4.2.1: Affected environment

Climate

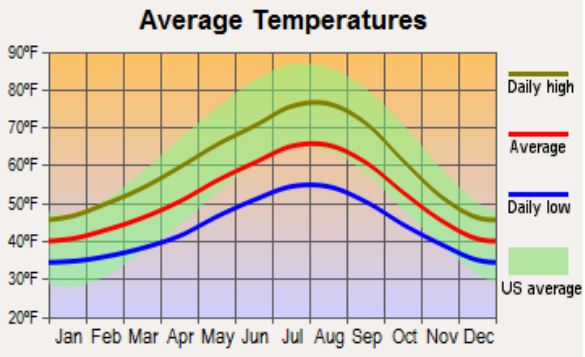
The MLK subarea is located in the western portion of Pierce County, Washington. The climate of Pierce County is greatly tempered by winds from the Pacific Ocean. Summers are fairly warm, but hot temperatures are not common except at higher elevations. During summer rainfall is extremely light, so crops growing actively during this period need irrigation. Often several weeks pass without precipitation. During the rest of the year rains are frequent, especially late in fall and in winter.

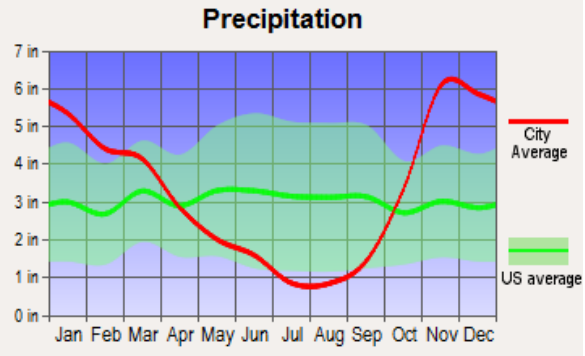
The average winter temperature is 40.5 degrees Fahrenheit, and the average daily minimum is 33.1 degrees. The lowest temperature on record, 0 degrees, occurred at Puyallup Experiment Station on November 15, 1955. In summer the average temperature is 62.9 degrees and the average daily maximum is 76.4 degrees. The highest temperature, 101 degrees, was recorded on June 9 in1955.

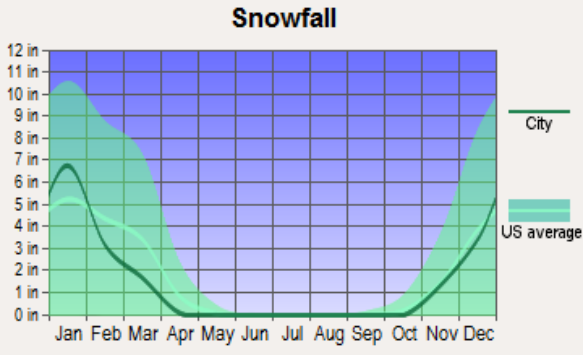
Beginning in spring, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees Fahrenheit). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

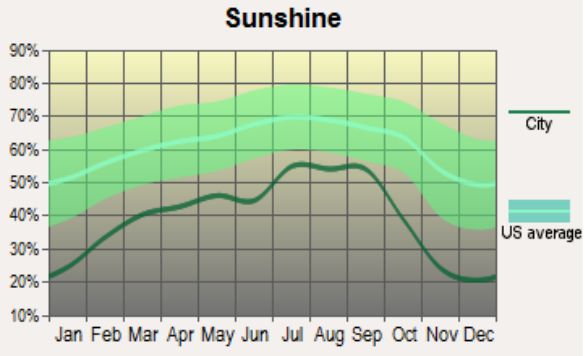
Of the total annual precipitation, about 25% usually falls during the period April through September, which includes the growing season for most crops. This seasonal precipitation is about 10 inches in the, west and 20 inches on the slopes. Two years in 10, the April-September rainfall is less than 8 and 15 inches, respectively. The heaviest 1-day rainfall during the period of record was 3.28 inches at Puyallup and 4.46 inches at Electron Headworks. Thunderstorms number about 6 each year, 3 of which occur in summer.

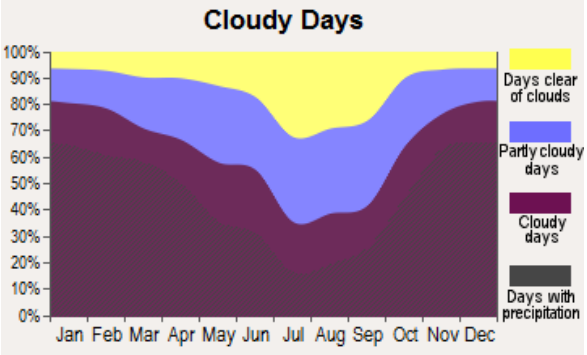
Average seasonal snowfall is 10 inches in the west and 47 inches on the slopes. The greatest snow depth at any one time during the period of record was 35 inches. On the average, 3 and 17 days, respectively, have at least 1 inch of snow on the ground, but the number of days varies greatly from year to year.

