATION: Southeast and southwest of College/Andrew Streets		AERIAL: SW	DATE: 1-19-95
OBSERVATION POINT: 11th Ct, College Street, Andrew Street		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: C1-B, the upper end of a tributary to Chehalam Creek, is located between 11th Court and the railroad line. Dominant land use surrounding this stream is residential; industrial uses are also present. Hillslope vegetation is dominated by a well developed mixed deciduous/coniferous forest canopy. Dominant tree types include Douglas fir, western red cedar, and big leaf maple. The understory is dominated by English ivy and Himalayan blackberry but contains scattered native species including Oregon grape and sword fern. Trails contribute to recreational values for residents living in the immediate vicinity although they are also contributing to soil erosion and potential water quality impacts. The riparian zone provides an aesthetic separation of industrial and residential land uses.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN
* big leaf maple	* English ivy
* Douglas fir	* Himalayan blackberry
* western red cedar	black cottonwood
snowberry	vine maple
sword fern	tall Oregon grape

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	steep slopes > 20%
2. WILDLIFE HABITAT	H	water, multi layered forest, woody debris
3. RIPARIAN WQ PROTECTION	H-M	well vegetated slope but Himalayan blackberry dominant
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain
5. NATURAL CONDITION	L	residences dense on top of hillslope
6. ECOLOGICAL INTEGRITY	M	native canopy species; understory Himalayan blackberry & English ivy

CONTRIBUTING FEATURES: Aesthetic value for residents; separates industrial use to the south from residential use. Trails: mostly steep pedestrian trails perpendicular and parallel to hillslope.

IMPACTS: Himalayan blackberry and English ivy are ubiquitous. Pedestrian (mt. bike?) trails are often steep and causing erosion of hillslopes. Railroad line potentially sprays herbicide and degrades downstream water quality. Fill at the end of this cul-de-sac could also erode into stream.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C2	STREAM: Tributary of Chehalem Creek	% SLOPE: ≈ 40%	FP WIDTH: ≤ 20 ft	RFZ: (ft) ≈ 175
MAP NO. F 13	LOCATION: Dayton Fork; south of 5th Street		AERIAL: SW	DATE: 1-19-95
OBSERVATION POINT: West end of 8th Street, 5th Street		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: C2, Dayton Fork, is a tributary to Chehalem Creek. Dominant land use surrounding this small stream is dense residential. Hillslopes are steep and vegetation is dominated by big leaf maple, Douglas fir, and English ivy. Vegetation in the upper half of the stream has generally been replaced with ornamental species in the back yards of residences. The flood plain is narrow and limited for most of the stream except at the confluence with Chehalem Creek where it broadens to more than 50 ft.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
		upper	mouth
* big leaf maple	western hazelnut	creeping buttercup	* reed canarygrass
* Douglas fir	* Himalayan blackberry	horsetail	red alder
Oregon white oak	* English ivy	stinging nettles	Oregon ash
black cottonwood	ornamentals		
red elderberry			

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	slopes > 20%
2. WILDLIFE HABITAT	M	seasonal water, woody debris, trees & shrubs
3. RIPARIAN WQ PROTECTION	M	south & east bank protected, ivy limits organic duff
4. FLOOD PLAIN WQ PROTECTION	M	limited flood plain except ≈ 50 ft at mouth
5. NATURAL CONDITION	L	surrounded by dense residential
6. ECOLOGICAL INTEGRITY	M-L	English ivy ubiquitous, canopy native in lower half

CONTRIBUTING FEATURES: ⌀

IMPACTS: Urban surface runoff; sewer line; invasive species (dense patches of Himalayan blackberry & English ivy)

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C3-A	STREAM: A tributary of Chehalem Creek	% SLOPE: ≈ 20%	FP WIDTH: -	RFZ: (ft) 150
MAP NO. F 11	LOCATION: Lower Marguerite Fork		AERIAL: Middle - W	DATE: 1-19-95
OBSERVATION POINT: North side of stream		ADJACENT LAND USE: Rural Residential, Industrial		

GENERAL DESCRIPTION: C3-A, lower Marguerite Fork, is a tributary to the East Fork of Chehalem Creek located between Highway 240 and Main Street. Dominant land use surrounding this reach is rural residential to the north and industrial to the south. Hillslopes are moderately steep and vegetation is dominated by Douglas fir, willow, and Himalayan blackberry. Douglas fir ranges in size from 12 in. to 3 ft. in diameter. The understory on the upper slope has been influenced by past clearing; the lower slope is more diverse and natural. The proximity of the east fork of Chehalem Creek increases wildlife habitat value for this reach.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* Douglas fir (3' dbh)	trailing blackberry	
* willow	English holly	
snowberry	tall Oregon grape	
* Himalayan blackberry	yerba buena	
ocean spray		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	≈ 20% slope
2. WILDLIFE HABITAT	H-M	seasonal water, variety of food & cover
3. RIPARIAN WQ PROTECTION	M	duff patchy
4. FLOOD PLAIN WQ PROTECTION	L	no flood plain
5. NATURAL CONDITION	M	south side dense development
6. ECOLOGICAL INTEGRITY	M	native canopy; invasive blackberry understory

CONTRIBUTING FEATURES: ⌀

IMPACTS: Water quality impacts due to industrial and residential stormwater runoff.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C3-B	STREAM: Tributary of Chehalem Creek	% SLOPE:	FP WIDTH: -	RFZ: (ft) -
MAP NO. F 10, 11 G 10	LOCATION: Upper Marguerite Fork		AERIAL: Middle - W	DATE: 1-19-95
OBSERVATION POINT: Main Street, Marguerite Way, Jaquith Park		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: C3-B, upper Marguerite Fork, is a tributary to the East Fork of Chehalem Creek. It is located between Main Street and College Street (near Jaquith Park). Dominant land use surrounding this reach is residential with dense development on both sides of the stream. The narrow riparian corridor contains limited flood plain and consequently provides low water quality protection. Vegetation is dominated by black cottonwood, Oregon ash, red alder, and Himalayan blackberry and provides low-moderate wildlife habitat value.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
black cottonwood	* Himalayan blackberry	soft rush
* Oregon ash	oak	
* red alder	sword fern	
* mowed lawn		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M	both > and < 20%
2. WILDLIFE HABITAT	M-L	seasonal water, limited understory
3. RIPARIAN WQ PROTECTION	M-L	duff patchy, mowed
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain
5. NATURAL CONDITION	L	dense development; park
6. ECOLOGICAL INTEGRITY	M-L	native canopy, disturbed understory

CONTRIBUTING FEATURES: Recreation: Jaquith Park

IMPACTS: The stream is channelized through Jaquith Park and lined with rocks adjacent to parking lot. Residential stormwater runoff can impact water quality. Fill along stream near Marguerite Way is eroding into the stream in places.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C4	STREAM: Lower East Fork Chehalem Creek	% SLOPE: > 40%	FP WIDTH: > 100 ft	RFZ: (ft) > 575
MAP NO. F 13, 15	LOCATION: Between Dayton Avenue and the Willamette River		AERIAL: SW	DATE: 2-28-95
OBSERVATION POINTS: Dayton Road and Ewing Young Park		ADJACENT LAND USE: Agriculture		

GENERAL DESCRIPTION: C4, the lower east fork of Chehalem Creek, is located between Dayton Road and its confluence with the Willamette River. Dominant land use surrounding C4 is agricultural (filbert). Residential development has recently occurred on the west side of this reach. Vegetation species and communities are diverse. Steep hillslopes vegetation is dominated by big leaf maple, Indian plum, snowberry, sword fern, and water leaf. The broad flood plain also includes a variety of species: red alder, Oregon ash, willow, ninebark, red elderberry, creeping buttercup, hedgenettle, and water leaf. The broad flood plain and riparian function zone maintain water quality protection and provide high quality wildlife habitat connected to the Willamette River. Trails traverse the hillslope from Ewing Young Park to the creek which contributes to public recreation. Wetland seeps on the hillslope below Frontier Lane and in the flood plain further contribute to water quality and wildlife habitat functions of the site.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* big leaf maple	western red cedar	red alder	Indian plum
* Indian plum	grand fir	Oregon ash	creeping buttercup
* snowberry	English holly	willow	hedgenettle
* sword fern	smilacina	ninebark	waterleaf
* water leaf	piggyback	red elderberry	
Douglas fir	Himalayan blackberry		
Oregon white oak	English ivy		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover
3. RIPARIAN WQ PROTECTION	H	tree, shrub cover with duff
4. FLOOD PLAIN WQ PROTECTION	H	broad flood plain, > 100 ft
5. NATURAL CONDITION	H	large RFZ surrounded by agriculture land
6. ECOLOGICAL INTEGRITY	H	invasives present; not overwhelming

CONTRIBUTING FEATURES: Recreation: walking trail down hillslope to flood plain and along flood plain. Wetland pockets in flood plain and in seeps scattered on hillslope in Ewing Young Park below Frontier Lane.

IMPACTS: Agriculture surface runoff from potential tilling, plowing and herbicide spraying.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
C5	East Fork of Chehalem Creek	> 40%	> 100 ft	475 - 800
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
E 12; F 12 & 13	Between Dayton Ave & Sunnycrest Rd		SW & Middle - W	1-19-95
OBSERVATION POINTS:		**ADJACENT LAND USE:**		
Sunnycrest, 99W, 5th Street & Dayton Avenue		Residential		

GENERAL DESCRIPTION: C5, a reach of the East Fork of Chehalem Creek, is located between Dayton Avenue and Sunnycrest Road. Dominant land use on the Newberg side of the stream is residential. The west side of the stream is presently rural residential. Steep hillslopes contain a well-developed canopy of Douglas fir, big leaf maple, oak, hazelnut, sword fern, and invasive non-native species (Himalayan blackberry & English ivy). The flood plain is broad (up to 400 ft) and contains a mosaic of wetlands and uplands, forest and open. Dominant flood plain vegetation includes red alder, Oregon ash, and reed canarygrass.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
big leaf maple	willow	* Oregon ash	Himalayan blackberry
Douglas fir	Himalayan blackberry	* red alder	English ivy
Oregon white oak	English ivy	red osier dogwood	* reed canarygrass
western hazelnut	sword fern		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	steep hillslopes > 20%
2. WILDLIFE HABITAT	H	permanent water, diverse food & cover
3. RIPARIAN WQ PROTECTION	H-M	duff excellent in places
4. FLOOD PLAIN WQ PROTECTION	H	forested flood plain wetlands
5. NATURAL CONDITION	H	residential but large RFZ
6. ECOLOGICAL INTEGRITY	M	English ivy and blackberry abundant, native canopy species

CONTRIBUTING FEATURES: Recreation: bike path on 5th street.

IMPACTS: Agricultural and residential surface runoff.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C6	STREAM: East Fork of Chehalem Creek	% SLOPE: = 30%	FP WIDTH: < 25 ft	RFZ: (ft) 300
MAP NO. E 12; F 10, 12	LOCATION: Between Sunnycrest Road & Pinehurst Drive		AERIAL: Middle W	DATE: 1-19-95
OBSERVATION POINTS: Sheridan Street, Pinehurst, Hwy 240		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: C6, a reach of the East Fork of Chehalem Creek, is located between Sunnycrest Road and Pinehurst Drive. Dominant land use surrounding the stream is residential. Hillslope vegetation is dominated by Douglas fir, snowberry, and Himalayan blackberry. The flood plain and riparian function zones are narrower than downstream (C5) and broader than upstream (C7). Flood plain vegetation includes soft rush, velvet grass, Oregon ash, and willow.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* Douglas fir (4' dbh)	ocean spray	Oregon ash
Oak	* Himalayan blackberry	willow
willow	* English ivy	velvet grass
* snowberry	trailing blackberry	soft rush
Oregon grape	mowed grass	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	mostly steep slopes > 20%
2. WILDLIFE HABITAT	H	diverse multi layered vegetation; water
3. RIPARIAN WQ PROTECTION	M	organic duff is patchy
4. FLOOD PLAIN WQ PROTECTION	M	mostly < 25 ft
5. NATURAL CONDITION	M	residential development on east side
6. ECOLOGICAL INTEGRITY	M	canopy of native species, invasive understory in places

CONTRIBUTING FEATURES: ⌀

IMPACTS: Agricultural and residential runoff; huge yard debris pile on hillslope south of Highway 240.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C7	STREAM: East Fork of Chehalem Creek	% SLOPE: -	FP WIDTH: ⌀	RFZ: (ft) -
MAP NO. F 9, 10	LOCATION: Between Pinehurst Drive and Lynn Drive		AERIAL: Middle - W	DATE: 1-19-95
OBSERVATION POINTS: Lynn Drive, Columbia Drive		ADJACENT LAND USE: Agriculture		

GENERAL DESCRIPTION: C7, a reach of the East Fork of Chehalem Creek, is located between Pinehurst Drive and Lynn Drive. Dominant land use surrounding this reach is agriculture (livestock-llamas). Grazing limits food and cover for wildlife species and also impacts water quality. The riparian function zone is mapped as 100 ft.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN	
grazed grass	scattered	willow
mowed grass	Oregon ash	Himalayan blackberry

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	L	gentle slope
2. WILDLIFE HABITAT	M-L	water, limited food and cover
3. RIPARIAN WQ PROTECTION	M	mowed or grazed grass
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain, mowed or grazed vegetation
5. NATURAL CONDITION	L	livestock
6. ECOLOGICAL INTEGRITY	L	grazed pasture, mowed field

CONTRIBUTING FEATURES: ⌀

IMPACTS: Llamas grazing adjacent to channel north of Columbia Street impact vegetation and water quality.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
C8	East Fork of Chehalem Creek	-	≈ 10 ft	-
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
G 8, 9; F 9	Between Main Street and Oxford Lane		NW	1-19-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Mountain View Drive		Residential		

GENERAL DESCRIPTION: C8, the upper reach of the East Fork of Chehalem Creek, is located between Main Street and Oxford Land. This reach has been culverted on both ends and channelized on the south end. Vegetation is dominated by black cottonwood, Oregon ash, willow, bittersweet nightshade and soft rush. A small wetland approximately 25 ft broad is located adjacent to the top of the 3 ft hillslope near Mountain View Drive. Above the park at Mountain View Drive, short hillslopes are steeper and eroding into the stream due to limited vegetation cover. Backyard fencing in this area is a barrier to some wildlife species (including the observer). Wildlife habitat is moderate due to dense residential development and lack of understory vegetation on the north end. Although this reach is short and isolated, it provides wildlife habitat and water quality benefits and is an aesthetic amenity to the neighborhood.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* black cottonwood	oak	* Oregon ash	water parsley
willow	Himalayan blackberry	* willow	American speedwell
weeping willow		* bittersweet nightshade	* soft rush

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M-L	gentle slope-north of Park at Mt. View - short hill, slopes
2. WILDLIFE HABITAT	M-L	seasonal water, limited understory vegetation
3. RIPARIAN WQ PROTECTION	M	turf, mowed
4. FLOOD PLAIN WQ PROTECTION	M-L	narrow flood plain; channelized stream
5. NATURAL CONDITION	L	dense residential development
6. ECOLOGICAL INTEGRITY	M-L	mostly native canopy, disturbed understory

CONTRIBUTING FEATURES: Large mowed open field at the end of Mountain View Drive. Small wetland adjacent to Mountain View Drive (Oregon ash, mowed grass).

IMPACTS: Residential runoff. Yard debris pile on stream bank at south end; potentially impacts water quality. Yard fencing adjacent to creek acts as a barrier to some wildlife species.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C9	STREAM: West Fork of Chehalem Creek	% SLOPE: ⌀	FP WIDTH: ⌀	RFZ: (ft) -
MAP NO. F 8	LOCATION: Between Crater Lane and Quail Drive		AERIAL: NW	DATE: 1-19-95
OBSERVATION POINT: Access from Crater Lane		ADJACENT LAND USE: Agriculture, Residential		

GENERAL DESCRIPTION: C9, is an isolated portion of the upper end of the west fork of Chehalem Creek between Crater Lane and Quail Drive. It is channelized and culverted on both ends. It is surrounded by a mowed weedy field and recent construction for a residential development. The riparian function zone is mapped as 100 feet.

