SOIL SURVEY OF MULTNOMAH COUNTY
USDA SCS

This soil is in capability subclass VIe.

17E—Goble silt loam, 30 to 60 percent slopes. This steep, moderately drained soil is on convex side slopes of ridgetops. This soil formed in silty materials mixed with volcanic ash. Elevation is 200 to 1,600 feet. The average annual precipitation is 60 to 70 inches, the average annual air temperature is 47 to 50 degrees F, and the frost-free period is 120 to 165 days.

Typically, the surface layer is very dark grayish brown silt loam about 14 inches thick. The upper part of the subsoil is dark brown silt loam and silty clay loam about 23 inches thick. The lower part of the subsoil is a mottled, dark yellowish brown, silty clay loam fragipan to a depth of 60 inches or more.

Included with this soil in mapping are areas of Cascade and Wauld soils and other Goble soils. The included soils make up as much as 15 percent of this map unit. Also included in mapping in T. 1 S., R. 1 E., are areas of Goble soils, but these soils have basalt bedrock at a depth of 40 to 60 inches.

Permeability is moderate above the fragipan and slow in the fragipan. Effective rooting depth is 30 to 48 inches. Available water capacity is 8 to 10 inches. Water-supplying capacity is 20 to 22 inches. Runoff is rapid, and the hazard of erosion is high. A water table is within a depth of 4 feet from December through April.

This soil is used for timber production, urban development, and wildlife habitat.

Vegetation is Douglas-fir, western hemlock, grand fir, western redcedar, red alder, bigleaf maple, red huckleberry, western hazel, vine maple, willow, thimbleberry, Cascade Oregon-grape, trailing blackberry, salal, common snowberry, swordfern, and forbs, including Pacific trillium and violets.

This soil is suited to Douglas-fir. The site index for Douglas-fir on this soil ranges from 145 to 155. Based on a site index of 149 this soil is capable of producing about 9,920 cubic feet from a fully stocked stand of 70-year old trees, or 55,020 board feet (international rule, one-fourth inch kerf) of merchantable timber from a fully stocked stand of 80-year old trees. Brushy species including salal, Cascade Oregon-grape, and common snowberry restrict natural regeneration of Douglas-fir.

The main limitations for timber production are the slowly permeable fragipan at a depth of 30 to 45 inches and the resultant perched water table from December through April. Some windthrow is possible because of the restricted rooting depth. Because of the steep slopes, such logging methods as aerial, high-lead, or skyline should be used for tree harvesting. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts, fills, and skidroads. Slumping occurs on road cuts and requires additional maintenance. All-season roads on this soil need a heavy base of rock.

In the mild, high rainfall areas of the Coast Range Mountains vegetation grows rapidly on this soil. Vegetational stages change dramatically as a result of clear-cut logging and fires.

The potential to produce wildlife, especially black-tailed deer, depends on the clearing of land and on the availability of new growth of trees, shrubs, and grasses. As new forest develops and most of the ground vegetation decreases, the deer population returns to a low level. As the trees grow larger, species such as blue grouse are favored. Suitable habitat is common for species such as Roosevelt elk, black bear, coyote, bobcat, skunks, weasels, raccoon, mountain beaver, rabbits, and squirrels. Resident or seasonally abundant birds are hawks, owls, jays, ravens, vultures, woodpeckers, grouse, mountain quail, band-tailed pigeon, and many small birds. Fur-bearing animals such as beaver, mink, and otter are common along larger streams. Most of the potential for wildlife habitat depends on the management of existing plant communities.

Increased population growth has resulted in increased home construction on this soil. This soil has severe limitations for dwellings and roads because of steep slopes. Other limitations are the seasonal high water table, low bearing strength, and the slowly permeable fragipan at a depth of 30 to 45 inches. Excavating during summer is difficult because of the strongly compacted fragipan. Slumping is possible in areas of cut and fill, and additional maintenance of banks, roads, and building foundations is required. A seasonal water table is perched on top of the fragipan, and drainage is required for best results with basements. Irrigation during summer is desirable for lawn grasses, shrubs, vines, vegetables, and most shade and ornamental trees. To establish plants in areas in which the surface layer has been removed and the fragipan exposed is difficult. Mulching and fertilizing cut areas help establish plants. Plants that tolerate droughty conditions should be selected if irrigation is not provided. This soil is in capability subclass VIe.