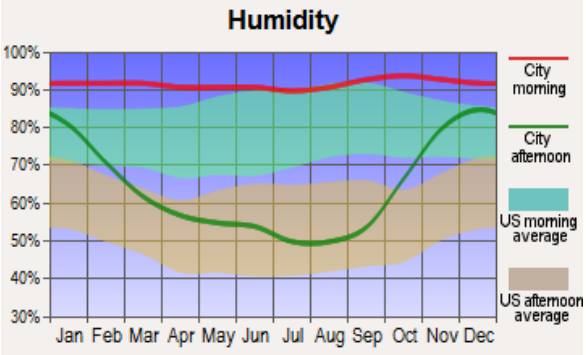


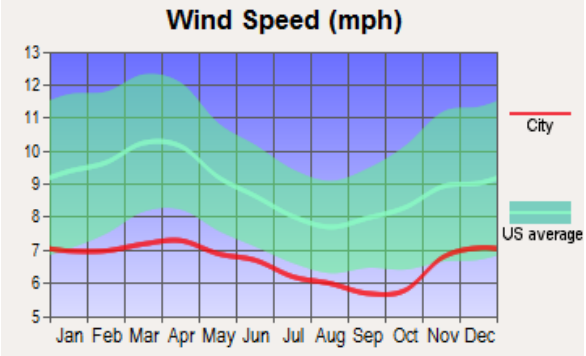












Source: www.city-data.com/city/Tacoma-Washington.html

In most winters, one or two storms over the whole county bring strong and sometimes damaging winds, and in some years the accompanying heavy rains cause serious flooding. Every few years, either in winter or in summer, a large invasion of a continental air mass from the east causes abnormal temperatures. In winter several consecutive days have temperatures well below freezing; in summer a week or longer have sweltering weather.

In the western portion of Pierce County, the average relative humidity in mid-afternoon in spring is less than 72%; during the rest of the year it is about 75%. Humidity is higher at night in all seasons, and the average at dawn is about 80%. The percentage of possible sunshine is 63% in summer and 51% in winter. The prevailing direction of the wind is from the southwest. Average wind speed is highest, 10.4 miles per hour, in January.

Topography

Pierce County is located adjacent to Puget Sound in the western part of Washington. The county covers 389,967 acres, or about 609 square miles. The elevation ranges from sea level to about 14,000 feet. The county consists of nearly level plains, rolling uplands, and steep foothills and mountains. Nearly level flood plains and low terraces dominate the river valleys.

Two major rivers - the Nisqually and Puyallup, flow through Pierce county and into Puget Sound. Major tributaries of the Puyallup River include the Carbon and White Rivers. Each of these four rivers has its source at glaciers on Mt. Rainier.

Once a largely rural area that had farming and lumbering as the principal industries, Pierce County has experienced rapid growth and development and a subsequent demand for residential, business, and industrial sites. Between 1958 and 1967, according to the Washington Soil and Water Conservation Needs Inventory, forests and croplands in Pierce County were converted to other uses at a rate of about 5,000 acres annually. It was estimated in 1976 that about 76,000 acres, or nearly 20% of the county was urban or built-up land – a percentage which is decidedly much higher now.

The soils have been important to the growth and development of Pierce County. Since 1870, the fertile floodplains and low terraces of the Puyallup and White River valleys have been intensively farmed. The harvesting and processing of flower bulbs, vegetables, cane fruits, and other crops for local and foreign markets have been and continue to be a source of employment for many people who live in the surrounding communities. According to the Pierce County Rural Manpower Service, in June 1974 more than 6,000 people were employed harvesting crops.

Recent urban development has centered initially upon soils with the fewest limitations for such use. For example, those soils that are nearly level to rolling and have good drainage, such as those in the Lakewood area, have become highly urbanized. Douglas-fir is a dominant species on the upland soils, which support mixed conifers and hardwoods. Increased urban pressures have

resulted in a shift of highly intensive woodland management from the uplands to the foothills and southern portions of the county.

Tacoma/MLK topography
Tacoma is located at the confluence of the Puyallup River's outlet into Commencement Bay, an inlet of Puget Sound. Tacoma corporate limits encompass about 50 square miles.

Topography in the area ranges in elevation from sea levelt on the Thea Foss Waterway and Commencement Bay to an elevation of 300 feet on the top of the MLK plateau or hilltop.

The hillside increases gradually in elevation from sea level at the south end of Thea Foss Waterway through the historic Brewery District and downtown core then increases more steeply from South Fawcett Avenue to South I Street to an elevation of about 300 feet.

The south end of the MLK subarea is defined by very steep grades with an elevation 120 feet or more overlooking Center Street and Interstate 5. The north end of the MLK subarea and Wright Park overlook historic downtown Tacoma which is situated on a bench at an elevation about 50 feet higher than the downtown core with exceptionally steep hillside drop off overlooking Schuster Parkway and Commencement Bay.

Physiographic characteristics
Pierce County lies within two distinct geologic provinces - the Puget Trough Province and the Southern Washington Cascades Province - that exhibit marked differences in topography and soils.

Puget Trough Province - extends from the Canadian border into Oregon. Western Pierce County, from a line generally west of Buckley to Eatonville. Tacoma, and the MLK subarea, are located within the Puget Sound Basin (or lowland) portion of this province.

The basin is a depressed, glaciated area which is partially submerged by Puget Sound. The geology and topography of the basin resulted almost entirely from four recognized glacial advances and retreats during the Pleistocene epoch, with the Vashon glaciations being the most recent.

Puget Sound Basin - is underlain by a great thickness of semi-consolidated and unconsolidated materials that were deposited by the glaciers to depths of 2,000 feet in places. The materials include clay, silt, sand, gravel, glacial till and peat.