DOMINANT VEGETATION:

HILLSLOPES - OPEN FIELD		FLOOD PLAIN - CHANNEL BANKS	
meadow foxtail	willow herb	apple	Himalayan blackberry
orchard grass	Klamath weed	black cottonwood	sword fern
perennial ryegrass	thistle		
tall fescue	Queen Anne's lace		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	L	flat to gentle slope
2. WILDLIFE HABITAT	L	seasonal water, channelized, narrow riparian strip
3. RIPARIAN WQ PROTECTION	L	riparian vegetation mowed, duff limited
4. FLOOD PLAIN WQ PROTECTION	L	no flood plain
5. NATURAL CONDITION	L	construction, mowed vegetation
6. ECOLOGICAL INTEGRITY	M-L	canopy contains pockets of native vegetation; understory invasive blackberry

CONTRIBUTING FEATURES: ⌀

IMPACTS: Recent construction causing sedimentation in stream impacting water quality. Channelization of stream.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. C10	STREAM: Upper West Fork of Chehalem Creek	% SLOPE:	FP WIDTH: 10 - 100 ft	RFZ: (ft) -
MAP NO. G 7	LOCATION: Between Highway 219 and No. 140		AERIAL: NW	DATE: 1-19-95
OBSERVATION POINTS: Road number 140; Highway 219		ADJACENT LAND USE: Agriculture		

GENERAL DESCRIPTION: C10 is an isolated reach at the upper end of the West Fork of Chehalem Creek located between Highway 219 and Road Number 140. Dominant land use surrounding this reach is agriculture including filberts and pasture. Vegetation is dominated by filberts and mowed or grazed grass. There are a few wetland pockets along the stream. The northernmost wetland is a broad (100 ft) reed canarygrass depression. The other wetlands are generally grazed or mowed. The wetlands contribute to water quality protection. The stream channel has been lined with rocks through the upper portion of the filbert orchard and is channelized north of the road on the south end. A few horses and donkeys are pastured in a wetland pocket on the south end; grazing impacts vegetation, wildlife habitat, and water quality. The riparian function zone is mapped as 100 ft.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* mowed lawn	ponderosa pine	reed canarygrass
* filbert orchard	Oregon white oak	soft rush

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	L	gentle slopes
2. WILDLIFE HABITAT	M-L	seasonal water, limited food and cover
3. RIPARIAN WQ PROTECTION	M	mowed, grazed
4. FLOOD PLAIN WQ PROTECTION	M	wetlands in pockets along stream; some grazed
5. NATURAL CONDITION	L	grazed
6. ECOLOGICAL INTEGRITY	L	grazed, reed canarygrass

CONTRIBUTING FEATURES: Wetlands occur in pockets adjacent to stream. On the north end there is a large reed canarygrass wetland. Other wetland pockets are generally mowed or grazed.

IMPACTS: Horses and donkey graze the field located between the filbert orchard to the north and a road to the south. Gazing impacts vegetation and water quality.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H1	STREAM: Tributary to Hess Creek	% SLOPE: ≈ 40%	FP WIDTH: ≈ 20 ft	RFZ: (ft) ≈ 300
MAP NO. H 14; I 13, 14	LOCATION: SE fork of Hess Creek		AERIAL: Center - S	DATE: 2-28-95
OBSERVATION POINT: Walked north end; Wynooski Street		ADJACENT LAND USE: Agriculture, Industrial, Residential		

GENERAL DESCRIPTION: H1, the southeast fork of Hess Creek, is located southeast of Sportsman Airpark between Hwy 219 and Wynooski Street. Mixed land use surrounds this reach including agricultural (hazelnut orchard, grass field), industrial, and residential. Hillslope vegetation is a multi-age mixed forest dominated by Douglas fir, big leaf maple, Himalayan blackberry, water leaf, and sword fern. The flood plain is narrow and averages approximately 20 ft wide. Vegetation in the flood plain is dominated by water parsley and ninebark. Impacts to water quality and wildlife habitat are occurring on the slope south of industrial development (see I 13); fill slope is eroding into the stream; needs stabilization with native plantings. An oak woodlot, located on the northwest end of the site, contributes additional food, cover, and riparian water quality protection for this stream. Deer tracks were observed on site.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* big leaf maple	Indian plum	ninebark
* Douglas fir	red hawthorn	water parsley
* Himalayan blackberry	snowberry	
* sword fern	wood violet	
grand fir	water leaf	
red elderberry		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water diverse food & cover except near industrial development
3. RIPARIAN WQ PROTECTION	M	duff patchy due to fill & Himalayan blackberry
4. FLOOD PLAIN WQ PROTECTION	M	narrow flood plain
5. NATURAL CONDITION	M	open space & development occur adjacent to stream
6. ECOLOGICAL INTEGRITY	M	canopy species native; understory variable depending on location & disturbance.

CONTRIBUTING FEATURES: Oak woodlot on northwest end. Trees are mature; understory is mowed and contains abundant native species. The headwaters of the southeast fork have been ditched along the north and east boundaries of the oak woodland.

IMPACTS: The hillslope on the north side, southwest of the hazelnut orchard and south of industrial development, is eroding replete with tires and corrugated metal into the stream.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H2-A	STREAM: Tributary to Hess	% SLOPE: ≤ 36%	FP WIDTH: 30 - 70 ft	RFZ: (ft) 150 - 300
MAP NO. H 13	LOCATION: Lower E Fork of Hess Ck		AERIAL: Center - S	DATE: 2-28-95
OBSERVATION POINT: Walked along bank south of Airport residence		ADJACENT LAND USE: Airport, Agriculture		

GENERAL DESCRIPTION: H2-A, lower east fork of Hess Creek, is located between the airport and the main stem of Hess Creek. Dominant land use surrounding this reach is agriculture. The airport and airport storage facilities are located on the northeast end of the reach. The flood plain ranges from 30 - 70 ft wide and vegetation consists of red alder, willow and reed canarygrass. It's widest at the north end where the stream has been dammed. Hillslopes are generally forested with big leaf maple, Douglas fir, white oak, and snowberry except adjacent to the pond where vegetation is mowed and weedy. Understory vegetation on the hillslopes is dominated by blackberry. A large linear wetland seep is also present, located on a terrace above the flood plain (see map H13). Deer tracks were observed along stream.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN	WETLAND SEEP
* big leaf maple	red alder	soft rush
* Douglas fir	willow	grass
Oregon white oak	reed canarygrass	creeping buttercup
* Himalayan blackberry		water parsley
* snowberry		
sword fern		
Scot's broom		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food and cover
3. RIPARIAN WQ PROTECTION	M	Blackberry abundant on slopes; limited duff
4. FLOOD PLAIN WQ PROTECTION	M	broad; wetland vegetation in places
5. NATURAL CONDITION	H	surrounded by agricultural
6. ECOLOGICAL INTEGRITY	M	canopy is well established but understory dense blackberry

CONTRIBUTING FEATURES: Open field, mature oak trees. Pond in upper end of reach.

IMPACTS: Potential water quality threat: 50 gallon drums on hillslope (labeled herbicide). Dense blackberry thickets.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
H2-B	Tributary to Hess Creek	< 20	5 to 40 ft	≈ 100
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
H 12	East fork of Hess Creek, N of Airport		Center - S	2-28-95
OBSERVATION POINT: Walked from airport		**ADJACENT LAND USE:** Agriculture, Open Space		

GENERAL DESCRIPTION: H2-B, the middle reach of the east fork of Hess Creek, is located south of 2nd Street between a residential development and the airport. Dominant land use surrounding this reach is agriculture and scrub-shrub open space. The flood plain is typically about 5 ft wide but widens to ≈ 40 ft wide at the south end. Vegetation in the flood plain consists of black cottonwood, red-osier, slough sedge, soft rush, and reed canarygrass. Hillslopes are dominated by scrub shrub vegetation including western hazelnut, black hawthorn, sword fern, and Himalayan blackberry. A large scrub-shrub habitat extends to the east and contributes to wildlife habitat, water quality protection, and aesthetics.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
Oregon white oak	rose	black cottonwood	red-osier dogwood
* western hazelnut	English ivy, holly	slough sedge	reed canarygrass
* Himalayan blackberry	* hawthorn	soft rush	
* sword fern			

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M	8-20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover; adjacent scrub-shrub
3. RIPARIAN WQ PROTECTION	H	well vegetated with duff
4. FLOOD PLAIN WQ PROTECTION	L	typically < 25 ft wide except at S end ≈ 40 ft
5. NATURAL CONDITION	H	limited development ; open space adjacent to reach
6. ECOLOGICAL INTEGRITY	M	native canopy; blackberry, ivy, holly common in understory

CONTRIBUTING FEATURES: Large scrub-shrub upland habitat dominated by hazelnut, hawthorn and sword fern increases wildlife habitat value.

IMPACTS: Invasive species such as Himalayan blackberry, English ivy and English holly are present.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H2-C	**STREAM:** Tributary to Hess Creek	**% SLOPE:** < 20	**FP WIDTH:** 6 ft	**RFZ: (ft)** ≈ 100
MAP NO. H 12	**LOCATION:** East fork of Hess Creek, vicinity of 2nd St/St. Paul Highway		**AERIAL:** Center - S	**DATE:** 2-28-95
OBSERVATION POINT: 2nd St.		**ADJACENT LAND USE:** Highway, Open Space		

GENERAL DESCRIPTION: H2-C, the upper reach of the east fork of Hess Creek, is located north and south of 2nd Street. Dominant land use surrounding this reach is open space and highway right-of-way. The flood plain is typically about 6 feet wide. Vegetation in the flood plain consists of cattail and speedwell. Hillslopes are dominated by Himalayan blackberry, teasel, and grass.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN
* Himalayan blackberry	broad-leaved cattail
teasel	speedwell
grass	

ENVIRONMENTAL VALUES	**Rating ****	**comments**
1. EROSION POTENTIAL	M-L	fill south of 2nd St.
2. WILDLIFE HABITAT	L	limited food & cover; adjacent highway
3. RIPARIAN WQ PROTECTION	L	fill eroding into stream; not well vegetated
4. FLOOD PLAIN WQ PROTECTION	L	limited floodplain
5. NATURAL CONDITION	L	adjacent to highway
6. ECOLOGICAL INTEGRITY	L	invasive species common (blackberry, teasel)

CONTRIBUTING FEATURES: limited by highway

IMPACTS: Invasive species such as Himalayan blackberry and teasel are present.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H3-A	STREAM: Tributary to Hess Creek	% SLOPE: ≈ 24%	FP WIDTH: ⌀	RFZ: (ft) 100
MAP NO. H 10	LOCATION: Lower Carol Ann Fork		AERIAL: Center	DATE: 2-08-95
OBSERVATION POINT: Carol Ann Drive		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: H3-A, lower Carol Ann Fork, is located between Birch Lane and Villa Road. Dominant land use surrounding this reach is dense residential. Hillslopes adjacent to the stream are moderately steep, and there is a limited flood plain. Native canopy species are present on the slopes but most understory species have been replaced by lawns and barkdust.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN
Douglas fir	Indian plum
Oregon white oak	Oregon grape
black cottonwood	red-twig dogwood
Oregon ash	English ivy
willow	Himalayan blackberry

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	M-L	water, limited understory, proximity of residences
3. RIPARIAN WQ PROTECTION	M	limited duff; bark dust
4. FLOOD PLAIN WQ PROTECTION	L	no flood plain
5. NATURAL CONDITION	L	dense residential
6. ECOLOGICAL INTEGRITY	M-L	blackberry, ivy, and barkdust abundant; - native canopy

CONTRIBUTING FEATURES: ⌀

IMPACTS: Surrounded by roads and dense residential development; backyards landscape to creek.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H3-B	STREAM: Tributary to Hess Creek	% SLOPE: < 20%	FP WIDTH: ⌀	RFZ: (ft) ≤ 100
MAP NO. H 9, 10; I 9	LOCATION: Upper Carol Ann Fork		AERIAL: Center	DATE: 2-08-95
OBSERVATION POINT: Between Newberg High School and Birch Lane		ADJACENT LAND USE: Forest, Open Space, & Residential		

GENERAL DESCRIPTION: H3-B is located between the Southern Pacific Railroad tracks and Birch Lane. It is the upper end of Carl Ann Fork, a tributary of Hess Creek. Dominant land use surrounding this reach is forest land to the north and residential and schools to the south. Most of this reach lies in a gently sloped swale; the lower end has shallow hillslopes of approximately 16% grade. Dominant vegetation along the channel in the wetland includes Oregon ash, willow, rose, spirea, slough sedge, reed canarygrass, soft rush, and water parsley. The adjacent deciduous forest is diverse and contributes to water quality protection, wildlife habitat, and aesthetics. Dominant forest vegetation includes big leaf maple, oak, madrone, ocean spray, Indian plum, snowberry, western hazelnut, sword fern, and trailing blackberry. Bushtit, Bewick's wren, red-breasted nuthatch, black-capped chickadee, and orange-crowned warbler were observed in the adjacent forest.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
big-leaf maple	western hazelnut	Oregon ash	reed canarygrass
Oregon white oak	sword fern	willow	slough sedge
Indian plum	trailing blackberry	rose	soft rush
snowberry		spirea	water parsley

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	L-M	slopes < 8% and slopes ≈ 16%
2. WILDLIFE HABITAT	H	water, diverse food and cover; large forest
3. RIPARIAN WQ PROTECTION	H	duff present, gentle slope
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain
5. NATURAL CONDITION	M	open space to the north
6. ECOLOGICAL INTEGRITY	H-M	pockets of Himalayan blackberry

CONTRIBUTING FEATURES: Wildlife Habitat: large adjacent mostly deciduous forest with a small pocket of forested wetland. Recreation: trails along stream and throughout forest. Education potential: adjacent to Newberg High School and Springbrook Middle School.

IMPACTS: Adjacent to Southern Pacific Railroad; bike trails with ramps and walking paths throughout forest; garbage due to use as high school "hang-out".

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H4	STREAM: Tributary to Hess Creek	% SLOPE: ≤ 20%	FP WIDTH: ø	RFZ: (ft) 100
MAP NO. H 9, 10	LOCATION: West of Herman Street		AERIAL: Center	DATE: 2-08-95
OBSERVATION POINT: Walked from parking lot		ADJACENT LAND USE: Resident		

GENERAL DESCRIPTION: H4 is a small seasonal (?) tributary to Hess Creek (H8). Dominant land use surrounding H4 is residential and includes a retirement home and a large maintained grass field with a trail. The stream is channelized with steep banks and limited vegetation. East of the trail at the upper end of the stream is a small seasonal wetland seep. Herbaceous vegetation on the hill surrounding the stream and in the seep is mowed.

DOMINANT VEGETATION:

HILLSLOPES	CHANNEL BANKS
Oak trees (above seep)	willow
mowed grasses	
Himalayan blackberry	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M	slopes 8 - 20%
2. WILDLIFE HABITAT	M-L	water, limited food & cover, connected to Hess Ck
3. RIPARIAN WQ PROTECTION	L	lawn, incised channel
4. FLOOD PLAIN WQ PROTECTION	L	no flood plain
5. NATURAL CONDITION	M	surrounded by mowed lawn & retirement home
6. ECOLOGICAL INTEGRITY	M-L	surrounded by mowed lawn and retirement home; native willow canopy

CONTRIBUTING FEATURES: Wetland seep above channel; forest adjacent to H3-B

IMPACTS: Lawn maintenance (runoff)

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H5	STREAM: Hess Creek	% SLOPE: 35%	FP WIDTH: ≈ 100 ft	RFZ: (ft) ≈ 450
MAP NO. H 13, 14	LOCATION: Between 9th St & Wynooski Rd.		AERIAL: Center - S	DATE: 2-28-95
OBSERVATION POINT: Wynooski Road (difficult access due to blackberry)		ADJACENT LAND USE: Agriculture		

GENERAL DESCRIPTION: H5 is lower Hess Creek from 9th Street to Wynooski Road near the sewage treatment plant. Two tributaries enter this reach and contribute to water volume, wildlife habitat and aesthetics. Dominant land use surrounding H5 is agriculture; residential land use is also present in the northwestern half. The flood plain is broad and includes wetlands and uplands. Vegetation is dominated by grass, reed canarygrass, and cattail. A great blue heron was observed foraging from the channel bank. Hillslopes are steep and vegetation is dominated by deciduous trees and Himalayan blackberry.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* big leaf maple	Himalayan blackberry	* reed canarygrass	willow
* black cottonwood	service berry	* cattail	red alder
* Douglas fir			

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover
3. RIPARIAN WQ PROTECTION	M	blackberry dominant on many slopes
4. FLOOD PLAIN WQ PROTECTION	H	broad flood plain with limited duff
5. NATURAL CONDITION	H	broad open space surrounds RFZ
6. ECOLOGICAL INTEGRITY	M	native canopy; invasive understory

CONTRIBUTING FEATURES: Two tributaries: H1 and H2. Small forest pocket above the hillslope north of the confluence of H2. Wetlands in flood plain.