18C—Goble-Urban land complex, 3 to 15 percent slopes. This complex consists of moderately well drained Goble soils. In most areas of this complex the soils have been graded, cut, filled, or otherwise disturbed. This complex is on rolling ridgetops. Slopes are convex. Areas are generally irregular in shape and 25 to 100 acres in size. The Goble soils and Urban land are in such an intricate pattern or so small in area that to separate them in mapping was not practical. Elevation is 200 to 1,600 feet. The average annual precipitation is 60 to 70 inches, the average annual air temperature is 47 to 50 degrees F, and the frost-free period is 120 to 165 days.

About 20 percent of this complex are areas of Goble soils that are relatively undisturbed. Typically, the surface layer is very dark grayish brown silt loam about 14 inches thick. The upper part of the subsoil is dark brown silt loam and silty clay loam about 23 inches thick. The lower part of the subsoil is a mottled, dark yellowish brown, silty clay loam fragipan to a depth of 60 inches or more.

EXHIBIT
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and the resultant perched water table from December through April. Some windthrow of trees is possible because of restricted rooting depth. When the soil is wet, the use of some conventional logging systems is limited. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts and fills. All-season roads on this soil need a heavy base of rock.

This soil is along a fringe area that is transitional from valley to forested hills. Openland and woodland are almost equal in extent. A wide variety of grain and grasses along with shrubs and trees furnish good food and cover for wildlife. Resident and seasonal wildlife in areas of this soil include black-tailed deer, Roosevelt elk, black bear, coyote, bobcat, raccoon, skunks, foxes, opossum, rabbits, squirrels, mice, moles, and gophers. Common birds are hawks, owls, jays, ravens, crows, vultures, woodpeckers, insect eaters, mourning doves, band-tailed pigeon, ruffed grouse, blue grouse, mountain quail, California quail, ring-necked pheasant, and many kinds of small birds. Potential is good for building ponds for fish and wildlife on this soil. Ponds have been built, and fish production generally is good in these ponds. Most of the potential for wildlife habitat depends on the management of existing plant communities, but some potential depends on growing desirable vegetation.

Increased population growth has resulted in increased homesite construction on this soil. The main limitations for urban development are the seasonal water table, slow permeability, and a fragipan at a depth of 20 to 30 inches. Dwellings and roads must be designed to offset these limitations. Excavation during summer is difficult because of the strongly compacted fragipan. A seasonal water table is perched on top of the fragipan and requires drainage for best results with basements and crawl spaces. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability. Drainage is required for best results with lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetables, and irrigation during summer is desirable. Recreational uses are limited by the seasonal high water table. Plants that tolerate droughty conditions should be selected if irrigation is not provided.

This soil is in capability subclass IIIw.

7C—Cascade silt loam, 8 to 15 percent slopes. This somewhat poorly drained soil is on convex side slopes of broad, rolling ridgetops. This soil formed in silty materials. Elevation is 250 to 1,400 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is 50 to 54 degrees F, and the frost-free period is 165 to 210 days.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is dark brown silt loam about 19 inches thick. The substratum is a dark brown, mottled, silt loam fragipan to a depth of 60 inches or more.

Included with this soil in mapping are areas of Goble and Cornelius soils and other Cascade soils. The included soils make up as much as 10 percent of this unit. Also included in Tps. 1 N. and 1 S., R. 1 E., are areas of Cascade soils, but in places these soils have basalt bedrock at a depth of 40 to 60 inches.

Permeability is slow. Effective rooting depth is 20 to 30 inches. Available water capacity is 5 to 7.5 inches. Water-supplying capacity is 17 to 19 inches. Runoff is medium, and the hazard of erosion is moderate. A water table is at a depth of 18 to 30 inches from December through April.

This soil is used for farming, timber production, urban development, and wildlife habitat.