Deposits of the Vashon glaciations, which represent most of the basin surface, consist largely of glacial drift with large variability in composition. A typical sequence consists of advance outwash sediments deposited in front of the advancing glacier, overlain by glacial till, and in turn overlain by granular deposits of recessional outwash.

Major surface features include the river and deep channels carved by melt-water discharge, a number of small lakes formed during glacial retreat and isolated mud flow deposits and peat bogs. The many steep-walled alluviated valleys and marine embayments divide the basin into isolated uplands ranging in size from a few square miles to several hundred square miles.

Soils

Soil maps are helpful for planning the general outline for urban areas though the maps cannot be used for the selection of sites for specific urban structures. In general soils that have good potential for cultivated crops also have good potential for urban development. The data about specific soils in a soil survey can be helpful in planning future land use patterns.

The United States Department of Agriculture (USDA) Soil Conservation Service (SCS) completed a soil survey for Pierce County in 1955 and again in 1976. USDA surveyed the entire county except for developed urban areas which could not be easily classified from aerial and field surveys. Currently, USDA is updating the soil descriptions and maps for Pierce County of which some, but not all data is available on-line (http://soildatamart.nrcs.usda.gov).

The City of Tacoma was not mapped by USDA for the reasons indicated above. Nonetheless, Tacoma and MLK soils are of the same general composition as the soils located on the bluffs located on both sides of the Puyallup River valley surrounding Commencement Bay that were mapped and analyzed by USDA for the Pierce County soils survey.

Soil orders and suborders
Soil differences result from the interaction of several major soil-forming factors:

- geology – the parent material from which the soil developed,
- climate during the soils development - especially soil temperature and moisture regimes,

- nature of the organic materials in the soil - reflecting the influence of the biota, particularly vegetation,
- relief - reflecting local physiography, and
- time - over which the soil developed.

The US Department of Agriculture (USDA) Soil Conservation Service (SCS) classifies the soil orders based on soil properties observed in the field from soil mapping and classification. Of the 10 soil orders that have worldwide distribution, 7 are located within the Pacific Northwest.

Soil orders - are the highest taxonomic category generalized by common properties including horizon development and pattern, color, soil moisture, and degree of oxidation.

Suborders – divide the soil orders based on characteristics which produce classes with the greatest genetic homogeneity including moisture regime, temperature, mineralogy, color, texture, and horizon properties. In total, 47 suborders have been identified worldwide of which 12 are located within the Pacific Northwest.

Great groups – are based on the soil assemblage along with similarity of soil moisture and temperature regimes. USDA SCS recognizes 203 great groups named for the soil compositions.

Families and series – are differentiated on the basis of properties important for utilization, especially plant growth. Soil series comprise a collection of soil individuals with essentially uniform differentiating characteristics. Soil series are given place names suggesting the fusion of the hierarchical soil taxonomy with real soils mapped and observed in the field.

Alderwood-Everett association
Soils within Tacoma and the MLK subarea are composed of Alderwood-Everett associated soils. These soils are nearly level to rolling, moderately well drained and somewhat excessively drained soils that formed in glacial till and glacial outwash; on uplands

This soil association consists of nearly level to rolling uplands, mainly in the northern part of Pierce County. Long, steep or very steep slopes break abruptly along the edges of these uplands into drainage channels or directly to the valley floor.

This soil association makes up about 16% of Pierce County. Alderwood soils make up about 32% of the association, Everett soils 22%, and Kapowsin, Indianola, and Kitsap soils 14%. Small amounts of other soils make up the remaining 32%.

Alderwood soils are moderately well drained. The substratum is weakly cemented and very slowly permeable, beginning at a depth of about 3 feet. Slopes are dominantly 0 to 15% but range to 30%.

Everett soils are somewhat excessively drained. They have a gravelly sandy loam subsoil and, at a depth of about 2 feet, a loose gravelly sand substratum. Slopes are nearly level. In places these slopes are broken by short, steep terrace breaks.

MLK soils
The MLK subarea is composed of Alderwood gravelly sandy loam soil defined further by the degree of slope and the effects topography has on soil characteristics. Alderwood 1B soils of 0 to 6 % slope are located on the top of the plateau along South L to I Streets, Alderwood 1C soils of 6 to 15% slope from South I Street to Yakima Avenue, and Alderwood 1D soils of 15 to 30% slope at the south end of MLK subarea overlooking Nalley Valley and Center Street, and from Yakima Avenue east into South Downtown.

(AgB) 1B-Alderwood gravelly sandy loam, 0 to 6% slopes - are nearly level to undulating soil that is moderately well drained. The soil formed in glacial till and is one of the most extensive soils on the broad uplands in the central part of the county.

Vegetation is hardwoods and conifers. Elevation ranges from 200 to 800 feet. The mean annual precipitation is about 35 inches, the mean annual air temperature is about 50 degrees Fahrenheit, and the frost-free season averages about 180 days. Individual soil areas average about 100 acres in size and 4% in slope. Granite boulders and stones are strewn across some slopes.

Included with this soil in mapping in some areas are as much as 10% poorly drained Bellingham and Norma soils and very poorly drained Dupont soils; other areas are as much as 5% Everett soils.