IMPACTS: Dense Himalayan blackberry

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H6	STREAM: Hess Creek	% SLOPE: ≈ 34%	FP WIDTH: ≈ 100 ft	RFZ: (ft) ≈ 440
MAP NO. G 12; H 12, 13	LOCATION: Between 99W and 9th Street		AERIAL: Center, Center - S	DATE: 2-28-95
OBSERVATION POINT: Hoover Park, Cemetery (Granite Road)		ADJACENT LAND USE: Residential, Cemetery		

GENERAL DESCRIPTION: H6 is a portion of Hess Creek between 99W and 9th Street. Dominant land use surrounding H6 is residential and includes a large cemetery. On the north end of this reach is a public park (Hoover); the stream is channelized through the park and the flood plain is a maintained lawn with scattered trees. Below the park the stream meanders through a broad flood plain that is generally open and mowed or grazed. Hillslopes are broad and steep; dominant vegetation includes coniferous and deciduous native species with a diverse understory of native canopy species as well as English ivy, vinca, and Himalayan blackberry. Two seasonal tributaries contribute water to the main stem and provide additional wildlife habitat.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* big leaf maple	* sword fern	(grazed and mowed)
* Douglas fir	western hazelnut	grass
* Oregon white oak	Indian plum	teasel
* Himalayan blackberry	English holly, vinca	
* serviceberry	English ivy	
* snowberry	waterleaf	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover; flood plain includes wetland pockets
3. RIPARIAN WQ PROTECTION	M	mowed, invasive species, and natural duff
4. FLOOD PLAIN WQ PROTECTION	H	broad & vegetated even though mowed/grazed in places
5. NATURAL CONDITION	H-M	residences/cemetery; broad RFZ
6. ECOLOGICAL INTEGRITY	M	native canopy; invasives plentiful

CONTRIBUTING FEATURES: Two small seasonal tributaries and additional forest habitat contribute to wildlife values. The east tributary surrounds the cemetery; vegetation is mostly native including serviceberry and waterleaf, providing aesthetics and excellent wildlife habitat. The west tributary is extremely disturbed and is dominated by weedy vegetation (blackberry & teasel). Wetland pockets occur in the park and in the flood plain south of the park. Additional native forest habitat is located adjacent to the north slope of the cemetery tributary.

IMPACTS: Yard debris piles from residences and cemetery; surface water runoff and groundwater from cemetery could degrade water quality.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
H7	Hess Creek	≈ 32%	20 - 50	≈ 250
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
G 11, 12; H 10, 11	Between 99W and Southern Pacific Railroad		Center	2-08-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Fulton, bridge south of Fulton		Residential, College		

GENERAL DESCRIPTION: H7 is a portion of Hess Creek located between 99W and the Southern Pacific Rail line. Dominant land use surrounding this reach is residential and mostly college related. The flood plain is generally 20 ft wide and broadens at the north end at the confluence of Carol Ann Fork. Flood plain vegetation is typically a narrow band of red alder and Oregon ash. Vegetation is more diverse at the north end and includes willow, Oregon ash, reed canarygrass, creeping buttercup, speedwell and water parsley. Hillslopes are fairly steep and contain walking trails. Some slopes (north of Fulton) and portions of the flood plain are mowed. Hillslopes south of Fulton contain diverse vegetation, dominated by big leaf maple, Douglas fir, oak, hazelnut, Himalayan blackberry, and English ivy.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	LARGE WETLAND IN FLOOD PLAIN
* big leaf maple	* Himalayan blackberry	* red alder	reed canarygrass
* Douglas fir	yew	* Oregon ash	creeping buttercup
grand fir	salal	willow	speedwell
* Oregon white oak	ornamentals (rhododendrons)	* reed canarygrass	water parsley
* western hazelnut			willow
* English ivy	Indian plum		Oregon ash

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H-M	M due to extensive mowed
3. RIPARIAN WQ PROTECTION	M-L	reduced due to extensive mowing
4. FLOOD PLAIN WQ PROTECTION	M	20-50 ft except large wetland at north end
5. NATURAL CONDITION	M-L	dense residential development, large RFZ
6. ECOLOGICAL INTEGRITY	M	native canopy; understory contains invasive blackberry and English ivy and is mowed

CONTRIBUTING FEATURES: Recreation: gravel trails north and south of Fulton Road, bridges crossing stream. Education: George Fox College. Large wetland in flood plain at confluence of Carol Ann Fork (H3).

IMPACTS: Sewerline in flood plain, fill slope for parking lot (south of Fulton, near bridge) eroding into stream; maintained "lawns" in flood plain north of Fulton and portions south of Fulton Road.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. H8	STREAM: Hess	% SLOPE: 26%	FP WIDTH: 100 ft	RFZ: (ft) 300
MAP NO. H 9, 10	LOCATION: Between Southern Pacific Railroad and Mountain View Road		AERIAL: Center	DATE: 2-08-95
OBSERVATION POINT: Villa Road, east of church, H4		ADJACENT LAND USE: Residential		

GENERAL DESCRIPTION: H8 is a portion of Hess Creek located between the Southern Pacific Rail line and Mountainview Road. Dominant land use surrounding this reach is residential; industrial, and open space (lawn) are also present. The flood plain is generally 100 ft wide with a braided channel and includes pondings created by beaver dams. Dominant flood plain vegetation consists of Oregon ash, willow and reed canarygrass. Hillslope vegetation is dominated by Oregon white oak, big leaf maple, and Himalayan blackberry with a few mature oak trees. The proximity of a seasonal stream (H4), large forest (H3-B), and adjacent meadow contribute to the wildlife habitat value of this reach. Water quality has been impacted by siltation; yard debris dumped in backyards and residential and industrial runoff also potentially impact water quality.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* big leaf maple	Indian plum	* Oregon ash
* Oregon white oak	* Himalayan blackberry	* willow
Douglas fir		* reed canarygrass

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, beaver dam, diverse food & cover
3. RIPARIAN WQ PROTECTION	M	limited duff adjacent to residences due to blackberry & reduced vegetation
4. FLOOD PLAIN WQ PROTECTION	H	vegetated with shrubs and emergents
5. NATURAL CONDITION	M	west slope residential, yard debris dumped
6. ECOLOGICAL INTEGRITY	H-M	excellent native canopy; understory mowed in places, reed canarygrass in flood plain.

CONTRIBUTING FEATURES: Unique mature trees (ie white oak behind church). H3-B, H4.

IMPACTS: Landscaped yards, mowing, dumping yard debris (behind residences), siltation of stream. Land use adjacent to the top of east hillslope is industrial.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
H9	Hess Creek	≈ 20%	20 - 40 ft	130 - 280
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
H 7 - 9	North of Mountain View		Center - N	1-21-95
OBSERVATION POINT: Walked east and west slopes		**ADJACENT LAND USE:** Agriculture		

GENERAL DESCRIPTION: H9, upper Hess Creek, is located between Mt. View Rd and the northern study area boundary. Dominant land use surrounding this perennial stream corridor is agriculture (grass field, pasture, and a small filbert orchard). The flood plain is narrow in places and broadens with input from seasonal streams and seeps. Dominant flood plain vegetation includes Oregon ash, red alder, reed canarygrass, and stinging nettles. Hillslopes contain a diverse mixture of coniferous and deciduous vegetation. Dominant species include Douglas fir, big leaf maple, snowberry, and sword fern. Himalayan blackberry is dominant at the forest edge in areas where the understory as been mowed. English ivy is also present in patches. The shrub understory in the south quarter of this reach has been mowed. Pockets of forest habitat located adjacent to the top of hillslopes help buffer the stream corridor from agricultural impacts; they also provide additional food and cover resources for wildlife. Permanent and seasonal pondings provide potential amphibian breeding habitat and refreshment for all wildlife. The northwest fork has been channelized; the riparian function zone in this area was mapped as 100 feet in order to protect water quality (map H7).

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* Douglas fir (mature)	rose	* Oregon ash	vine maple
* big leaf maple (mature)	Indian plum	* red alder	willow
grand fir	ninebark	* reed canarygrass	piggyback
Oregon white oak	Oregon grape	* stinging nettles	horsetail
madrone	* snowberry	black cottonwood	soft rush
red alder	western hazelnut		
western yew	* sword fern		
* Himalayan blackberry	avens		
	* English ivy (pockets)		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover, large open space
3. RIPARIAN WQ PROTECTION	H-M	limited duff where blackberry is dominant
4. FLOOD PLAIN WQ PROTECTION	H-M	floodplain > 25 ft in places & vegetated
5. NATURAL CONDITION	H	large and undeveloped
6. ECOLOGICAL INTEGRITY	H-M	excellent native canopy; understory impacted by blackberry, English ivy, and mowing in places.

CONTRIBUTING FEATURES: Unique habitat in "island" above upper fork; dominated by diverse native species-almost pristine conditions. Additional forest above break in slope on both sides of stream contributes to wildlife habitat, riparian water quality protection, and aesthetics. Wetland seep on west side of stream, 3 seasonal tributaries, and 2 artificial ponds contribute to wildlife habitat.

IMPACTS: Cattle on north end have access to stream and impact water quality. A small dump is located on the top of the eastern hillslope; yard debris, fruit boxes, and plastic oil containers have been bulldozed onto the slope, potentially leaching chemicals into the stream. A fenceline crosses the stream and is a barrier to some wildlife species.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
S1-A	Lower W Fork Springbrook	> 20%	< 25 ft	= 160
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
I 11, 12	SE 99W/Springbrook St		Mid - E	2-08-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Walked		Agricultural		

GENERAL DESCRIPTION: S1-A, the lower west fork of Springbrook Creek, is located between the Fred Meyer entrance off of Springbrook St and Fernwood Rd. Dominant land use surrounding this reach is agriculture (ryegrass and filbert orchards); rural residential is also present in the southwest corner. The flood plain is narrow and contains Oregon ash, willow, and mature black cottonwoods exceeding 3 ft in diameter. Hillslope vegetation consists of Douglas fir, big leaf maple, Indian plum, western hazelnut, willow, sword fern, holly, and English ivy. Pockets of forest habitat located adjacent to the top of the hillslopes help buffer the stream from agricultural impacts; they also provide additional food and cover resources for wildlife. The oak woodlot located south of Fred Meyers contributes additional food, cover, and nesting resources for birds that find refreshment along the stream. The understory of the woodlot is severely disturbed by invasive Himalayan blackberry.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* Douglas fir	western hazelnut	* black cottonwood
* black cottonwood (>3'dbh)	Indian plum	* Oregon ash
willow	sword fern	willow
big leaf maple	English holly	
* Himalayan blackberry	English ivy	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse cover & food, connectivity to additional open space
3. RIPARIAN WQ PROTECTION	H-M	broad hillslopes have shrub understory; duff patchy
4. FLOOD PLAIN WQ PROTECTION	M	limited fringe wetlands
5. NATURAL CONDITION	H	large open space; no development nearby
6. ECOLOGICAL INTEGRITY	M	Himalayan blackberry abundant in margins

CONTRIBUTING FEATURES: Narrow pockets of forest habitat are contiguous with hillslope forests. There is also an Oregon white oak woodlot located approximately 250 ft from the riparian function zone on the north end adjacent to Fred Meyers

IMPACTS: Stream channel incised with narrow fringe wetlands. Agricultural practices have smoothed out natural riparian topographic break and caused erosion of slopes and siltation of stream.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
S1-B	W fork Springbrook Creek	-	0 - 40 ft	≈ 100
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
I 11	SE 99W/Springbrook St		Mid - E	2-08-95
OBSERVATION POINT: Walked from Springbrook Rd at Fred Meyer entrance		**ADJACENT LAND USE:** Commercial		

GENERAL DESCRIPTION: S1-B, an isolated section of the west fork of Springbrook Creek, is located southeast of the intersection of 99W and Springbrook Street. Water flows into the site through two culverts located on the north end. The pond was most likely created as compensatory mitigation for wetland fill and/or water quality protection. Red-winged blackbirds and mallards were observed on-site. The proximity of 99W, Springbrook St., and Fred Meyer's parking lot reduces its value as wildlife habitat. [Note: erosion control fence should be removed from mitigation area and dead trees and shrubs replaced. Eroding areas on east bank should be smoothed out and reseeded; weed control of Scot's broom, thistle, and Himalayan blackberry should be undertaken ASAP. Habitat can easily be improved with willow cuttings along pond margins.]

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN
* bentgrass	Oregon grape	* cattail
* velvetgrass	rose	* soft rush
bullthistle	willow	* slough sedge
Klamath weed	weeping willow	redtop
Scot's broom		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M	(> 20%) steep with side, 28% east side
2. WILDLIFE HABITAT	M-L	permanent water, low cover & food, 99W
3. RIPARIAN WQ PROTECTION	M-L	grassy slopes; some places eroding on E slope
4. FLOOD PLAIN WQ PROTECTION	M	flood control, fringe wetland TYNA
5. NATURAL CONDITION	L	surrounded by commercial development & thoroughfares
6. ECOLOGICAL INTEGRITY	L	created and weedy

CONTRIBUTING FEATURES: ⌀

IMPACTS: Stormwater runoff; adjacent to 99W

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
S1-C	W fork Springbrook	> 20%	ø	≈ 100
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
I 11	NW 99W/Springbrook St		Mid - E	2-08-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Walked		Commercial, Hwy 99W		

GENERAL DESCRIPTION: S1-C, an isolated section of the upper west fork of Springbrook Creek, is located northwest of the intersection of 99W and Springbrook St. It is culverted on each end and surrounded by fill &/or disturbed soils. Hillslope vegetation is dominated by black cottonwood, western hazelnut, willow, and Himalayan blackberry. Blackberry on the flat surrounding the site has been sprayed and mowed recently. This reach is surrounded by commercial development and 99W.

DOMINANT VEGETATION:

HILLSLOPES

* black cottonwood
* willow
  western hazelnut
* Himalayan blackberry

FLOOD PLAIN

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	steep slopes > 20%
2. WILDLIFE HABITAT	M-L	isolated; adjacent to 99W, water
3. RIPARIAN WQ PROTECTION	L	Himalayan blackberry-no duff; fill
4. FLOOD PLAIN WQ PROTECTION	L	no flood plain
5. NATURAL CONDITION	L	surrounded by commercial development & 99W
6. ECOLOGICAL INTEGRITY	L	Himalayan blackberry is dominant

CONTRIBUTING FEATURES: adjacent meadow

IMPACTS: tire and debris in channel; surrounded by fill and disturbed soils.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. S1-D	STREAM: W fork Springbrook	% SLOPE: -	FP WIDTH: ⌀	RFZ: (ft) - 200 +
MAP NO. I 10	LOCATION: Upper West fork between Aquarius Blvd & Springbrook St.		AERIAL: Middle - E	DATE: 1-19-95
OBSERVATION POINT: Walked		ADJACENT LAND USE: Residential & Commercial		

GENERAL DESCRIPTION: S1-D, the upper west fork of Springbrook Creek, is located southeast of the intersection of Springbrook Rd and Aquarius Blvd. It is a large forested, scrub-shrub, emergent wetland complex with pockets of upland. Dominant land use surrounding S1-D includes residential and commercial uses.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN	
tall fescue (mowed)	* Oregon ash	red osier dogwood
	* Nootka rose	spirea
	* Reed canarygrass	slough sedge
	* meadow foxtail	creeping buttercup
	* American speedwell	Himalayan blackberry

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	L	gentle slope
2. WILDLIFE HABITAT	H-M	isolated but fairly large w/diverse structure; habitat mosaic
3. RIPARIAN WQ PROTECTION	M	turf
4. FLOOD PLAIN WQ PROTECTION	H	flat & forested or emergent
5. NATURAL CONDITION	M	large; surrounded by residential & commercial development
6. ECOLOGICAL INTEGRITY	M	Reed canarygrass, blackberry; canopy native

CONTRIBUTING FEATURES: ⌀

IMPACTS: Past dumping of concrete chunks, pipe; stormwater runoff

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO. S2	STREAM: Middle Springbrook Creek	% SLOPE: 10 +	FP WIDTH: ⌀	RFZ: (ft) 100 - 150
MAP NO. J 12	LOCATION: Tributary to Middle Springbrook Creek		AERIAL: Middle - E	DATE: 2-08-95
OBSERVATION POINT: Walked edge of riparian zone		ADJACENT LAND USE: Agriculture (grass seed)		

GENERAL DESCRIPTION: S2 is a seasonal tributary to Springbrook Creek (S3). Dominant land use surrounding S2 is agriculture (ryegrass field). Agricultural practices potentially cause degradation of water quality with erosion of sediments into the stream. Dominant vegetation include Oregon ash, English ivy and blackberry. Red osier dogwood is also dominant near the confluence with Springbrook Creek. The value of this stream increases due to its location and connectivity with S3. The riparian function zone was mapped as 100 ft where slopes were less than 20%.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* Oregon ash	tall Oregon grape	* Oregon ash	hedgenettle
* English ivy	Western hazelnut	* red osier dogwood	piggyback plant
* Himalayan blackberry	Indian plum	willow	spreading rush
trailing blackberry	red elderberry		
sword fern	snowberry		

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	M-H	> 10% slope
2. WILDLIFE HABITAT	H-M	seasonal water, connected to large diverse habitat
3. RIPARIAN WQ PROTECTION	M	riparian vegetation disturbed; duff patchy
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain until confluence
5. NATURAL CONDITION	H	large open space
6. ECOLOGICAL INTEGRITY	M	dominated by English ivy and blackberry in places

CONTRIBUTING FEATURES: S3

IMPACTS: Field eroding into creek; two small gullies (probably due to unseasonably heavy rains this year and recent planting of field). Hay bales placed to curtail erosion.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
S3	Middle Springbrook Creek	35	100 ft +	350 +
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
J 11,12; K 11,12	N of Fernwood		Middle - E	2-03-95
OBSERVATION POINT: Walked drainage		**ADJACENT LAND USE:** Agriculture, Forest		

GENERAL DESCRIPTION: S3, Middle Springbrook Creek, is located in the middle of the eastern boundary of the study area north of Fernwood Road. Dominant land use surrounding S4 is agricultural (ryegrass fields) and undeveloped forest land. Springbrook Creek meanders through a broad flood plain (100 ft+). Dominant flood plain vegetation includes reed canarygrass, red-osier dogwood, and red alder. Steep hillslopes are vegetated with Douglas fir, Oregon Ash, snowberry, sword ferns and a variety of other species. Large forested and open habitat is full of singing birds such as winter wren, chickadee, bushtit, towhee and song sparrows and also includes signs of deer, raccoon, and beaver. The broad flood plain and riparian function zone maintain water quality protection and provide high quality wildlife habitat. A seasonal stream and a large adjacent undeveloped forest further contribute to the aesthetics, uniqueness, and diversity of habitats in S3.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
* Douglas fir	bald hip rose	* Oregon ash	* Reed canarygrass
* Oregon ash	oceanspray	* red alder	Douglas spirea
* salal	Indian plum	* willow	Nootka rose
* snowberry	English ivy	* red osier dogwood	common scouring rush
* sword fern	Himalayan blackberry		
big leaf maple			

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & cover, connectivity
3. RIPARIAN WQ PROTECTION	H	moss and duff; well developed in east
4. FLOOD PLAIN WQ PROTECTION	H	broad flood plain, meandering channel
5. NATURAL CONDITION	H	large adjacent open space
6. ECOLOGICAL INTEGRITY	H	Reed canarygrass, English ivy & Himalayan blackberry are present but native species are generally dominant.