This soil is suited to farming. If this soil is drained, most climatically adapted crops do well. The major crops are grain, berries, vegetables, nursery stock, hay, and pasture. Irrigation during summer is required for maximum production of most crops. Returning all crop residue to the soil and including grasses, legumes, or grass-legume mixtures in the cropping system help maintain fertility and tilth. If the soil is to be left bare during winter, it should be fertilized and planted to a cover crop in fall. Grassed waterways help control erosion in drainageways. Limiting tillage to seedbed preparation and weed control helps to control runoff and erosion. A cloddy condition helps protect the soil from erosion during rainy periods.

Excessive cultivation can result in formation of a tillage pan in this soil. Subsoiling is required to break up this pan and is more successful if done when the soil is dry than when wet.

The soil has a perched water table in winter and early in spring. Tile systems are difficult to install because of shallow depth to the hardpan. Tile systems are installed across the slope to intercept ground water. Subsoiling should be across the tile lines. Sprinkler irrigation can be used to increase crop production in dry periods in summer. Water needs to be applied slowly to prevent runoff. Grain and grass crops respond to nitrogen. Legumes respond to phosphorus, potassium, sulfur, and lime and in places, to boron. Berries respond to nitrogen, phosphorus, potassium, and sulfur and in places, to boron.

The vegetation in areas not cultivated is Douglas-fir, western redcedar, red alder, grand fir, western hemlock, bigleaf maple, willow, Pacific dogwood, wild cherry, western hazel, thimbleberry, salal, vine maple, trailing blackberry, Cascade Oregon-grape, swordfern, common snowberry, roses, forbs, and grasses.

This soil is suited to Douglas-fir. The site index for Douglas-fir on this soil ranges from 150 to 165. Based on a site index of 157, this soil is capable of producing about 10,720 cubic feet from a fully stocked stand of 70-year old trees, or 63,280 board feet (international rule, one-fourth inch kerf) of merchantable timber from a fully stocked stand of 80-year old trees. Brushy species, including salal, Cascade Oregon-grape, and common snowberry, restrict natural regeneration of Douglas-fir.

The main limitations to timber production are the slowly permeable fragipan at a depth of 20 to 30 inches

and the resultant perched water table from December through April. Some windthrow of trees is possible because of restricted rooting depth. When the soil is wet, the use of some conventional logging methods is limited. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts and fills. All-season roads on this soil need a heavy base of rock.

This soil is along a fringe area that is transitional from valley to forested hills. Openland and woodland are almost equal in extent. A wide variety of grain and grasses along with shrubs and trees furnish good food and cover for wildlife.

Resident and seasonal wildlife in areas of this soil include black-tailed deer, Roosevelt elk, black bear, coyote, bobcat, raccoon, skunks, foxes, oppossum, rabbits, squirrels, mice, moles, and gophers. Common birds are hawks, owls, jays, ravens, crows, vultures, woodpeckers, insect eaters, mourning dove, band-tailed pigeon, ruffed grouse, blue grouse, mountain quail, California quail, ring-necked pheasant, and many kinds of small birds. Potential is good for building ponds for fish and wildlife on this soil. Ponds have been built, and fish production is generally good in these ponds. Most of the potential for wildlife habitat depends on the management of existing plant communities, but some potential depends on growing desirable vegetation.

Increased population growth has resulted in increased homesite construction on this soil (fig. 6). The main limitations for urban development are the seasonal high water table, slow permeability, low strength, a fragipan at a depth of 20 to 30 inches, and slopes of 8 to 15 percent. Dwellings and roads need to be designed to offset these limitations. Excavating during summer is difficult because of the strongly compacted fragipan. A seasonal water table is perched on top of the fragipan and requires drainage for best results with basements and crawl spaces. Septic tank absorption fields do not function properly during rainy periods because of wetness and slow permeability. Drainage is required for best results with lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetables, and irrigation during summer is desirable. Recreational uses are limited by slope and a seasonal high water table. Plants that tolerate droughty conditions should be selected if irrigation is not provided.

This soil is in capability subclass IIIe.