In a typical profile, a thin mat of un-decomposed needles and wood fragments overlies a 1.5-inch, very dark grayish brown gravelly sandy loam surface layer. The subsoil and the upper part of the substratum, to a depth of 38 inches, are dark yellowish brown, brown, and dark grayish brown gravelly sandy loam.

The lower part of the substratum, to a depth of more than 60 inches is weakly cemented, compact glacial till. Reaction is medium acid.

A perched water table develops for short periods during the winter and spring rainy seasons. Permeability is very slow in the weakly cemented, compact part of the substratum. Commonly root growth is inhibited and roots are matted directly above this layer. The available water capacity is low. Surface runoff is very slow to slow, and the erosion hazard is slight.

In places, plant competition prevents adequate restocking, either natural or artificial, without proper site preparation. During periods of heavy rainfall the perched water table may be at a shallow depth and will restrict the use of ground equipment. Wind thrown trees are common.

The increase in population and the movement of people from urban to rural areas have resulted in greater residential use of this Alderwood soil.

Home site excavation is limited by the weakly cemented and compact substratum. In areas of moderate to high population, on-site sewage disposal systems often fail or do not function properly during periods of high rainfall because of this restrictive layer. This soil has a natural ability to support large loads. The soil is of a capability subclass IVs.

(AgC) 1C-Alderwood gravelly sandy loam, 6 to 15% slopes - are rolling moderately well drained. This soil formed in glacial till on broad uplands. It is extensive in the Lake Tapps area.

Vegetation is hardwoods and conifers. Elevation ranges from 200 to 800 feet. The mean annual precipitation is about 35 inches, mean annual air temperature is about 50 degrees Fahrenheit, and the frost-free season averages about 180 days. Individual soil areas average about 125 acres in size. Most slopes average about 8%. Granite boulders and stones are strewn across some slopes.

Included with this soil in mapping are small areas of better drained Indianola loamy sand on side slopes and poorer drained Norma sandy loam or Dupont muck in troughs. In addition, some areas of Alderwood gravelly sandy loam and Kapowsin gravelly loam, 0 to 6% slopes, are included.

In a typical soil profile, a mat of un-decomposed needles and wood fragments rests upon a 1.5-inch-thick very dark grayish brown gravelly sandy loam surface layer. The subsoil and the upper part of the substratum, to a depth of 38 inches, are dark yellowish brown, brown, and dark grayish brown gravelly sandy loam. The lower part of the substratum, to a depth of more than 60 inches, is weakly cemented compact glacial till. Reaction is medium acid.

The water table is perched above the very slowly permeable, weakly cemented and compact part of the substratum during periods of heavy rainfall. However, the perched water table is of short duration because water flows laterally above this layer to seeps at the bottom of slopes. Very few roots penetrate this dense substratum. The available water capacity is low. Surface runoff is medium, and the erosion hazard is moderate.

This soil has few limitations except plant competition, which prevents adequate restocking, either natural or artificial, without proper site preparation. Except for some matting of roots because of the dense substratum, root growth is normal. Wind-thrown trees are common.

The soil has an inherent ability to support a large load. Soil slope and the weakly cemented, compact substratum are its limiting features. In areas of moderate to high population density, on-site sewage disposal systems often fail or do not function properly during periods of rainfall in winter. Excavation for basements and utility lines is difficult. Topsoil needs to be stockpiled and subsequently used to cover excavated soil material. The soil is of a capability subclass IVe.

(AgD) 1D-Alderwood gravelly sandy loam, 15 to 30% slopes - are moderately steep and moderately well drained soils. The soil formed in glacial till on the broad uplands.

Vegetation is hardwoods and conifers. Elevation ranges from 200 to 800 feet. The mean annual precipitation is about 35 inches, the mean annual air temperature is about 50 degrees Fahrenheit, and the frost-free season averages about 180 days. Individual soil areas are long and narrow and are along drainage-ways. Most slopes average about 18%.

Included with this soil in mapping on the lower portions of slopes are small areas of Everett gravelly sandy loam, Indianola loamy sand, and Ragnar sandy loam.

In a typical soil profile, a mat of un-decomposed needles and wood rests upon a 1.5-inch-thick very dark grayish brown gravelly sandy loam surface layer. The subsoil and the upper part of

the substratum, to a depth of 40 inches, are dark yellowish brown, brown, and dark grayish brown gravelly sandy loam. The lower part of the substratum, to a depth of more than 60 inches, is weakly cemented, compact glacial till. Reaction is medium acid.

Water is perched above the very slowly permeable, weakly cemented, compact part of the substratum only for short periods. It flows on top of this dense layer to seeps on the lower portions of these moderately steep slopes. Very few roots enter this layer except through cracks. The available water capacity is low. Surface runoff is medium to rapid, and the erosion hazard is moderate to severe.

Plant competition prevents adequate restocking, either natural or artificial, without proper site preparation. Wind-thrown trees are common. Soil losses are minimized by use of special erosion control practices.

This Alderwood soil is limited for home sites because of the moderately steep slopes. Excavation involves ripping the weakly cemented, compact substratum. The topsoil needs to be stockpiled and subsequently used to cover excavated soil material. A site preparation system that controls runoff and maintains the esthetic value is needed. During the winter and spring rainy season, septic water from onsite sewage disposal units may seep at points farther down the slope. The soil is of a capability subclass Vie.