CONTRIBUTING FEATURES: S3, middle Springbrook Creek, is located in the middle of the eastern boundary of the study area north of Fernwood Rd. Dominant land use surrounding S3 is agriculture (ryegrass fields) and undeveloped forest land. Springbrook Ck meanders through a broad flood plain (100 ft.+). Dominant flood plain vegetation includes reed canarygrass, red-osier dogwood, and red alder. Steep hillslopes are vegetated with Douglas fir, Oregon ash, snowberry, sword fern and a variety of other species. The large forested and open habitats are full of song birds such as winter wren, chickadee, bushtit, towhee, and song sparrow and also include signs of deer, raccoon, and beaver. The broad flood plain and riparian function zone maintain water quality protection and provide high quality wildlife habitat. A seasonal stream and a large undeveloped forest further contribute to the aesthetics, uniqueness, and diversity of habitats in S3.

IMPACTS: Agricultural surface runoff-from tilling, plowing, herbicides (?)

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
S4	Upper Springbrook Creek	≈ 35	⌀	≈ 220
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
J 8, 9	Putnam Road		NE	1-19-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Putnam Road		Agriculture w/ rural residences		

GENERAL DESCRIPTION: S4, Upper Springbrook Creek, is located in the northeast corner of the study area in the vicinity of the Southern Pacific Railroad line and Putnam Road. Dominant land use surrounding S4 is agriculture (grass fields and hazelnut orchards) and rural residential. The stream flows through steep hillslopes. Vegetation is dominated by Douglas fir and Himalayan blackberry. The stream gradient is steep enough to limit flood plain development. The riparian function zone is approximately 220 ft wide.

DOMINANT VEGETATION:

HILLSLOPES	FLOOD PLAIN
* Douglas fir	oceanspray
Oregon ash	red elderberry
Oregon white oak	orchard grass
* Himalayan blackberry	tall fescue
western hazelnut	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	> 20% slope
2. WILDLIFE HABITAT	H	water, diverse food & structure
3. RIPARIAN WQ PROTECTION	M-L	Himalayan blackberry dominant; limited duff
4. FLOOD PLAIN WQ PROTECTION	L	limited flood plain
5. NATURAL CONDITION	H	surrounded b agricultural land & rural residences
6. ECOLOGICAL INTEGRITY	M	dominance of Himalayan blackberry in understory; canopy is native

CONTRIBUTING FEATURES: Mixed coniferous/deciduous forest extends southeast from southern boundary within and outside the study area; contributes to wildlife habitat providing food and cover for all wildlife species and hunting perches for raptures.

IMPACTS: Hay field on west hillslope; potential cause of erosion and degradation of water quality and native vegetation.

* major dominant
** L = Low, M = Moderate, H = High

STREAM REACH ASSESSMENT

SITE NO.	STREAM:	% SLOPE:	FP WIDTH:	RFZ: (ft)
W1	Willamette	> 20%	-	200 - 375
MAP NO.	**LOCATION:**		**AERIAL:**	**DATE:**
G 14, 15	Between Chehalem and Hess Creeks		SW & Center S	2-28-95
OBSERVATION POINT:		**ADJACENT LAND USE:**		
Rogers Landing		Agriculture, Industrial		

GENERAL DESCRIPTION: W1 is a small portion of the Willamette River between Chehalem and Hess Creeks. Dominant land uses surrounding this site are agricultural and industrial. Hillslopes and flood plain contain diverse vegetation where not disturbed by quarry or clearing activities. Hillslope vegetation is dominated by big leaf maple, Douglas fir, western hazelnut, snowberry, sword fern, black hawthorn, scouring horsetail, Himalayan blackberry, and English ivy. Flood plain wetlands and lower slope vegetation are dominated by black cottonwood, Oregon ash, red osier dogwood, willow, and reed canarygrass.

DOMINANT VEGETATION:

HILLSLOPES		FLOOD PLAIN	
lower	upper		
black cottonwood	big leaf maple	Oregon ash	black cottonwood
black hawthorn	Douglas fir	snags	purple loosestrife
red osier dogwood	sword fern	red alder	reed canarygrass
snowberry	English ivy	willow	scouring horsetail
Himalayan blackberry	western hazelnut	red osier dogwood	

ENVIRONMENTAL VALUES	Rating **	comments
1. EROSION POTENTIAL	H	very steep slopes > 20%
2. WILDLIFE HABITAT	H	water, diverse plant communities, food & cover
3. RIPARIAN WQ PROTECTION	H-M	patchy duff, steep slopes, large area
4. FLOOD PLAIN WQ PROTECTION	H-M	large forested/emergent flood plain
5. NATURAL CONDITION	H-M	large size, hillslope, quarry
6. ECOLOGICAL INTEGRITY	H-M	reed canarygrass, purple loosestrife

CONTRIBUTING FEATURES: Recreation: public boat dock and launch

IMPACTS: Quarry disturbance, sewage treatment plant, and paper mill potentially reduce water quality. Invasive species are common. There is a small population of purple loosestrife in the lower wetland in the fenced off area west of the parking lot. Purple loosestrife could spread downstream; since it is notorious for degrading wetlands in the mid-west it should be removed to curtail its spread.

* major dominant
** L = Low, M = Moderate, H = High

Table 1. City of Newberg Stream Corridor Inventory: Environmental Values Assessment

Site No.	Location	EP	WH	R-WQP	FP-WQP	NC	EI	H	M	L	FP(ft.)	RFZ(ft.)	LU	Map No.
C1-A	Between RXR & mouth	H	H	M	L	H	M	3	2	1	5	250	A	F14,G14
C1-B	SE & SW College/Andrew	H	H	H-M	L	L	M	3	2	2	5	250	R	G13,14
C2	Dayton Fork	H	M	M	M	L	M-L	1	4	2	20	175	R	F13
C3-A	Lower Marguerite Fork	H	H-M	M	L	M	M	2	4	1	0	150	R,I	F11
C3-B	Upper Marguerite Fork	M	M-L	M-L	L	L	M-L	0	4	5	0	<100	R	F10,11,G10
C4	Betw. Dayton & Willamette	H	H	H	H	H	H	6	0	0	100	575	A	F13,15
C5	Betw. Sunnycrest & Dayton	H	H	H-M	H	H	M	5	2	0	100	600	R	E12,F12,13
C6	Betw. Pinehurst & Sunnycrest	H	H	M	M	M	M	2	4	0	25	300	R	E12,F10,12
C7	Between Lynn & Pinehurst	L	M-L	M	L	L	L	2	2	3	0	<100	A	F9,10
C8	Between Main & Oxford Ln.	M-L	M-L	M	M-L	L	M-L	0	5	5	10	<100	R	F9,G8,9
C9	Between Crater Ln & Quail Dr	L	L	L	L	L	M-L	0	1	6	0	<100	A,R	F8
C10	Between Hwy 219 & No.140	L	M-L	M	M	L	L	0	3	4	50	<100	A	G7
H1	SE Fork of Hess Cr.	H	H	M	M	M	M	2	4	0	20	300	A,I,R	H14,I13,14
H2-A	Lower E Fork of Hess	H	H	M	M	H	M	3	3	0	50	200	A	H13
H2-B	East Fork of Hess	M	H	H	L	H	M	3	2	1	25	100	A	H12
H2-C	Upper East Fork Hess	M-L	L	L	L	L	L	0	0	6	6	<100	R	H12
H3-A	Lower Carol Ann Fork	H	M-L	M	L	L	M-L	1	3	4	0	100	R	H10
H3-B	Upper Carol Ann Fork	L	H	H	L	M	H-M	3	2	2	0	100	F,R	H9,10,I9
H4	West of Herman St.	M	M-L	L	L	M	M-L	0	4	4	0	100	R	H9,10
H5	Between 9th & Wynooski	H	H	M	H	H	M	4	2	0	100	450	A	H13,14
H6	Between Hwy 99W & 9th	H	H	M	H	H-M	M	4	3	0	100	440	R	G12,H12,13
H7	Between SPRR & Hwy 99W	H	H-M	M-L	M	M-L	M	2	5	2	35	250	R	G11,12,H10,11
H8	Between Mt.View & SPRR	H	H	M	H	M	H-M	4	3	0	100	300	R	H9,10
H9	North of Mt.View Rd.	H	H	H-M	H-M	H	H-M	6	3	0	30	200	A	H7-9
S1-A	SE Hwy 99W/Springbrook	H	H	H-M	M	H	M	4	3	0	25	160	A	I11,12
S1-B	SE Hwy 99W/Springbrook	M	M-L	M-L	M	L	L	0	4	4	30	100	C	I11
S1-C	NW Hwy 99W/Springbrook	H	M-L	L	L	L	L	1	1	5	0	100	C	I11
S1-D	SE Aquarius/Springbrook	L	H-M	M	H	M	M	2	4	1	0	200	R,C	I10
S2	North of Fernwood	H-M	H-M	M	L	H	M	3	4	1	0	125	A	J12
S3	North of Fernwood	H	H	H	H	H	H	6	0	0	100	350	A,F	J11,12;K11,12
S4	Putnam Rd.	H	H	M-L	L	H	M	3	2	2	0	220	A	J8,9
W1	Betw. Chehalem & Hess Crks	H	H	H-M	H-M	H-M	H-M	6	4	0	>100	300	A,I	G14,15

EP - erosion potential, WH - wildlife habitat, R - riparian, WQ - water quality protection, NC - natural condition, EI - ecologic integrity, RFZ - riparian function zone, LU - land use

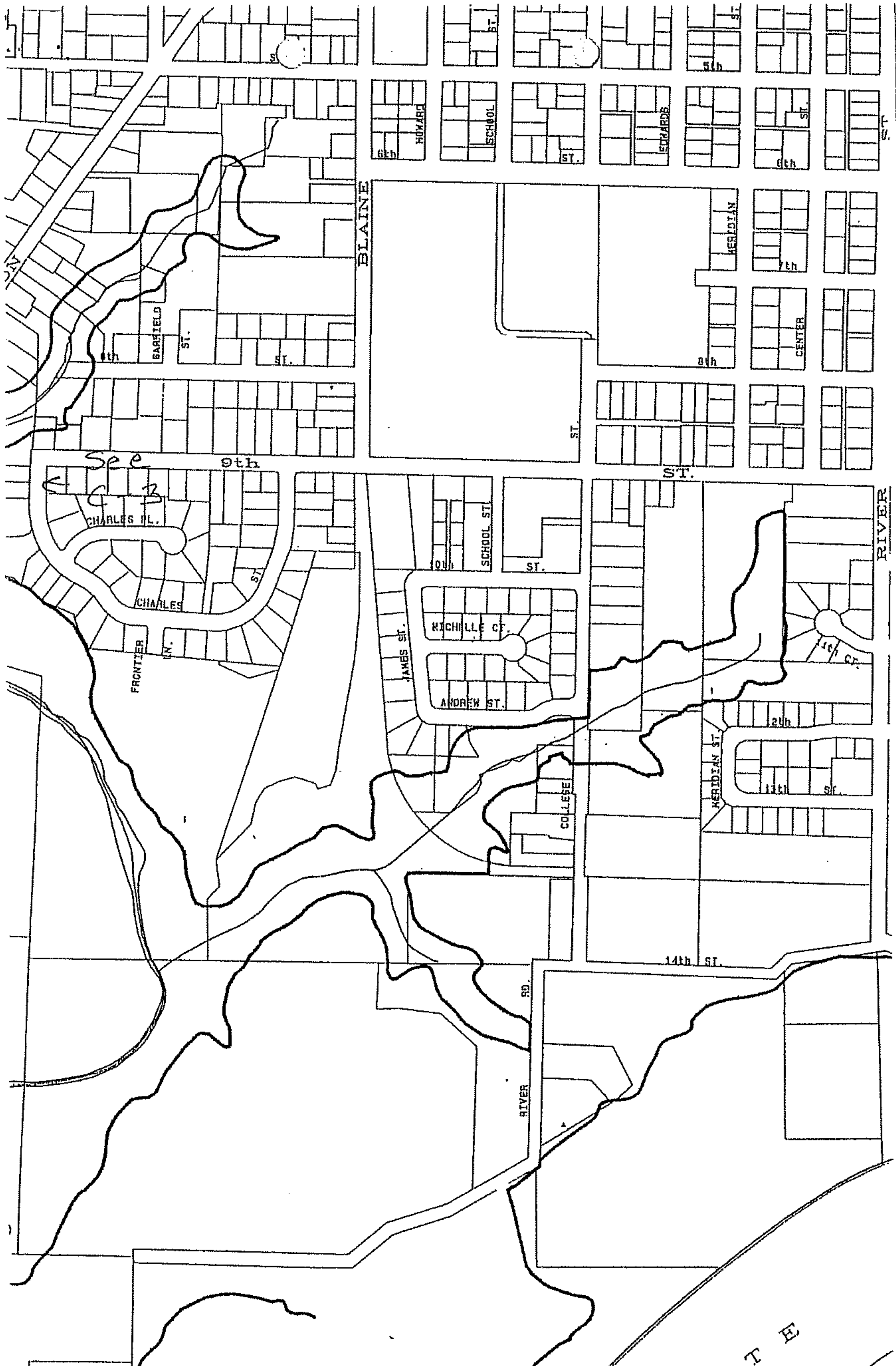
EXHIBIT A.3.A.