7D—Cascade silt loam, 15 to 30 percent slopes. This somewhat poorly drained soil is on convex side slopes of broad, rolling ridgetops. This soil formed in silty materials. Elevation is 250 to 1,400 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is 50 to 54 degrees F, and the frost-free period is 165 to 210 days.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is dark brown silt loam about 19 inches thick. The substratum is a dark brown, mottled, silt loam fragipan to a depth of 60 inches or more.

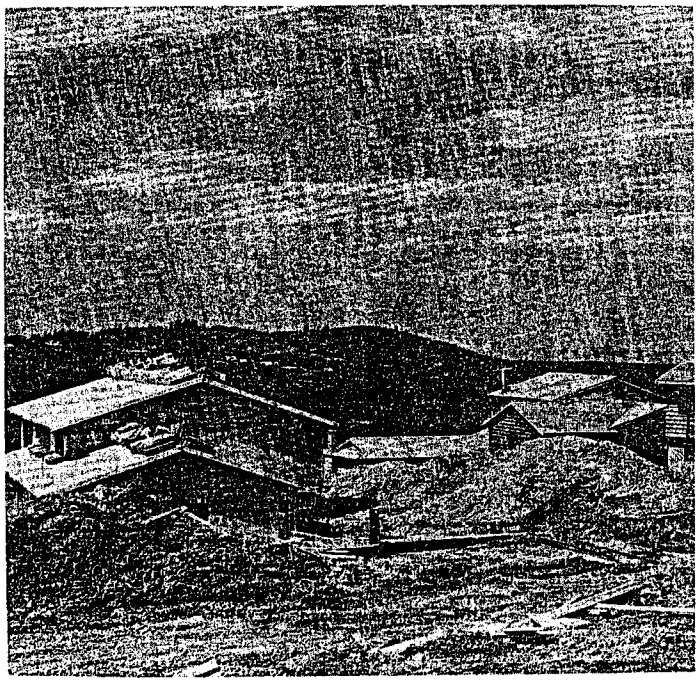

Figure 6.—Homesites on Cascade silt loam.

Included with this soil in mapping are areas of Goble and Cornelius soils and other Cascade soils. The included soils make up as much as 15 percent of this map unit. Also included in Tps. 1 N. and 1 S., R. 1E., are areas of Cascade soils, but in places these soils have basalt bedrock at a depth of 40 to 60 inches.

Permeability is slow. Effective rooting depth is 20 to 30 inches. Available water capacity is 5 to 7.5 inches. Water-supplying capacity is 17 to 19 inches. Runoff is medium, and the hazard of erosion is high. A water table is at a depth of 18 to 30 inches from December through April.

This soil is used for farming, timber production, urban development, and wildlife habitat.

The native vegetation is Douglas-fir, western redcedar, red alder, grand fir, western hemlock, bigleaf maple, willow, Pacific dogwood, wild cherry, western hazel, thimbleberry, salal, vine maple, trailing blackberry, Cascade Oregon-grape, roses, swordfern, common snowberry, forbs, and grasses.

This soil is suited to Douglas-fir. The site index for Douglas-fir on this soil ranges from 150 to 165. Based on a site index of 157, this soil is capable of producing about 10,720 cubic feet from a fully stocked stand of 70-year old trees, or 63,280 board feet (international rule, one-fourth inch kerf) of merchantable timber from a fully stocked stand of 80-year old trees. Brushy species, in-

cluding salal, Cascade Oregon-grape, and common snowberry, restrict natural regeneration of Douglas-fir.

The main limitations for timber production are the slowly permeable fragipan at a depth of 20 to 30 inches and the resultant perched water table from December through April. Some windthrow of trees is possible because of the restricted rooting depth. When the soil is wet, the use of some conventional logging methods is limited. Roads and landings can be protected from erosion by constructing water bars and by seeding cuts and fills. All-season roads on this soil need a heavy base of rock.

This soil is poorly suited to farming. If this soil is drained, most climatically adapted crops do well. The major crops are grain, hay, and pasture. Irrigation during summer is required for maximum production of most crops. Returning all crop residue to the soil and including grasses, legumes, or grass-legume mixtures in the cropping system help maintain fertility and tilth. Tilling and planting across the slope help reduce runoff and erosion. If the soil is to be left bare over winter, it should be fertilized and planted to a cover crop in fall. Grassed waterways help control erosion in drainageways. Limiting tillage to seedbed preparation and weed control helps control runoff and erosion. A cloddy condition helps protect the soil from erosion during rainy periods.