MLK subarea soil capabilities

Properties	AgB	AgC	AgD
Streets and roads	somewhat limited - depth to saturated zone	somewhat limited - depth to saturated zone and slope	very limited - depth to saturated zone and steepness
shallow excavations	very limited – depth to saturated zone, cutbanks cave, and dense layer	very limited – depth to saturated zone, cutbanks cave, dense layer, and slope	very limited – depth to saturated zone, cutbanks cave, dense layer, and steepness

Source: US Department of Agriculture (USDA) Soil Conservation Service (SCS), http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Geologically hazardous areas

Geologically hazardous areas are susceptible to erosion, sliding, earthquakes, or other geological events and pose a threat to the health and safety of citizens, and possibly to adjacent lands. There are 5 specific types of geologically hazardous areas.

Geologically hazardous areas

Hazardous areas	Mapped by agency:	Definition
Erosion hazards	US Department of Agriculture-Natural Resources Conservation Service (USDA - NRCS)	Moderate to very severe rill and inter-rill erosion, Slopes greater than 15%
Landslide hazards	US Department of Agriculture Natural Resources Conservation Service (USDA – NRCS) Department of Ecology Department of Natural Resources US Geological Survey	Subject to landslides due to a combination of geologic, topographic, and hydrologic factors such as bedrock, soil, slopes, structures, or hydrology
Seismic hazards	Tacoma Community & Economic Development Department	Subject to severe risk of damage from ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting
Extreme slope hazards	Tacoma Community & Economic Development Department	Severe erosion potential and high probability of slope failure & landslide occurrence, Slopes greater than 25%
Other geological events	Tacoma Community & Economic Development Department	Mass wasting, debris flows, rock falls, differential settlement.

The Tacoma Community and Economic Development Department mapped all critical areas including geologically hazardous areas in the city in 2004 and 2008.

Areas with geological risk due to slope and soil combinations were located in the steep bluffs to the south of MLK overlooking Nalley Valley at Center Street and north of the downtown core overlooking Schuster Parkway and Commencement Bay. There were no identified geological risk areas within the MLK subarea.

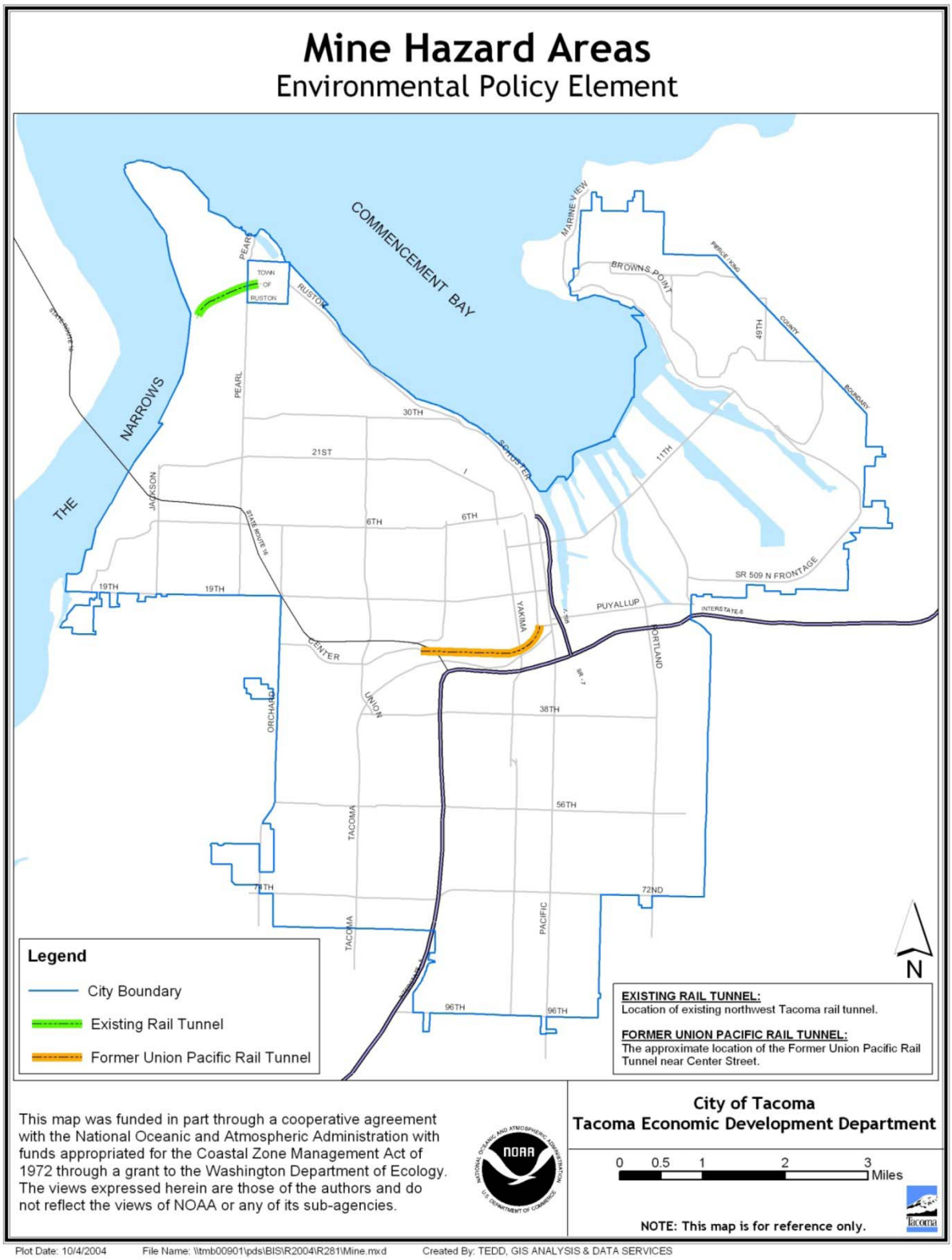
Union Pacific Rail Tunnel - in addition to geologically hazardous areas due to soil and slope conditions, potential hazardous areas also include old and abandoned mines and railroad tunnels.