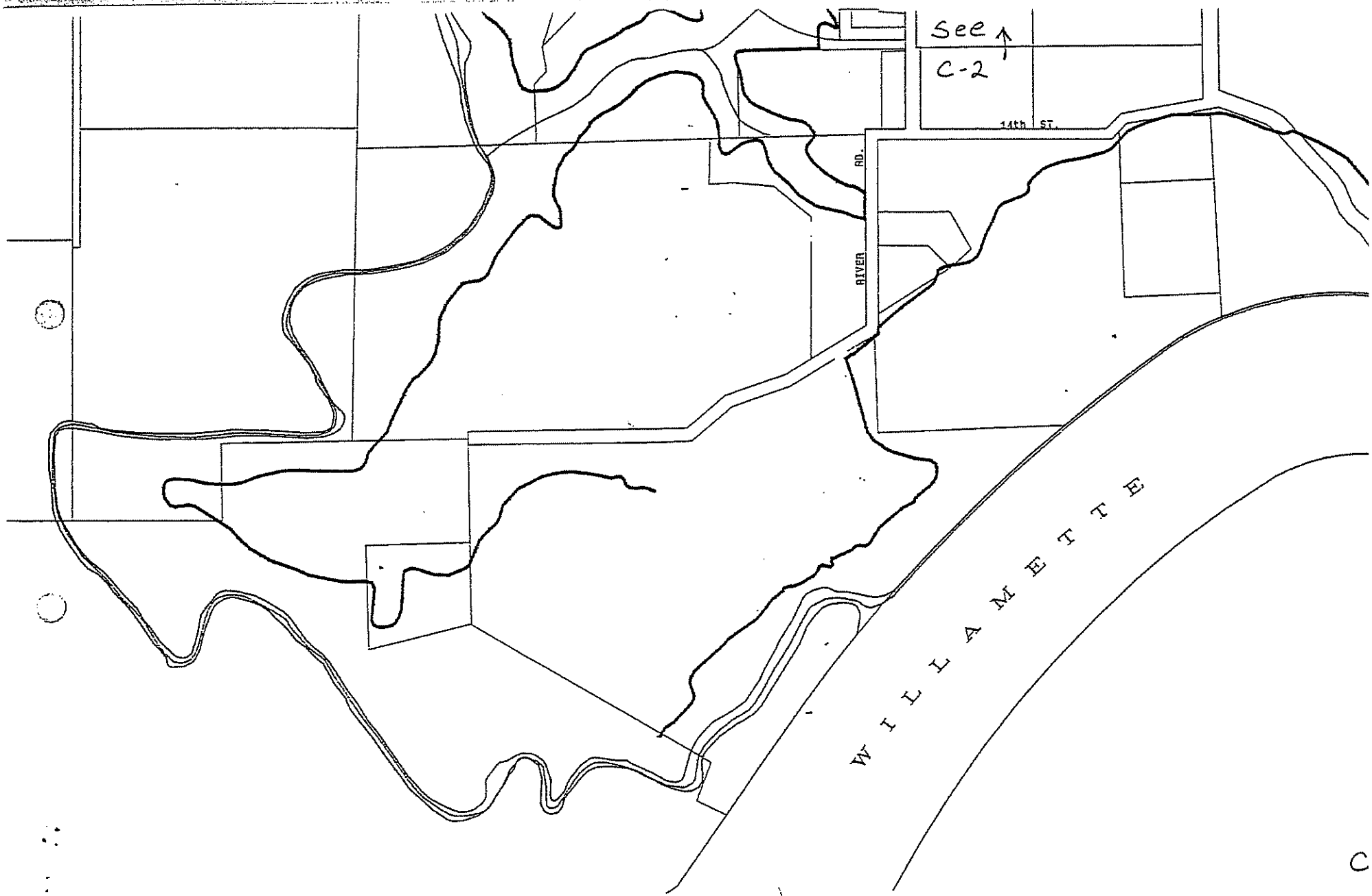
THE ATTACHED MAPS ARE CONCEPTUAL AND ARE FOR REFERENCE ONLY:

CHEHALEM CREEK REACH
SPRINGBROOK CREEK REACH
HESS CREEK REACH

The official Stream Corridor Maps are 100 scale aerial topographic maps that will be kept on file at the Community Development Department (File CPA-1-95). The maps will also be digitized and placed on the Newberg Zoning Map and Newberg Comprehensive Plan Map.

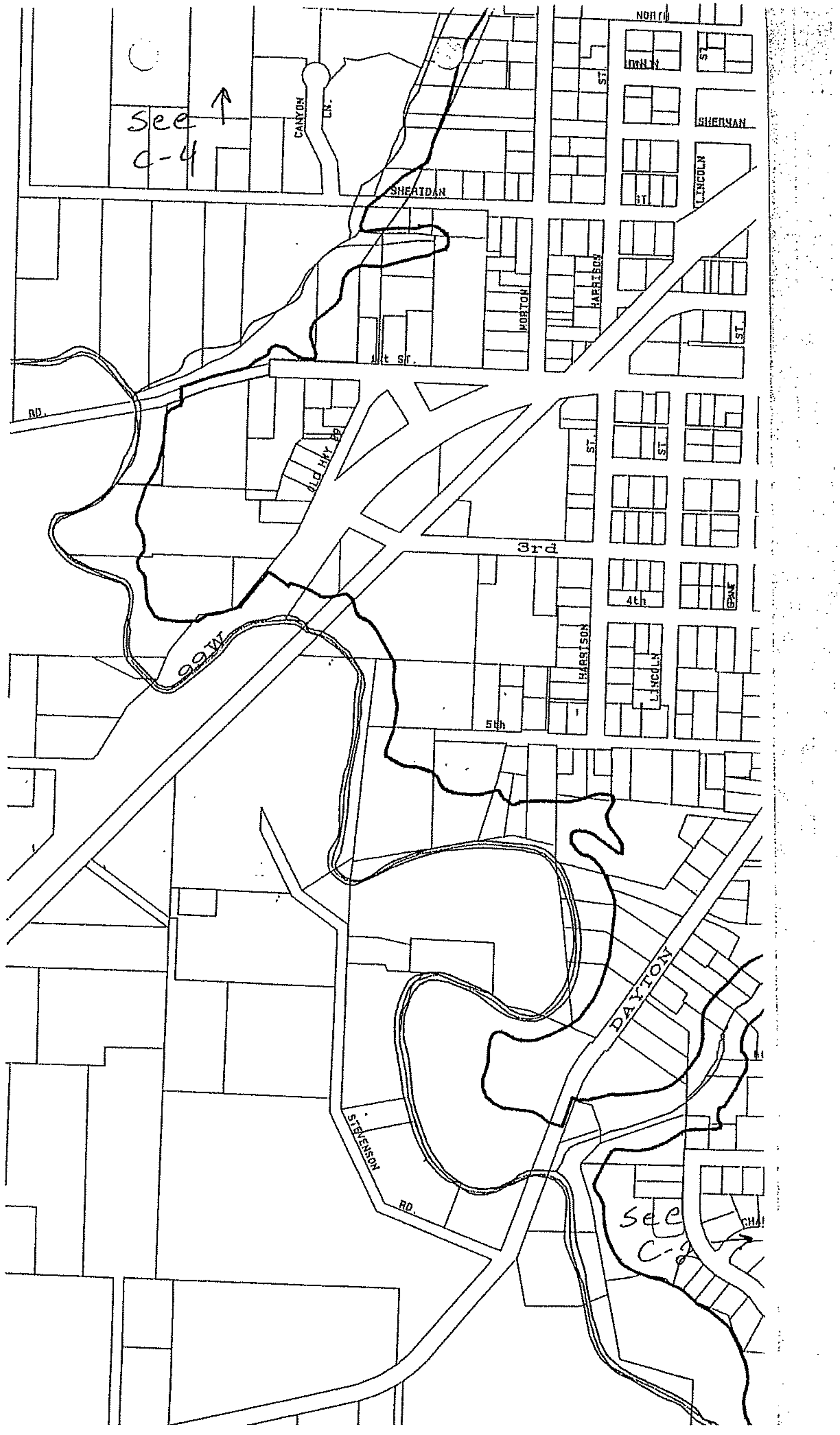
CHEHALEM CREEK REACH


BLAINE
5th
6th
HOWARD
SCHOOL
ST.
EDWARDS
MERIDIAN
7th
CENTER
8th
GARFIELD
ST.
9th
ST.
CHARLES PL.
CHARLES
FRONTIER
LN.
10th
SCHOOL ST.
JAMES ST.
MICHELLE CT.
ANDREW ST.
RIVER
11th CT.
12th
MERIDIAN ST.
13th
COLLEGE
14th ST.
RD.
RIVER


See
C-2
14th ST.
RIVER RD.
WILLAMETTE

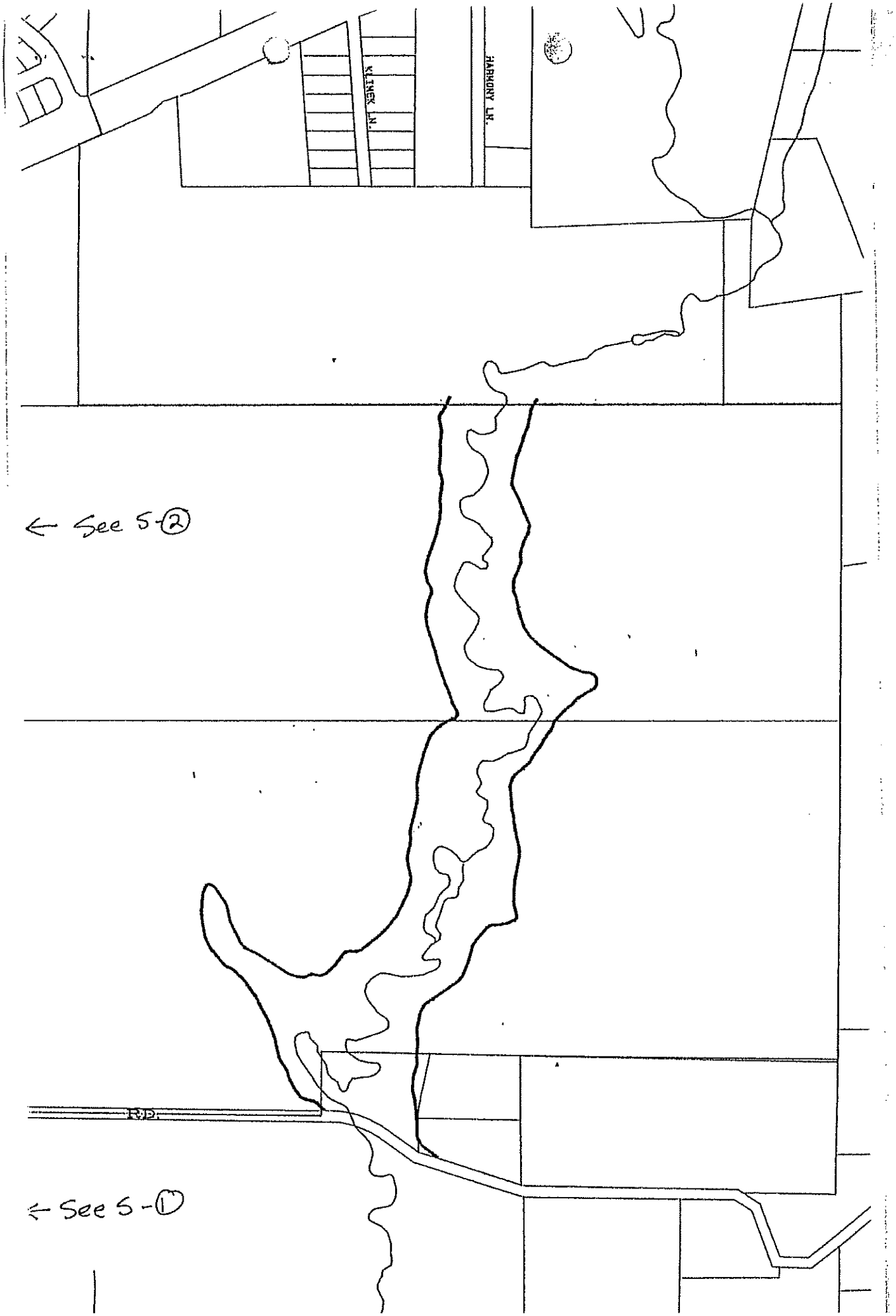

MOUNTAINV
MOUNTAINVIEW
CT.
MELODY CT
MELODY
PROSPECT
DR.
RUSSET LN.
VALERI DR
LYNN DR.
MAIN
ST.
CRESTVIEW DR.
COLUMBIA
DRIVE
ASHLEY CT.
PINEHURST CT.
PINEHURST
CHEHALEM
HARRIS WAY
MARGUERITE WAY
MISSION
RENTFRO WAY
HWY
ILLINOIS ST
ST.

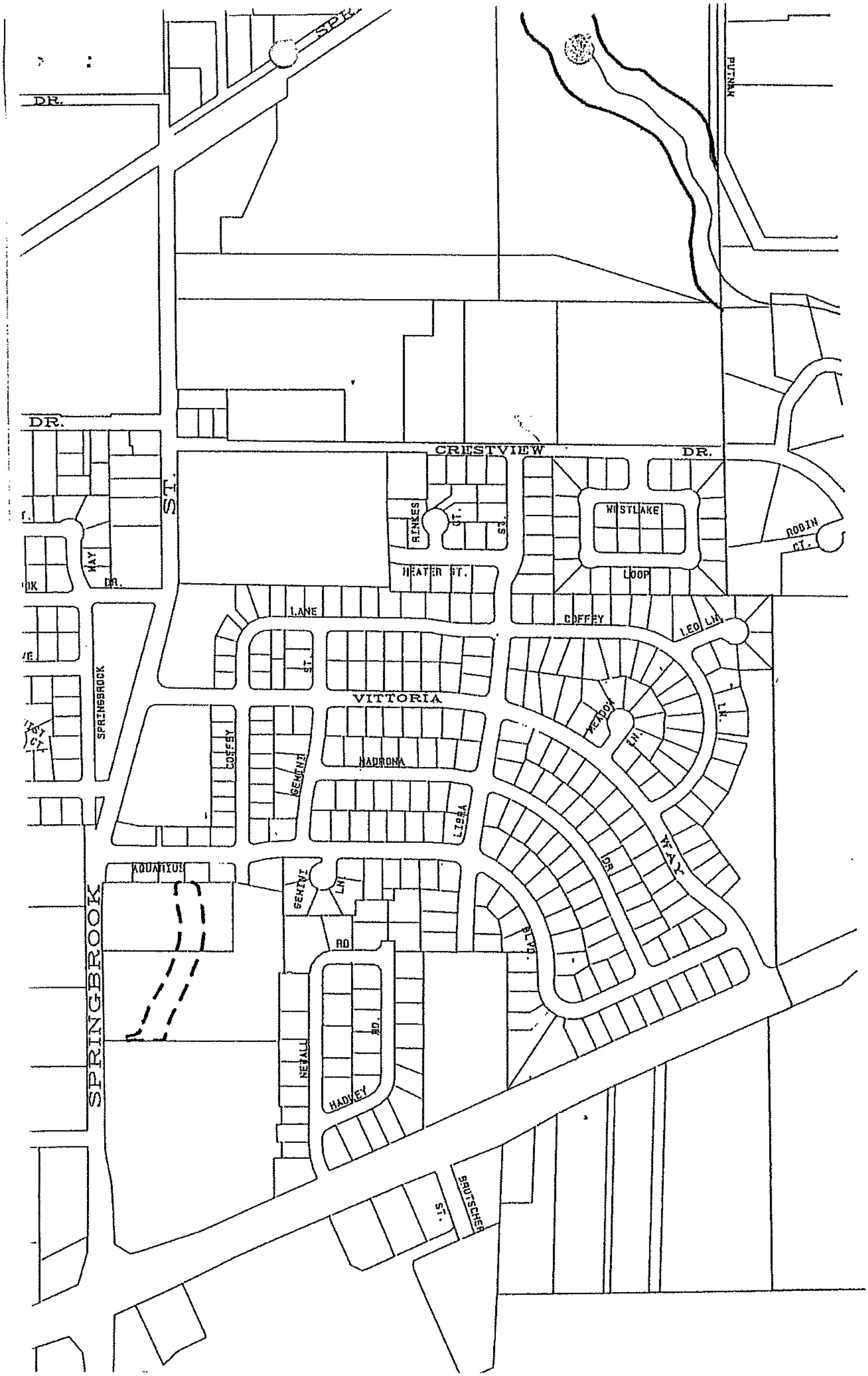

See C-5
COLUMBIA
DRIVE
AMULET CT.
PINEHURST CT.
PINEHURST
JERUSALEM
MAIN
HARRIS WAY
ALAMEDA WAY
MISSION
HWY
240
HONEY LN.
ILLINOIS
NORTH
ST.
GRANT ST.
CANYON
LN.
SHERIDAN
SHERMAN ST.
LINCOLN

