

Group Project 2: A town expansion plan

The mythical town of Point Bar, Washington, is nestled in the foothills of the western Cascades, about an hour and a half drive from Seattle. The town has recently decided to take advantage of the overcrowding in Seattle and expand its limits. To do this, the town needs to increase its tax base, and to do that, the town needs to attract industry and development.

So the town manager made several out-of-state trips to business conferences and she came back with the good news that three companies with revenues in the tens of millions of dollars wish to relocate to Point Bar.

She has hired you, a consulting group of environmental geologists and planners, to map out a town plan that will not only place the newly-established industries, but also allow for the inevitable expansion of the population base.

For convenience, all the town maps will be on the same scale, roughly 400 feet to the inch. For areas, we will use the “**square**”, which is a square 100 feet by 100 feet (physically, it is the size of one of the squares on the graph paper). Four and a half squares is roughly an acre.

The town manager has given you the following list of land uses (and their requirements) which are **required** to be placed on the new town map (in other words, you can't skip placing the inconvenient or polluting ones):

1. The City of Point Bar itself must expand by **20 squares** for new retail businesses for the added population. The additional squares can be any shape, but they must be contiguous (attached) to the existing town.
2. A computer chip manufacturing plant (Fujitel, Inc.) needs a **3 square by 5 square** space and it will also need access to water on-site. The plant will generate a significant amount of possibly harmful wastewater.
3. An outlet mall (RAA Associates, Inc.) which can use *either* a **4 square by 6 square** site *or* a **3 square by 8 square** site. It will generate lots of runoff from its parking lots.
4. A hog finishing feedlot (Purtill Pork Products Co.) needs a **5 square by 6 square** site. It will need access to water on-site and will generate lots of contaminated runoff.
5. A light aircraft airport and heliport to accommodate business travelers needs a **2 square by 12 square** site. The runways will, of course, generate runoff.
6. For the added population, about 25 acres of housing will be needed. This works out to a total of **100 squares**. You may choose to subdivide the 100 squares into, at most, 3 separate sites. Each subdivision will need on-site water access.

7. For the first time, the town will need a waste treatment plant to comply with state law. It will need a **3 square by 2 square** site and will need to be on the banks of a river.

8. A municipal park for all the new (and old) townspeople will take up **20 squares**, in any shape.

Note that “on-site water access” simply means that fresh water must be available at the site, either from surface or groundwater sources. Note that you need not worry about roads, since that will be handled by the town engineering department.

The manager hands you the attached packet: a **town map**, a **soils map** and a **stratigraphic cross-section** of Point Bar and environs. She adds that, in your following meeting (Wednesday), you may request one other piece of information, which she will try to supply at that meeting. At the following meeting (Thursday), you will present to a conference of consultants working on the same problem, your vision of the expanding town of Point Bar. In **your seven-minute oral presentation**, she will be looking for:

- All eight requirements fulfilled (16 points)
- A justification for the placement of the eight land uses, especially with regard to potential geological hazards (24 points)
- Some comment about possible future hazards which the town will have to look out for (10 points)

Some issues you should keep in mind about Washington:

- The western Cascade foothills receive about fifty inches of **precipitation** (rain and snow) per year.
- Washington state has strict rules about maintaining **stream quality**, especially the idea of *minimizing* silt suspension in streams.
- Western Washington, as you know, is a **tectonically active** area.

You *should* have ready a **map** which shows the placement of all seven requirements (both overhead transparency and poster formats are good); you *should* also have a **three-page executive summary** to hand out to the other groups and to the town manager, which highlights your main points.

Key for the soils map:

AgC (Alderwood gravelly sandy loam) — Thin A horizon, thick B horizon, thick C horizon. Permeability is rapid. Available water capacity is low. Hazard of erosion is moderate; runoff is slow.

AkF (Alderwood and Kitsap soils, very steep) — This mapping unit is about 50 percent Alderwood gravelly sandy loam and 25 percent Kitsap silt loam, with slopes ranging from 25 to 70 percent. Distribution of the soils varies greatly within short distances. Runoff is rapid to very rapid and the erosion hazard is severe to very severe. The slippage potential is severe. Permeability varies.

Br (Briscot silt loam) — Well-developed O horizon, thick A and B horizons, thin C horizon. Permeability is moderate. In winter, the seasonal water table is within a depth of 1 to 2 feet. In drained areas, roots penetrate to a depth of 60 inches or more. Available water capacity is high. Runoff is slow and erosion hazard is slight. Stream overflow is a moderate hazard.

Rh (riverwash) — Consists of sand, gravel and stones along channels of larger streams. Some areas are barren of vegetation and others support various trees and shrubs. Overflow and alteration by severe erosion and deposition are frequent.

Wo (Woodinville silt loam) — Moderate O and A horizons, thick B horizon, thin C horizon. B horizon contains peat. Permeability is slow. There is a seasonal high water table at or near the surface. In drained areas, roots penetrate with difficulty to 60 inches. The available water capacity is high. Runoff is slow and the hazard of erosion is slight. Stream overflow can be a severe hazard in some areas unless flood protection is provided.

Key for the stratigraphic cross-section:

Qc (Quaternary colluvium) — Weathered gravity-deposited surface material, usually soils.

Qa (Quaternary alluvium) — Weathered water-deposited surface material, usually soils or stream deposits.

Qvt (Quaternary Vashon Till) — see Lab 6

Qes (Quaternary Esperance Sand) — see Lab 6

Qlc (Quaternary Lawton Clay) — see Lab 6

Qkf (Quaternary Kitsap Formation) — see Lab 6

Tb (Tertiary basalt flow) — Unknown thickness basalt flow from the Cascades; rock is moderately fractured and contains vesicles.