The Union Pacific Railroad initiated construction of a rail tunnel below the bluffs at the south end of the MLK subarea in Nalley Valley near Center Street to improve access to downtown and the company's other rail lines.

Union Pacific bought portions of the sparsely populated hillside in 1907 and started construction of the "Big Bore". The Big Bore was to consist of a tunnel with an easy grade, more than 70 feet deep in places, 1.5 miles long, punched through the hillside at South 24th Street and Jefferson Avenue, arcing south then west.

Digging started from the north portal in April 1909. By early June, test holes bored near the south portal opened up 6-inch streams of water. By early October crews had tunneled more than 0.5 miles from the north portal but power shovels were blocked by the flood of water. By November, the digging stopped altogether.

Union Pacific ultimately gave up the project and paid to haul its trains on a competitor's track. By 1913, the abandoned tunnel began to collapse in so many places that the railroad and the city undertook a new public works project to fill it, first with dirt and rock, then with cordwood. The railroad deeded the properties back to their original owners. The Big Bore was wiped from official records and maps by 1915.


Mine Hazard Areas
Environmental Policy Element
COMMENCEMENT BAY
NARROWS
THE
TOWN OF RUSTON
RUSTON
PEARL
MARINE VIEW
BROWNS POINT
PIERCE KING COUNTY
49TH
BOARDWY
30TH
21ST
SCHUSTER
11TH
JACKSON
STATE ROUTE 16
6TH
6TH
19TH
19TH
SR 509 N FRONTAGE
PUYALLUP
INTERSTATE-5
YAKIMA
CENTER
PORTLAND
SR - 7
UNION
ORCHARD
38TH
56TH
TACOMA
72ND
72ND
PACIFIC
96TH
96TH
N
Legend
City Boundary
Existing Rail Tunnel
Former Union Pacific Rail Tunnel
EXISTING RAIL TUNNEL:
Location of existing northwest Tacoma rail tunnel.
FORMER UNION PACIFIC RAIL TUNNEL:
The approximate location of the Former Union Pacific Rail Tunnel near Center Street.
This map was funded in part through a cooperative agreement with the National Oceanic and Atmospheric Administration with funds appropriated for the Coastal Zone Management Act of 1972 through a grant to the Washington Department of Ecology. The views expressed herein are those of the authors and do not reflect the views of NOAA or any of its sub-agencies.
NOAA
City of Tacoma
Tacoma Economic Development Department
0 0.5 1 2 3 Miles
NOTE: This map is for reference only.
Plot Date: 10/4/2004
File Name: \\tmb00901\pds\BIS\R2004\R281\Mine.mxd
Created By: TEDD, GIS ANALYSIS & DATA SERVICES

4.2.2: Impacts

Both alternatives

Both alternatives will continue development of the lands within the MLK subarea for urban uses and activities to various intensities. Additional urban development of previously undeveloped lands or of a higher intensity of previously committed lands could erode soils and enter surface water runoff degrading the quality of surface water bodies if not properly managed.

Inadequate on-site treatment could create pollutants that enter surface water runoff and degrade the quality of surface water bodies and/or be absorbed into the seasonal high water table and thereby the underground water supply system.

If intensive urban uses are not allocated to capable soils and effective grading and landscaping measures are not provided, additional or more intensive urban developments could cause severe erosion risks with irreversible damage to sensitive wetlands and anadromous fish-bearing waters.

Inadequately located or designed urban infrastructure including roads, parking lots, and other improvements that are not sited on level lands and/or that are not planted with adequate ground covering materials could cause silting conditions to fill and pollute plant and fish-bearing waters.

Alternative 1: No-action

The Washington Administrative Code requires a no-action alternative be considered within the environmental review process. Under a no-action alternative, the prevailing 2012 Tacoma Comprehensive Plan and Zoning Map would remain in effect and all MLK subarea planning and implementation policies would continue to be coordinated with these documents.

The present plan and policies or no-action would result in the following:

Neighborhood Residential Mixed Use (NRX) zoning - would remain as designated in the current zoning map. The NRX zoned area would likely retain much of the existing single and multifamily housing stock avoiding extensive construction and earth moving activities.

Residential Commercial Mixed Use (RCX) zoning - would remain as designated in the current zoning map. The RCX zoned area would likely retain much of the existing single and multifamily family housing stock on blocks where the structures remain in good condition.

Underdeveloped or "soft" properties would likely be redeveloped throughout the zone for buildings with sub and ground floor "platforms" providing parking and some retail or related use. Redevelopment activities would alter the grade in some places removing dirt during construction activities.