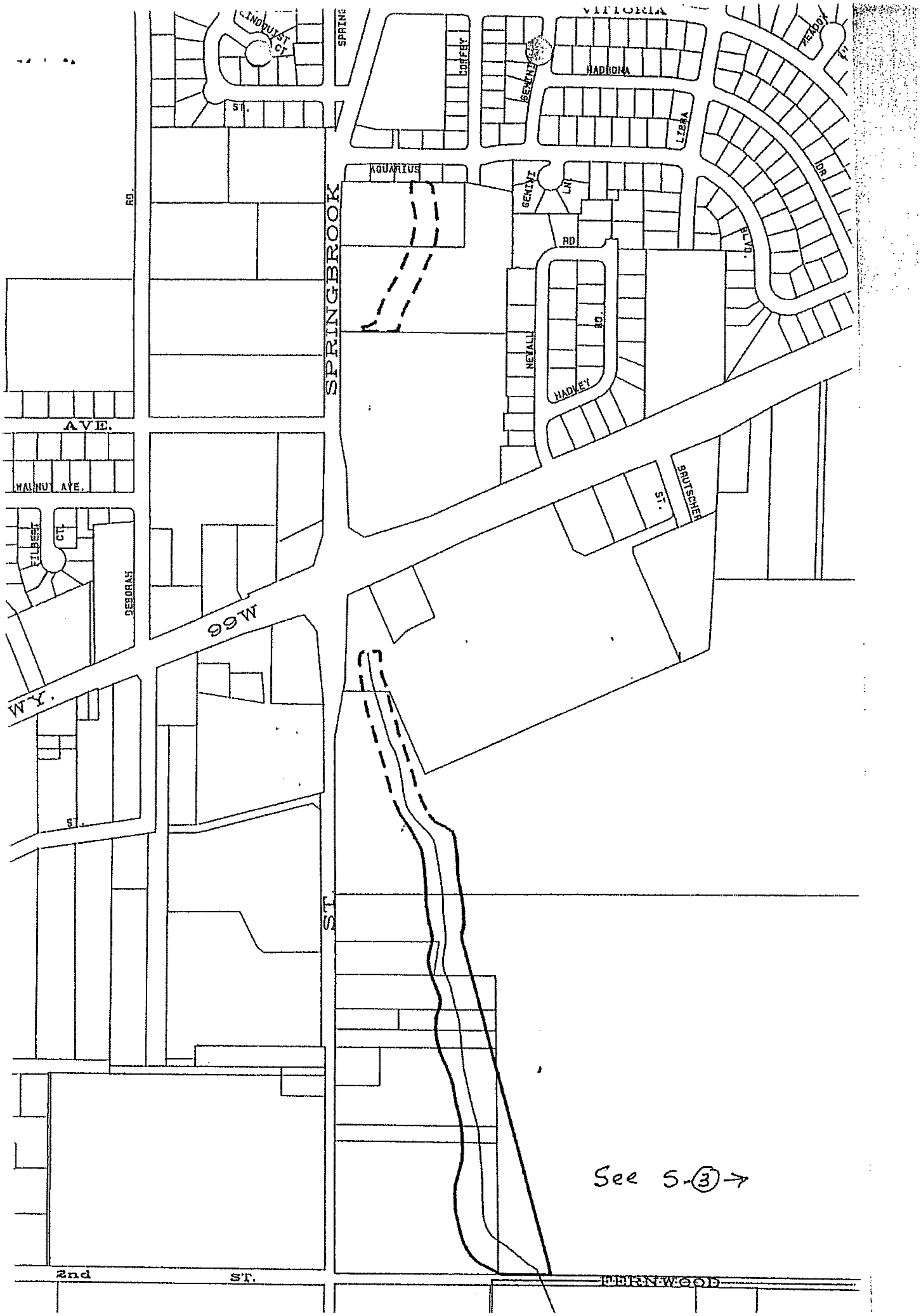


See C-4
CANYON
LN.
SHERIDAN
SHERMAN
LINCOLN
MORTON
HARRISON
1st ST.
RD.
OLD HWY 99
3rd
4th
5th
99W
HARRISON
LINCOLN
DAYTON
STEVENSON
RD.

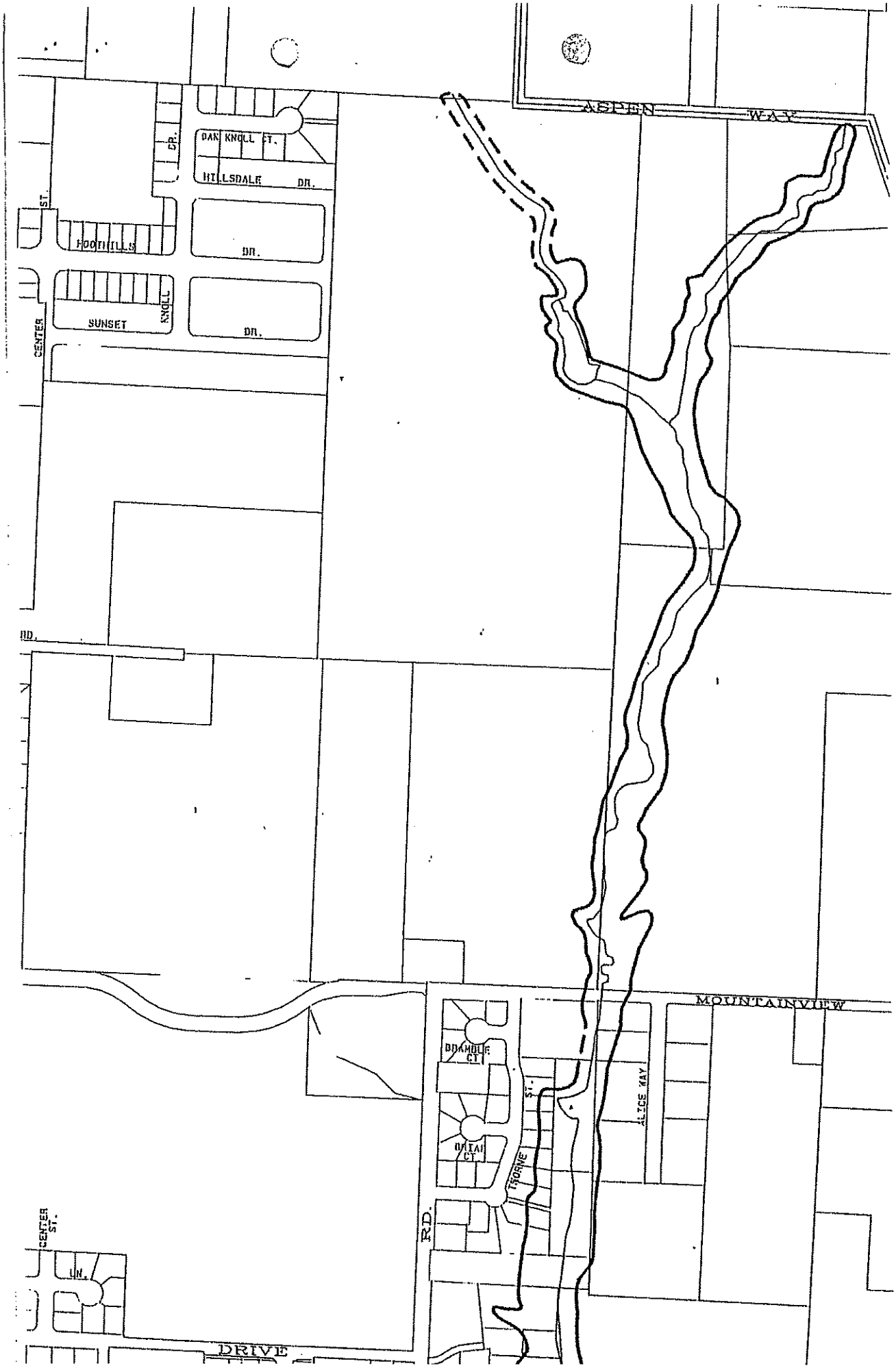
SPRINGBROOK CREEK REACH

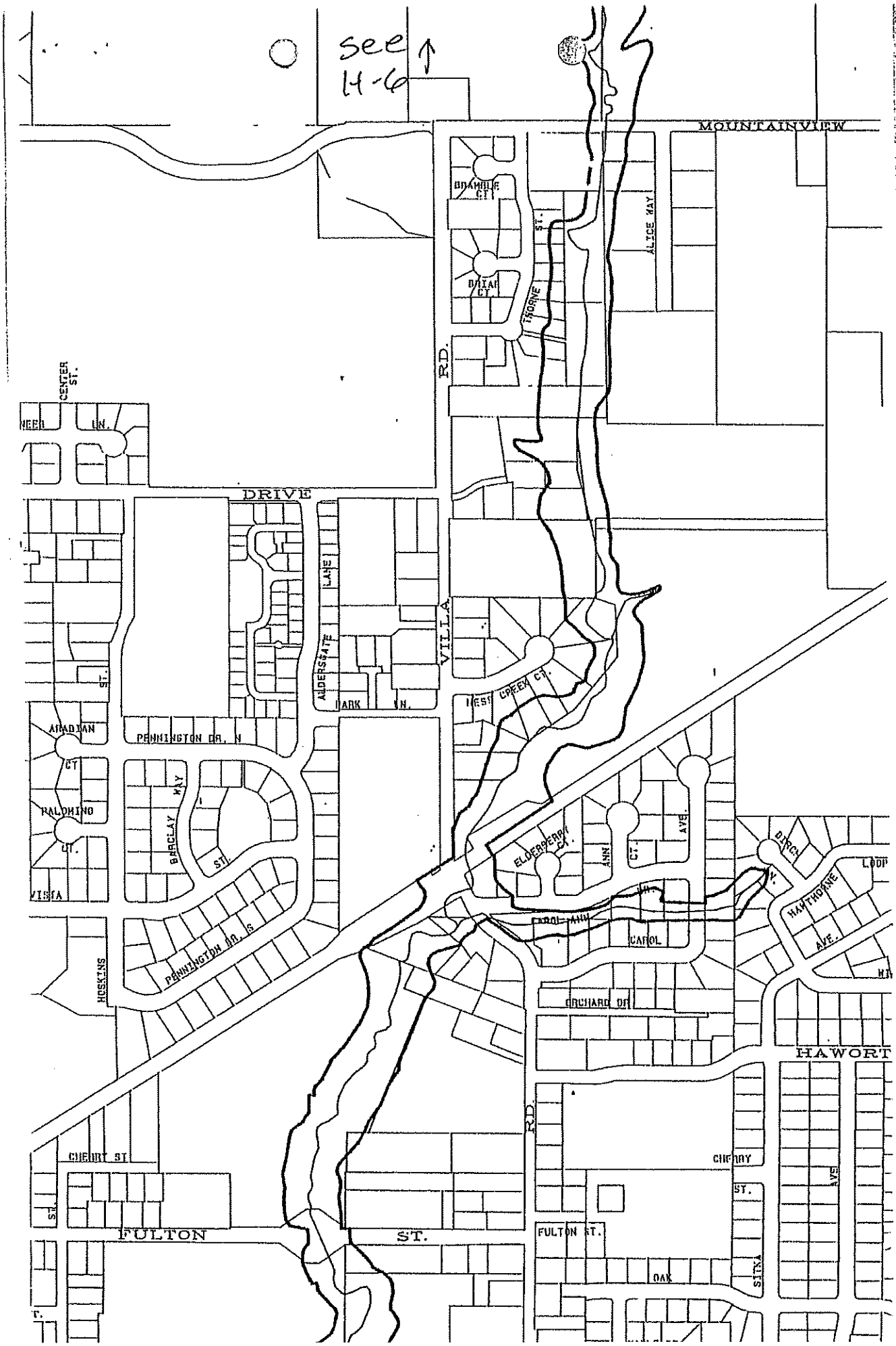

KLINEX LN.
HARMONY LN.
R.R.
← See S-②
← See S-①

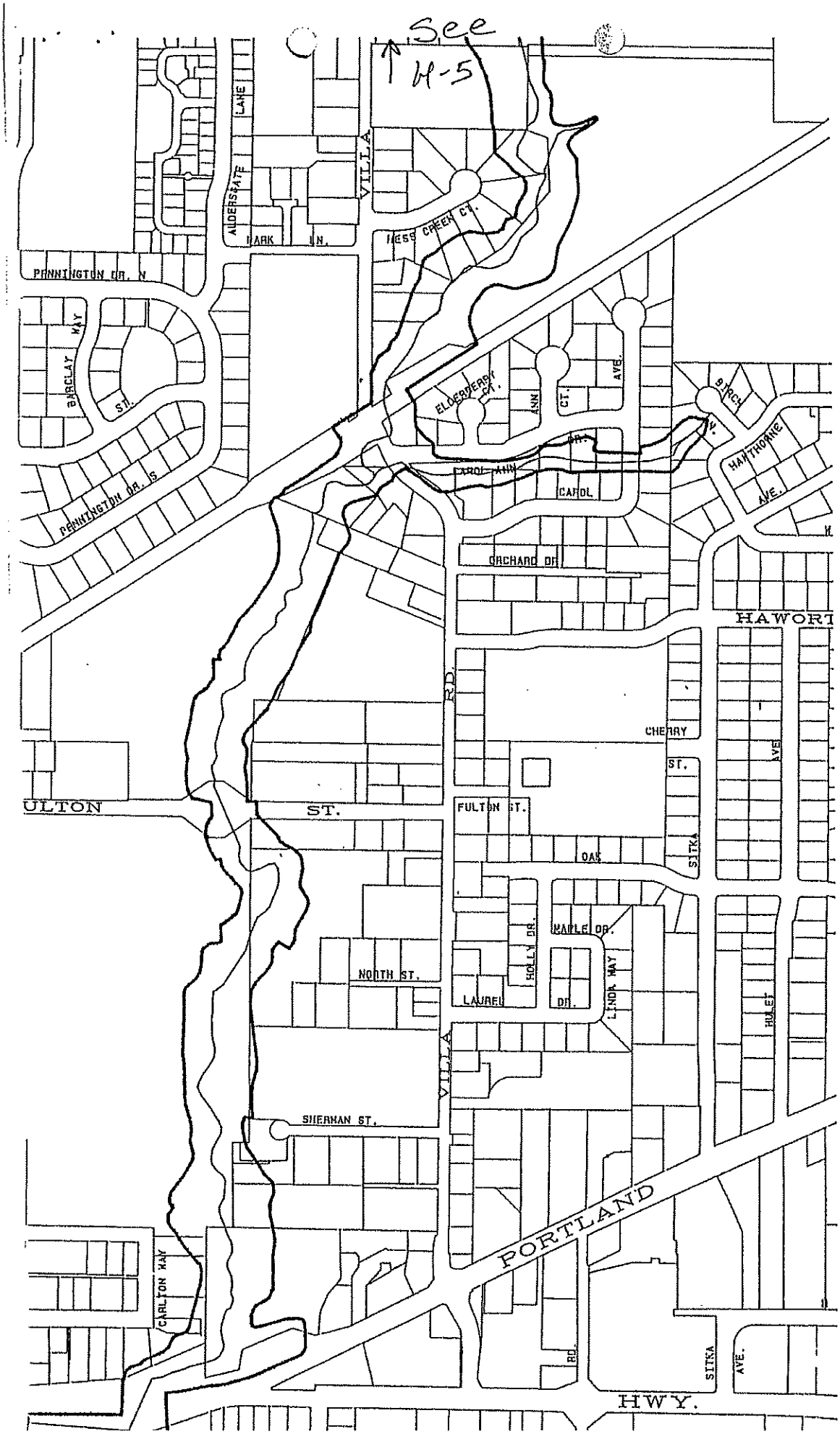

SPR
DR.
PUTNAM
DR.
CRESTVIEW
DR.
ST.
WESTLAKE
LOOP
RINKES
CT.
ST.
HEATER ST.
ROBIN
CT.
WAY
DR.
LANE
COFFEY
LEO LN.
ST.
VITTORIA
SPRINGBROOK
COFFEY
GEMINI
MADRONA
MEADOW
LN.
LN.
LISBA
DR.
WAY
AQUARIUS
GEMINI
LN.
RD
BLVD.
NEWALL
RD.
HADLEY
SPRINGBROOK
ST.
BRUTSCHER