Excessive cultivation can result in the formation of a tillage pan in this soil. Subsoiling is required to break up this pan and is more successful if done when the soil is dry than when wet. The soil has a perched water table in winter and early in spring. Tile systems are difficult to install because of shallow depth to the hardpan. Tile systems are installed across the slope to intercept ground water. Subsoiling should be across the tile lines. Sprinkler irrigation can be used to increase crop production in dry periods in summer. Water needs to be applied slowly to prevent runoff. Grain and grass crops respond to nitrogen. Legumes respond to phosphorus, potassium, sulfur, and lime and in places, to boron. Berries respond to nitrogen, phosphorus, potassium, and sulfur and in places, to boron.

This soil is along a fringe area that is transitional from valley to forested hills. Openland and woodland are almost equal in extent. A wide variety of grain and grasses along with shrubs and trees furnishes good food and cover for wildlife.

Resident and seasonal wildlife in areas of this soil, include black-tailed deer, Roosevelt elk, black bear, coyote, bobcat, raccoon, skunks, foxes, oppossum, rabbits, squirrels, mice, moles, and gophers. Common birds are hawks, owls, jays, ravens, crows, vultures, woodpeckers, insect eaters, mourning dove, band-tailed pigeon, ruffed grouse, blue grouse, mountain quail, California quail, ring-necked pheasant, and many kinds of small birds. Most of the potential for wildlife habitat depends on the management of existing plant communities, but some potential depends on growing desirable vegetation.

Increased population growth has resulted in increased homesite construction on this soil. The main limitations for urban development are a seasonal high water table, slow permeability, low strength, a fragipan at a depth of 20 to 30 inches, and slopes of 15 to 30 percent. Dwellings and roads need to be designed to offset these limitations. Excavating during summer is difficult because of the strongly compacted fragipan. Slumping is possible in areas of cut and fill, and additional maintenance is required for banks, roads, and building foundations. A seasonal water table is perched on top of the fragipan and requires drainage for best results with basements and crawl spaces. Septic tank absorption fields do not function properly during rainy periods because of wetness, steep slopes, and slow permeability. Drainage is required for best results with lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetables, and irrigation during summer is desirable. Recreational uses are limited by the seasonal high water table. Plants that tolerate droughty conditions should be selected if irrigation is not provided.

This soil is in capability subclass IVe.

7E—Cascade silt loam, 30 to 60 percent slopes. This steep, somewhat poorly drained soil is on side slopes of broad, rolling ridgetops. This soil formed in silty materials. Elevation is 250 to 1,400 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is 50 to 54 degrees F, and the frost-free period is 165 to 210 days.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is dark brown silt loam about 19 inches thick. The substratum is a dark brown, mottled, silt loam fragipan to a depth of 60 inches or more.

Included with this soil in mapping are areas of Goble, Cornelius, Saum, and Wauld soils and other Cascade soils. The included soils make up as much as 15 percent of this unit. Also included in Tps. 1 N. and 1 S., R 1 E., are areas of Cascade soils, but in places these soils have basalt bedrock at a depth of 40 to 60 inches.

Permeability is slow. Effective rooting depth is 20 to 30 inches. Available water capacity is 5 to 7.5 inches. Water-supplying capacity is 17 to 19 inches. Runoff is rapid, and the hazard of erosion is high. A water table is at a depth of 18 to 30 inches from December through April.

This soil is used for timber production, urban development, and wildlife habitat.

The native vegetation is Douglas-fir, western redcedar, red alder, grand fir, western hemlock, bigleaf maple, willow, Pacific dogwood, wild cherry, western hazel, thimbleberry, salal, vine maple, trailing blackberry, Cascade Oregon-grape, roses, swordfern, common snowberry, forbs, and grasses.

This soil is suited to Douglas-fir. The site index for Douglas-fir on this soil ranges from 150 to 165. Based on a site index of 157, this soil is capable of producing