Neighborhood Commercial Mixed Use (NCX) zoning - would remain as designated in the current zoning map. The NCX zoned area would retain some of the older, possibly historic retail and apartment structures along MLK Way and South 11th Street that are in good condition and rented.

Considerable underdeveloped or "soft" properties would be redeveloped throughout the zone for buildings with sub and ground floor "platforms". Redevelopment activities would alter the grade in some places removing dirt during construction activities.

Hospital/Medical Mixed Use (HMX) zoning - would remain as designated in the current zoning map. The HMX zone would contain all hospital medical and related facilities including most structured parking. Future hospital facility development activities would alter the grade in some places removing dirt during construction activities.

Alternative 2: MLK Subarea Plan

Alternative 2: MLK Subarea Plan will conform to the 2011 Comprehensive Plan but amend the Zoning Map to result in the following impacts:

NCX to URX zoning – for the blocks located south of South 19th Street on MLK Way to reflect existing good condition single family committed structures and protect the integrity of the neighborhood from fragmentation avoiding extensive construction and earth moving activities.

NCX zoning would be retained - however, for the corner lots on MLK Way at South 23rd Street to retain the neighborhood stores that were developed to serve historical streetcars lines on MLK Way.

RCX to URX zoning – would be designated for the blocks located south of South 19th Street on J Street and on the west side of I Street south of South 23rd Street to reflect existing good condition single family committed structures

and protect the integrity of the neighborhood from fragmentation avoiding extensive construction and earth moving activities.

HMX zoning would be expanded – to include MultiCare Health System properties that have been acquired west of South L Street and north of South 6th Avenue that are viable and supportable for hospital related developments.

As in Alternative 1, Alternative 2 would facilitate future hospital facility development activities that would alter the grade in some places removing dirt during construction activities.

HMX zoning would be revised – to exclude the churches and existing apartment buildings located on Division Avenue and I Street/Yakima Avenue that are not owned by MultiCare Health Systems and which are not viable or necessary for future hospital development.

These properties may be rezoned RCX to reflect current church and residential uses, avoiding extensive construction and earth moving activities.

4.2.3: Mitigation measures

Both alternatives

Chapter 4 Environmental Element of Tacoma's Comprehensive Plan
Chapter 4 is a comprehensive, single source of Tacoma's environmental policies. The element presents a culmination of policy recommendations on some of the city's most important environmental issues. It provides direction for evaluating environmental conditions and natural processes.

Framework - managing growth within potentially hazardous natural areas prevents environmental problems as well as preserves open space.

Developments in potentially hazardous areas need to be subject to standards which may be stricter than the standards which apply in areas where natural constraints are not present. In cases where developments are permitted in these potentially hazardous areas, the developments need to be designed in harmony with natural systems.

Critical areas – include wetlands, areas of critical recharging effect on aquifers used for potable water (aquifer recharge areas), fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas representing a variety of ecosystems providing necessary biological and physical functions. Critical areas can also present threats to human safety and to public and private property if not protected and monitored.

Some beneficial functions and values provided by critical areas include protection of water quality, protection of fish and wildlife habitat; ground water recharge, erosion control, support of nutritional relationships for fish and wildlife, flood management, protection from landslide hazards, aesthetic opportunities, and recreation.

In accordance with GMA – Tacoma prepared a comprehensive land use plan identifying critical areas and adopting regulations for protection while accommodating reasonable use of private property.

Chapter 4 identifies the goals, policies, guidelines, and requirements of GMA "to designate and classify ecologically sensitive and hazardous areas and to protect these areas and their functions and values, while also allowing for reasonable use of private property".

There are no significant critical areas known to be located within the MLK subarea.

Best Available Science (BAS) – was used to develop Tacoma's policies and development regulations to protect the functions and values of critical areas. BAS involved:

- Adopting information from local, state, or federal natural resource agencies that are appropriate for local circumstances;
- Consulting with a qualified scientific expert or team to assess applicability to the local critical area; and
- Determining if a person is a qualified scientific expert - has professional credentials or certifications, advanced degrees, years of experience in the specific field, and/or peer-reviewed publications or other professional publications.

Growth and development - Tacoma will continue to be the focal point of growth for Pierce County as well as a growth center for the region and the state. It is intended that growth and development occur in an orderly and desirable manner in accordance with citizen needs and desires and the physical characteristics of the land. To accomplish this with minimal environmental hazard, Tacoma adopted the following policies concerning growth and development:

E-GD-1 Site Planning
Encourage site planning and construction techniques that maintain natural landforms, retain native vegetation, and preserve open space.

E-GD-2 Development Hazards
Discourage development on lands where such development would pose hazards to life or property, or where important ecological functions or environmental quality would be adversely affected: (a) floodways of 100-year floodplains, (b) erosion hazard areas, (c) landslide hazards areas, (d) unique or significant wetlands or stream corridors, (e) fish and wildlife conservation areas and (f) seismic hazard areas.

E-GD-3 Manage Development
Encourage development standards in critical areas in accordance with the severity of natural constraints to reduce risks, minimize damage to life and property and mitigate potential hazards.

E-GD-4 Educational/Aesthetic Appearance
Encourage regulations or development limitations within areas of recognized educational, anthropological, historical, biological or aesthetic significance to avoid irreversible damage to such areas.