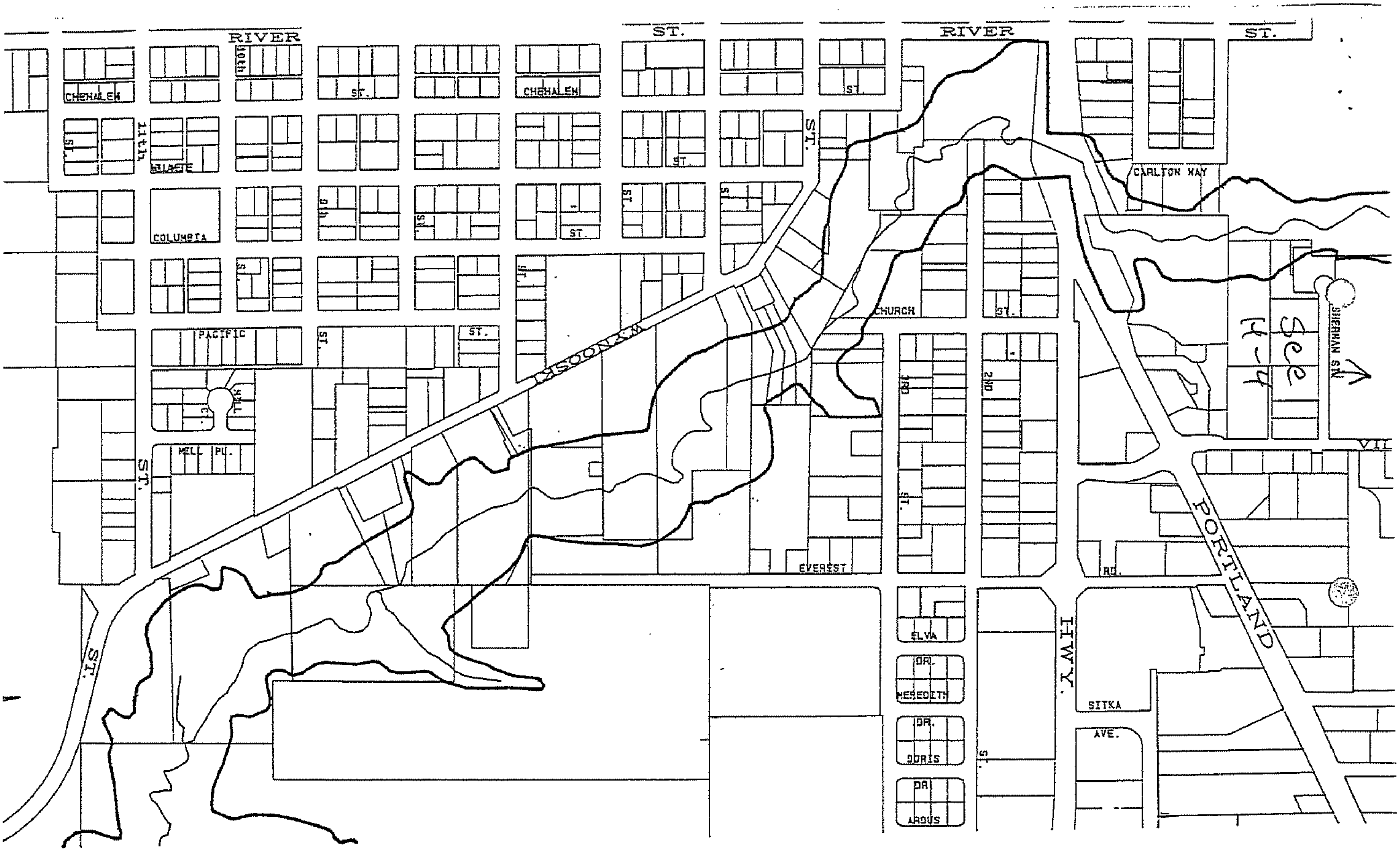

VITTORIA
LINDQUIST CT
SPRING
COFFEY
GEMINI
MADRONA
ST.
LIBRA
AQUARIUS
GEMINI LN
RD.
RD
SPRINGBROOK
BLVD.
NEWALL
SQ.
HADLEY
AVE.
WALNUT AVE.
BRUTSCHER
ST.
FILBERT CT
DEBORAH
99W
WY.
ST.
ST.
2nd ST.
FERNWOOD
See S-③ →

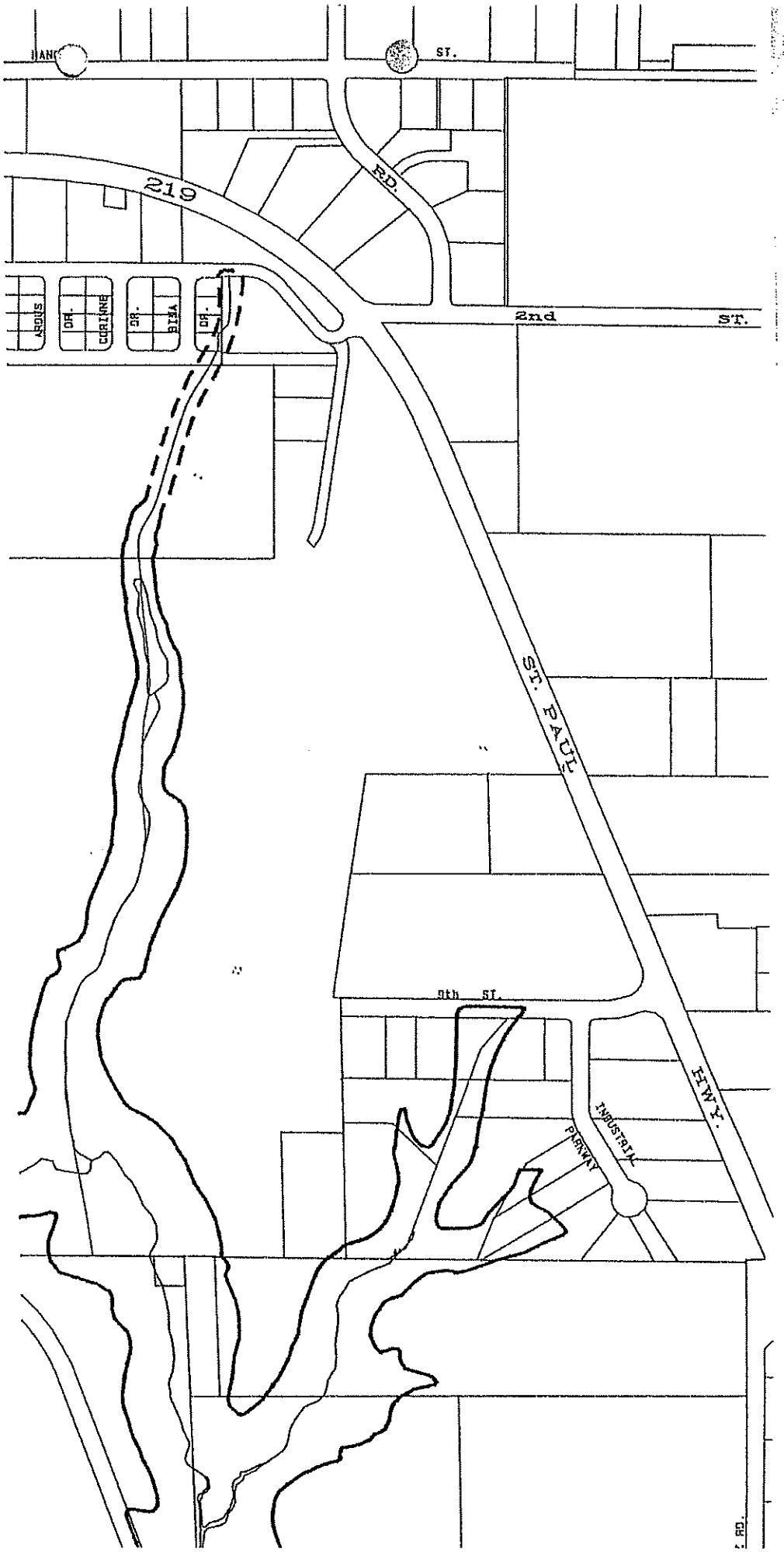
HESS CREEK REACH


ASPEN WAY
OAK KNOLL CT.
HILLSDALE DR.
DR.
HOOTHILLS
DR.
SUNSET KNOLL
DR.
CENTER
RD.
MOUNTAINVIEW
BRAMBLE CT
ALICE WAY
RD.
CENTER ST.
DRIVE

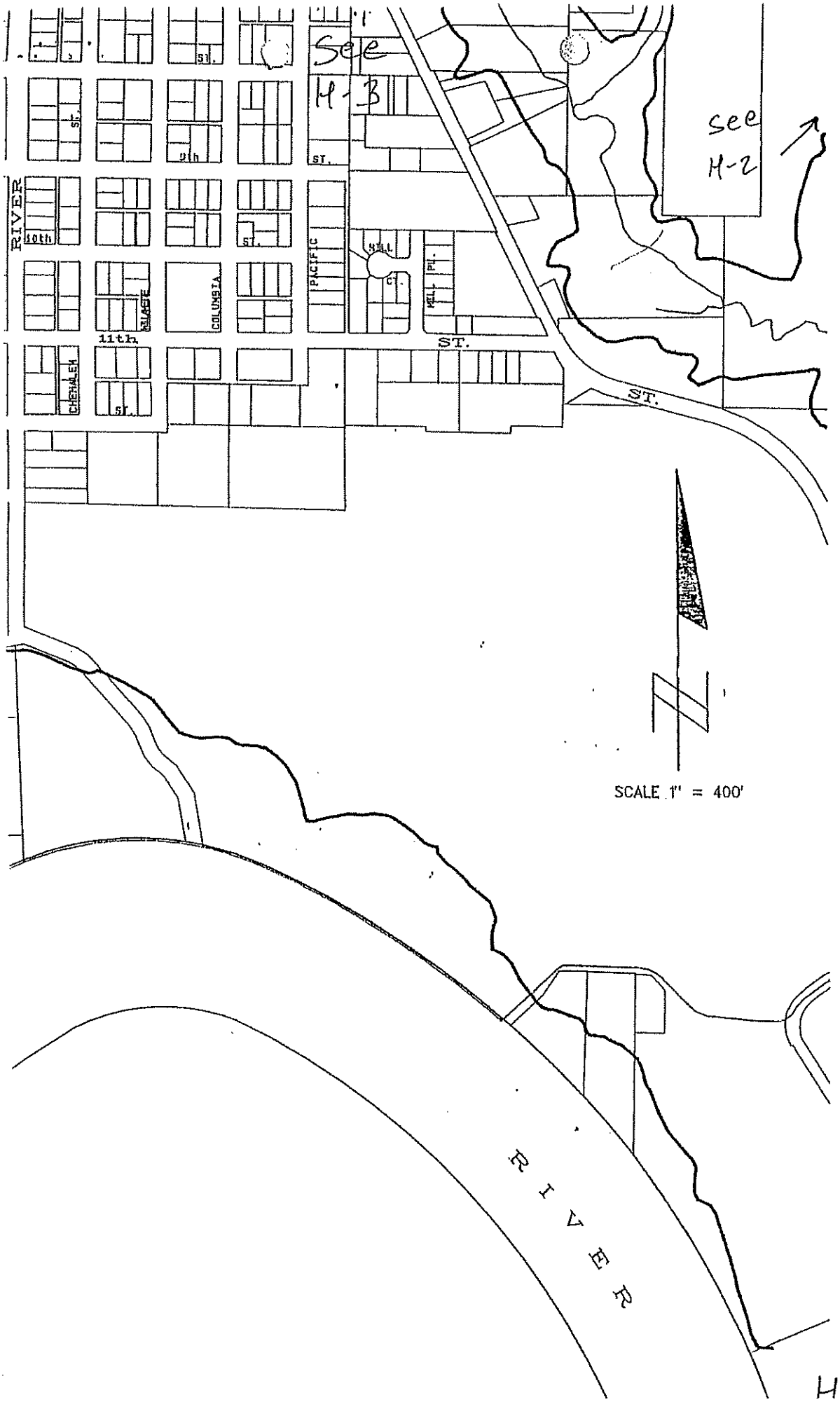

see 14-6
MOUNTAIN VIEW
BRAMBLE CT.
BRIAR CT.
ALICE WAY
THORNE
RD.
CENTER ST.
DRIVE
VILLA
ALDERGATE LANE
PARK LN.
WEST CREEK CT.
AMADIAN CT.
PENNINGTON DR. N
RALPHINO CT.
BARCLAY WAY
ST.
VISTA
PENNINGTON DR. S
HOSKINS
ELDERBERRY CT.
ANN CT.
AVE.
BIRCH
LOOP
HAWTHORNE AVE.
CAROL
ORCHARD DR
HAWORT
CHERRY ST
FULTON ST.
CHERRY
OAK
SITKA
AVE


See
M-5
ALDERSGATE LANE
VILLA
MESS CREEK CT.
PARK LN.
PENNINGTON DR. N
BARCLAY WAY
ST.
PENNINGTON DR. S
ELDERBERRY CT.
ANN CT.
AVE.
BIRCH
HAWTHORNE AVE.
CAROL ANN DR.
CAROL
ORCHARD DR.
HAWORTH
RD.
CHERRY ST.
AVE
ULTON ST.
FULTON ST.
OAK
SITKA
MAPLE DR.
HOLLY DR.
NORTH ST.
LAUREL DR.
LINDA WAY
HULET
VILLA
SHERMAN ST.
PORTLAND
CARLTON WAY
RD.
SITKA AVE.
HWY.


RIVER
ST.
RIVER
ST.
10th
CHEHALEM
CHEHALEM
11th
COLUMBIA
9th
PACIFIC
WYNOOSKI
MILL
CT.
MILL PL.
CHURCH
3RD
2ND
CARLTON WAY
SHERMAN ST.
See H-4
EVEREST
ELVA
DR.
MEREDITH
DR.
DORIS
DR.
ARDUS
HWY.
PORTLAND
RD.
SITKA
AVE.


ST.
RD.
219
2nd ST.
ARDUS DR.
CORINNE DR.
BIRA DR.
ST. PAUL
9th ST.
HWY.
INDUSTRIAL PARKWAY

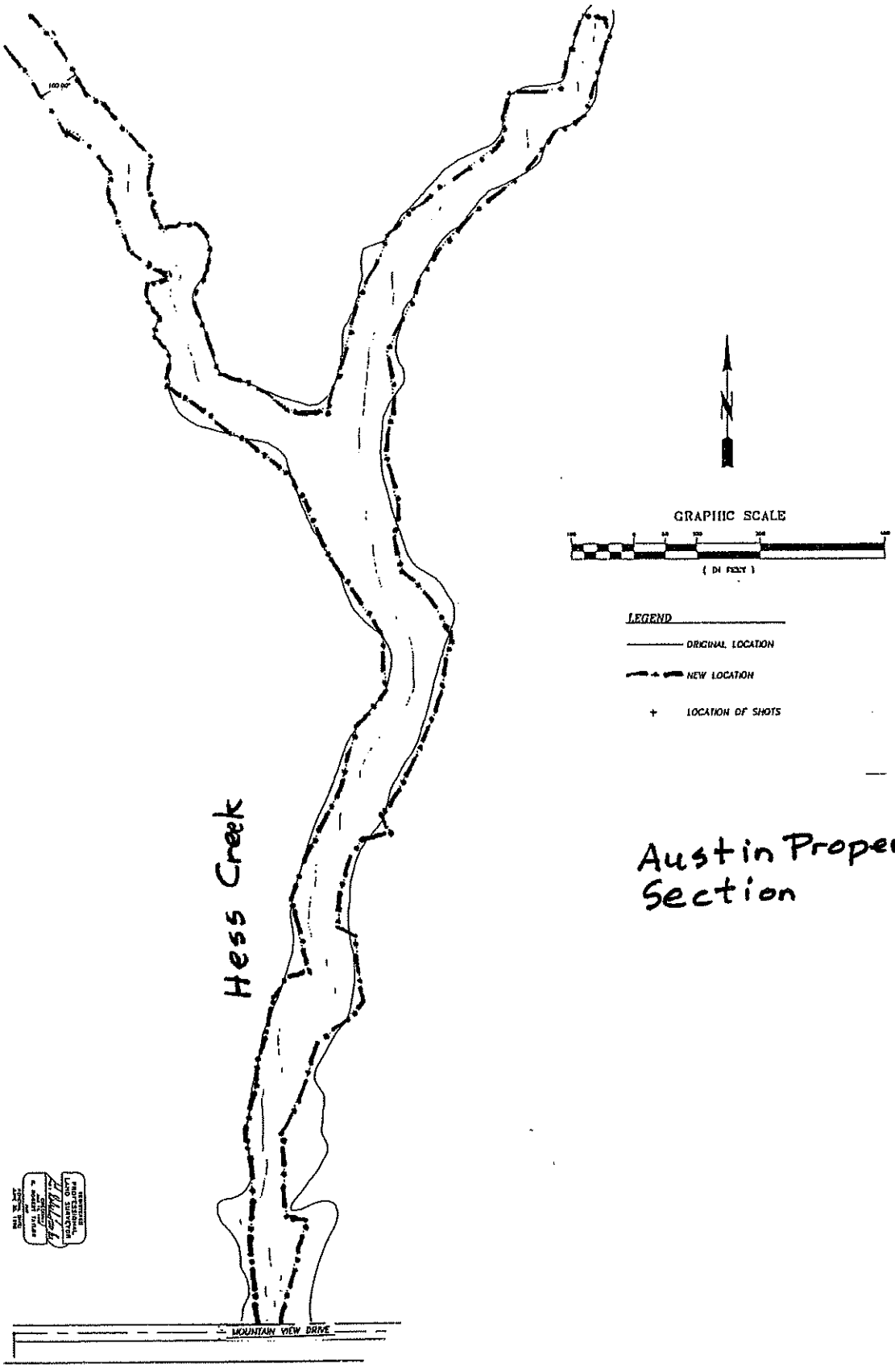
See H-1


See H-3
See H-2
RIVER
10th
9th
8th
ST.
PACIFIC
COLUMBIA
HILL
HILL PL.
11th
ST.
CHEHALEM
ST.
ST.
SCALE 1" = 400'
RIVER

H-1

EXHIBIT A.3.B.