E-GD-5 Environmental/Economic Consideration
Recognize that management of environmental resources should consider protection of the public health, safety and welfare and economic development needs.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Environmental Natural Features – Tacoma's unique natural features are a visual and aesthetic asset to the community. Lakes, streams, slopes, and gulches are highly valued for their aesthetic quality and recreational opportunities. These natural features also provide valuable ecological functions as well.

E-ENF-1 Natural Features Value
Recognize the value of natural features of the land within the urban environment; conserve as many natural features as is possible and appropriate. Natural features are not only important for ecological reasons but they both possess educational and recreational values as well.

E-ENF-2 Preservation of Natural Resources
Preserve through programs of acquisition, easement, design standards and zoning an optimum amount of the city's desirable natural features for public purposes. Included would be steep slope areas, water frontage, wooded areas, aquatic lands and other unique and significant natural areas.

E-ENF-3 Environmental Considerations
Emphasize careful planning in growth and development activities in order that the city's natural features may be preserved, soil stability maintained and renewable and non-renewable resources protected.

E-ENF-4 Natural Features and Unstable Soil
Carefully plan residential development in order that the city's natural features are preserved, if at all possible, and areas of unstable soil are not disturbed.

E-ENF-5 Natural Features
Avoid alteration of desirable natural features, where feasible, in the development of utilities and services facilities.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Low Impact Development - emphasizes protection and use of on-site natural features integrated with engineered, small scale stormwater controls at the parcel and subdivision scale to manage stormwater and maintain or restore pre-development watershed hydrology functions.

Creating sustainable stormwater systems is a Tacoma priority. The effects of urbanization on stormwater may be partially alleviated by designing and using systems that mimic natural conditions such as low impact development techniques including rain gardens, bio-retention swales, pervious pavement, green roofs and vegetated walls, retention of native vegetation, avoidance of soil disturbance, appropriate planting and other techniques.

E-LID-1 Manage Stormwater
Encourage the use of low impact development techniques to mitigate storm water runoff, including bioretention systems, green roofs and vegetated walls, retention of native vegetation, avoidance of soil disturbance, appropriate planting, and using pervious or permeable materials that allow water to infiltrate where hard surfaces are needed.

E-LID-2 Innovative Landscaping in Mixed-Use Centers
Require and encourage new development in mixed-use centers to provide vegetated cover through a flexible approach that includes low impact development options such as vegetated walls, green roofs, rain gardens, permeable paving and planted layers of vegetation and trees that are visible to the public.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Environmental remediation – is the prevention of contamination and the clean-up of identified contaminated sites to improve the quality of Tacoma's environment. Tacoma has defined the following policies for dealing with hazardous sites:

E-ER-1 Comprehensive Cleanup Strategies Encourage improvement of the environmental quality of Commencement Bay, its associated waterways, and the Tacoma watershed, including all nearshore and adjacent upland areas through comprehensive cleanup strategies.
ER-2 Contaminated Sites Encourage the identification and characterization of all contaminated sites which adversely affect the City's shoreline areas, surface waters, groundwater, and soils.
E-ER-3 Source Control Encourage source control of all contaminated sites within and adjacent to the City's shoreline areas or which impact shoreline areas or surface waters.
E-ER-4 Public/Private Partnerships Encourage public and public/private partnerships to ensure the most comprehensive, timely and cost-effective cleanup actions.
E-ER-5 Best Management Practices Ensure the use of Best Management Practices by private industry and municipal government to prevent recontamination of wetlands, streams, shorelines, groundwater and other aquatic areas.
E-ER-6 Best Available Science Ensure the use of Best Available Science Practices by private industry and municipal government to prevent recontamination of wetlands, streams, shorelines, groundwater and other aquatic areas. Special attention should be placed on anadromous fisheries.
E-ER-7 Intergovernmental Partnerships Coordinate and cooperate with State and Federal programs (e.g., Department of Ecology, Environmental Protection Agency) in encouraging and monitoring the remediation of contaminated sites.

Source: Chapter 4 Environmental Element, Tacoma Comprehensive Plan 2011

Mitigation sequencing - identifies preferred options to use when the proposed activity cannot be avoided or minimized to cause the least amount of impact. Mitigation sequencing is listed in the order of preference:

- Avoiding the impact by not taking a certain action;
- Minimizing the impact by limiting the degree of the action, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Minimizing or eliminating the hazard by restoring or stabilizing using approved engineering or other methods;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the proposed action;
- Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; or
- Monitoring the impact and taking appropriate corrective measures.

Specific mitigation measures for each type of critical area are included in the Critical Areas Ordinance (TMC Chapter 13.11).

4.2.4: Unavoidable adverse impacts

There are limited, known environmentally sensitive areas within the MLK subarea. However, under both alternatives, Chapter 4 Environmental Element of Tacoma's Comprehensive Plan along with applicable critical areas and development regulations will protect sensitive environmental lands, particularly lands that could be subject to erosion, siltation, and seismic hazard risk.

Under Alternative 2: MLK Subarea Plan, portions of the single family neighborhood at the south end of the MLK subarea and existing apartment buildings and churches at the north end of the subarea will be rezoned to promote retention of the existing structures and thus reduce or avoid the amount of land and soil that could be disturbed by redevelopment clearance and reconstructions.

Under Alternative 2: MLK Subarea Plan, potentially contaminated sites, or brownfields, will be identified so that a more comprehensive, proactive approach to clean-up can be pursued.