AUSTIN PROPERTIES MAP SECTION



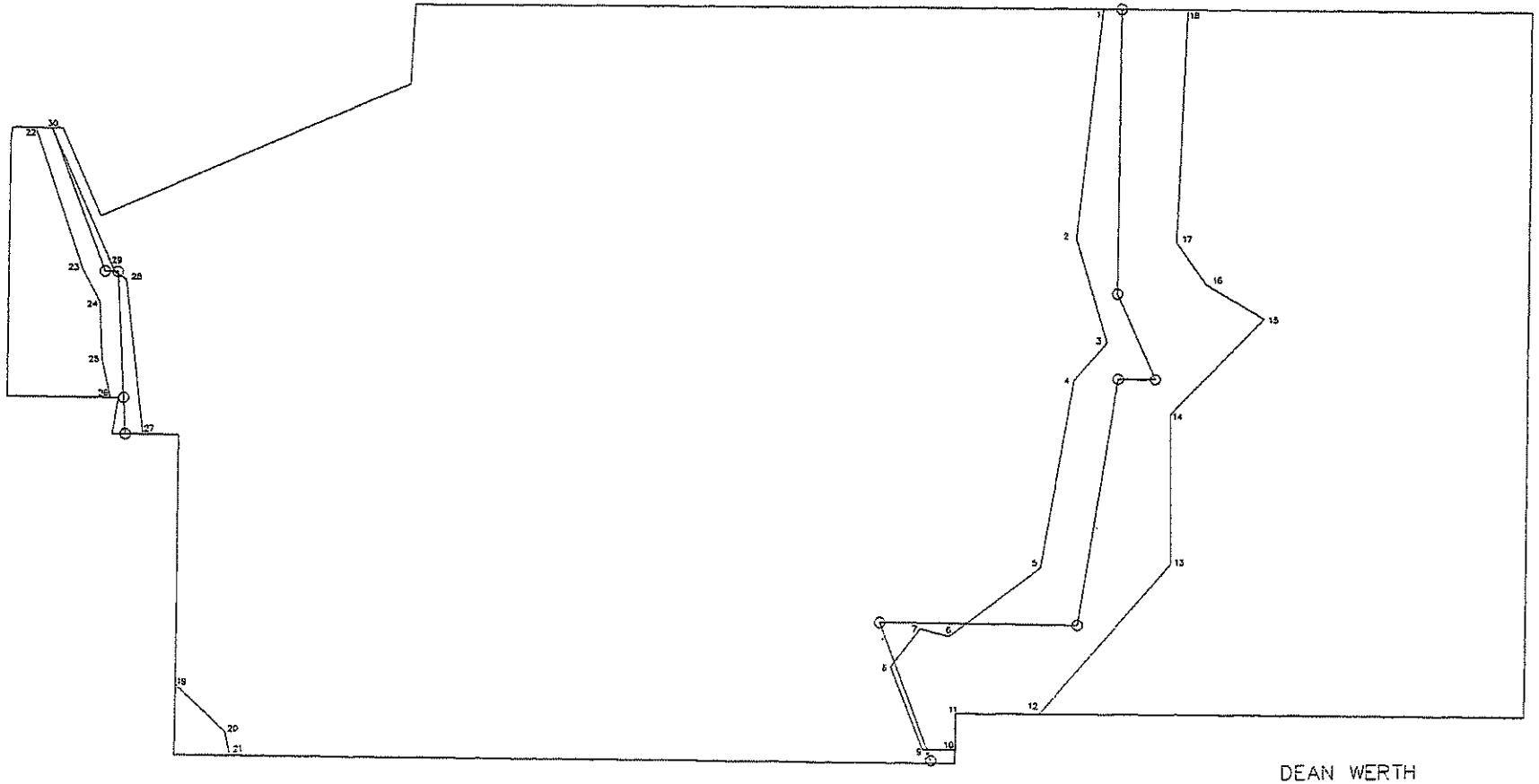
Austin Properties Section

EXHIBIT A.3.C.

WERTH PROPERTY MAP SECTION AND LEGAL DESCRIPTION

STREAM CORRIDOR DELINEATION

USE THIS DRAWING WITH YAMHILL CO CS-10479 X-809
SEE SEPARATE TABLE FOR COORDINATES OF NUMBERED POINTS



DEAN WERTH
SEPT 20, 1996

Ex. A.3.C.

Werth Property Legal

LEGAL DESCRIPTION FOR STREAM CORRIDOR. WERTH PROPERTY, EAST SPRINGBROOK.

A PARCEL OF PROPERTY IN THE SEBASTIAN BRUTSCHER DONATION LAND CLAIM AND IN THE SOUTHWEST 1/4 OF SECTION 15, SOUTH 1/2 OF SECTION 16, NORTH 1/2 OF SECTION 21, AND NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 3 SOUTH, RANGE 2 WEST OF THE WILLAMETTE MERIDIAN IN YAMHILL COUNTY, OREGON DESCRIBED AS FOLLOWS:

COMMENCING AT A FOUND 2" BRASS DISK AT THE NORTHWEST CORNER OF SAID BRUTSCHER DONATION LAND CLAIM;

THENCE SOUTH 00°43'22" WEST, ALONG THE WEST LINE OF SAID BRUTSCHER DONATION LAND CLAIM, 276.55 FEET TO A FOUND BRASS CAP IN A MONUMENT BOX AT THE NORTHEAST CORNER OF THE RICHARD EVEREST DONATION LAND CLAIM;

THENCE SOUTH 00°55'29" WEST, ALONG SAID WEST LINE, 2749.14 FEET;

THENCE SOUTH 89°04'35" EAST, 46.47 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSON # 834" AT THE EAST LINE OF SPRINGBROOK ROAD AS CONVEYED TO THE STATE OF OREGON BY DEED RECORDED IN VOLUME 23, AT PAGE 400 OF YAMHILL COUNTY RECORDS, AND THE WESTERLY SOUTHWEST CORNER OF LOT 2 OF MINOR PARTITION RECORDED AS 1990-61 OF YAMHILL COUNTY RECORDS;

THENCE SOUTH 89°04'35" EAST, ALONG THE SOUTH LINE OF SAID LOT 2 A DISTANCE OF 181.58 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSON #834";

THENCE SOUTH 22°55'23" EAST, ALONG THE SOUTH LINE OF SAID LOT 2 A DISTANCE OF 346.71 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSEN #834;

THENCE NORTH 67°04'37" EAST, ALONG THE SOUTH LINE OF SAID LOT 2 A DISTANCE OF 1207.91 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSON #834";

THENCE NORTH 04°03'33" EAST ALONG THE EAST LINE OF SAID LOT 2 A DISTANCE OF 286.62 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE # 2030" AT THE NORTH LINE OF THE SOUTH HALF OF SAID BRUTSCHER DONATON LAND CLAIM, AND THE NORTHERLY NORTHWEST CORNER OF LOT 1 OF MINOR PARTITION RECORDED AS 1990-61 OF YAMHILL COUNTY RECORDS;

THENCE SOUTH 89°13'14" EAST 2527.83 FEET ALONG NORTH LINE OF SAID LOT 1 TO A 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABELED "BOYER LS 2270", THE POINT OF TRUE BEGINNING;

THENCE NORTH 89°13'14" WEST A DISTANCE OF 66.61 FEET TO A POINT;

THENCE SOUTH 6°45'54" WEST A DISTANCE OF 833.73 FEET TO A POINT;

THENCE SOUTH 16°12'00" EAST A DISTANCE OF 391.45 FEET TO A POINT;

THENCE SOUTH 41°15'00" WEST A DISTANCE OF 179.98 FEET TO A POINT;

THENCE SOUTH 10°28'26" WEST A DISTANCE OF 683.74 FEET TO A POINT;

THENCE SOUTH 53°00'36" WEST A DISTANCE OF 407.89 FEET TO A POINT;

THENCE NORTH 74°00'54" WEST A DISTANCE OF 106.07 FEET TO A POINT;

THENCE SOUTH 37°37'05" WEST A DISTANCE OF 172.71 FEET TO A POINT;

THENCE SOUTH 20°45'32" EAST A DISTANCE OF 315.75 FEET TO A POINT;

THENCE SOUTH 89°00'47" EAST A DISTANCE OF 115.93 FEET TO A POINT ON THE EAST PROPERTY LINE OF SAID LOT 1;

THENCE NORTH 00°59'16" EAST A DISTANCE OF 128.28 FEET ALONG THE EAST PROPERTY LINE OF SAID LOT 1 TO A 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABLED "TOWLE #2030";

THENCE SOUTH 89°20'12" EAST A DISTANCE OF 300.00 FEET ALONG THE SOUTH PROPERTY LINE OF SAID LOT 1 TO A POINT;

THENCE NORTH 41°24'00" EAST A DISTANCE OF 715.12 FEET TO A POINT;

THENCE NORTH 00°00'00" A DISTANCE OF 538.66 FEET TO A POINT;

THENCE NORTH 45°00'00" EAST A DISTANCE OF 480.19 FEET TO A POINT;

THENCE NORTH 53°58'59" WEST A DISTANCE OF 243.45 FEET TO A POINT;

THENCE NORTH 34°47'28" WEST A DISTANCE OF 185.88 FEET TO A POINT;

THENCE NORTH 02°55'44" EAST A DISTANCE OF 841.57 FEET TO A POINT ON THE NORTH PROPERTY LINE OF SAID LOT1;

THENCE NORTH 89°13'14" WEST A DISTANCE OF 239.22 FEET ON THE NORTH PROPERTY LINE OF SAID LOT 1 TO THE POINT OF TRUE BEGINNING.

LEGAL DESCRIPTION FOR STREAM CORRIDOR, WERTH PROPERTY, WEST SPRINGBROOK

A PARCEL OF PROPERTY IN THE SEBASTIAN BRUTSCHER DONATION LAND CLAIM AND IN THE SOUTHWEST 1/4 OF SECTION 15, SOUTH 1/2 OF SECTION 16, NORTH 1/2 OF SECTION 21, AND NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 3 SOUTH, RANGE 2 WEST OF THE WILLAMETTE MERIDIAN IN YAMHILL COUNTY, OREGON DESCRIBED AS FOLLOWS:

COMMENCING AT A FOUND 2" BRASS DISK AT THE NORTHWEST CORNER OF SAID BRUTSCHER DONATION LAND CLAIM;

THENCE SOUTH 00°43'22" WEST, ALONG THE WEST LINE OF SAID BRUTSCHER DONATION LAND CLAIM, 276.55 FEET TO A FOUND BRASS CAP IN A MONUMENT BOX AT THE NORTHEAST CORNER OF THE RICHARD EVEREST DONATION LAND CLAIM;

THENCE SOUTH 00°55'29" WEST, ALONG SAID WEST LINE, 2749.14 FEET;

THENCE SOUTH 89°04'35" EAST, 46.47 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSON # 834" AT THE EAST LINE OF SPRINGBROOK ROAD AS CONVEYED TO THE STATE OF OREGON BY DEED RECORDED IN VOLUME 23, AT PAGE 400 OF YAMHILL COUNTY RECORDS, AND BEING THE WESTERLY SOUTHWEST CORNER OF LOT 2 OF MINOR PARTITION RECORDED AS 1990-61 OF YAMHILL COUNTY RECORDS AND BEING THE WESTERLY NORTH WEST CORNER OF LOT 1 OF SAID MINOR PARTITION;

THENCE SOUTH 89°04'35" EAST, ALONG THE NORTH LINE OF SAID LOT 1 A DISTANCE OF 83.05 FEET TO THE POINT OF TRUE BEGINNING;

THENCE SOUTH 89°04'35" EAST, ALONG THE NORTH LINE OF SAID LOT 1 A DISTANCE OF 60.42 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "BOYER LS 2270";

THENCE SOUTH 22°58'12" EAST A DISTANCE OF 566.44 FEET TO A POINT;

THENCE SOUTH 54°43'44" EAST A DISTANCE OF 54.64 FEET TO A POINT;

THENCE SOUTH 05°49'44" EAST A DISTANCE OF 557.08 FEET TO A POINT ON A SOUTH LINE OF SAID LOT 1;

THENCE NORTH 89°20'12" WEST A DISTANCE OF 110.03 FEET ALONG THE SOUTH LINE OF SAID LOT 1 TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE #2030";

THENCE NORTH 10°11'21" EAST A DISTANCE OF 130.72 FEET ALONG A WEST LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD WITHOUT CAP;

THENCE NORTH 88°59'09" WEST A DISTANCE OF 29.68 FEET ALONG A SOUTH LINE OF SAID LOT 1 TO A POINT;

THENCE NORTH 11°35'13" WEST A DISTANCE OF 150.66 FEET TO A POINT;

THENCE NORTH 1°23'49" WEST A DISTANCE OF 197.41 FEET TO A POINT;

THENCE NORTH 27°30'43" WEST A DISTANCE OF 130.25 FEET TO A POINT;

THENCE NORTH 18°16'30" WEST A DISTANCE OF 544.74 FEET TO THE POINT OF TRUE BEGINNING.

LEGAL DESCRIPTION FOR STREAM CORRIDOR, WERTH PROPERTY, WEST SPRINGBROOK AT SW CORNER.

A PARCEL OF PROPERTY IN THE SEBASTIAN BRUTSCHER DONATION LAND CLAIM AND IN THE SOUTHWEST 1/4 OF SECTION 15, SOUTH 1/2 OF SECTION 16, NORTH 1/2 OF SECTION 21, AND NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 3 SOUTH, RANGE 2 WEST OF THE WILLAMETTE MERIDIAN IN YAMHILL COUNTY, OREGON DESCRIBED AS FOLLOWS:

COMMENCING AT A FOUND 2" BRASS DISK AT THE NORTHWEST CORNER OF SAID BRUTSCHER DONATION LAND CLAIM;

THENCE SOUTH 00°43'22" WEST, ALONG THE WEST LINE OF SAID BRUTSCHER DONATION LAND CLAIM, 276.55 FEET TO A FOUND BRASS CAP IN A MONUMENT BOX AT THE NORTHEAST CORNER OF THE RICHARD EVEREST DONATION LAND CLAIM;

THENCE SOUTH 00°55'29" WEST, ALONG SAID WEST LINE, 2749.14 FEET;

THENCE SOUTH 89°04'35" EAST, 46.47 FEET TO A FOUND 5/8" X 30" IRON ROD WITH YELLOW PLASTIC CAP LABELED "OLSON # 834" AT THE EAST LINE OF SPRINGBROOK ROAD AS CONVEYED TO THE STATE OF OREGON BY DEED RECORDED IN VOLUME 23, AT PAGE 400 OF YAMHILL COUNTY RECORDS, AND BEING THE WESTERLY SOUTHWEST CORNER OF LOT 2 OF MINOR PARTITION RECORDED AS 1990-61 OF YAMHILL COUNTY RECORDS, AND BEING THE WESTERLY NORTHWEST CORNER OF LOT 1 OF SAID MINOR PARTITION;

THENCE SOUTH 08°13'10" WEST A DISTANCE OF 50.94 FEET ALONG THE WEST LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE 2030"

THENCE SOUTH 00°55'29" WEST A DISTANCE OF 922.18 FEET ALONG THE WEST LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE 2030" ;

THENCE SOUTH 88°59'09" EAST A DISTANCE OF 401.00 FEET ALONG THE SOUTH LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD;

THENCE SOUTH 10°11'21" WEST A DISTANCE OF 130.72 FEET ALONG THE WEST LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE 2030" ;

THENCE SOUTH 89°20'12" EAST A DISTANCE OF 240.04 FEET ALONG THE SOUTH LINE OF SAID LOT 1 TO A FOUND 5/8" IRON ROD WITH YELLOW PLASTIC CAP LABELED "TOWLE 2030" ;

THENCE SOUTH 00°55'29" WEST A DISTANCE OF 902.47 FEET ALONG THE WEST LINE OF SAID LOT 1 TO THE POINT OF TRUE BEGINNING.

THENCE SOUTH 46°54'36" EAST A DISTANCE OF 245.63 FEET TO A POINT;

THENCE SOUTH 10°58'05" EAST A DISTANCE OF 87.21 FEET TO A POINT ON THE SOUTH LINE OF SAID LOT 1;

THENCE NORTH 89°00'47" WEST A DISTANCE OF 200 FEET ALONG THE SOUTH LINE TO THE SW CORNER OF SAID LOT 1;

THENCE NORTH 00°55'29" EAST A DISTANCE OF 250.00 FEET ALONG THE WEST LINE OF SAID LOT 1 TO THE POINT OF TRUE BEGINNING