2.0 BACKGROUND

2.1 Historic Settlement Pattern of Surrey

The pattern of modern settlement in Surrey was governed in large part by the existing landscape structure, organic development, and the agricultural grid. The landscape structure is distinguished by the low-lying floodplains of the Serpentine and Nicomekl River systems, which are contained on three sides by a ridge/hill/upland terrain. This structure influenced the placement of a trail system, which was built diagonally along the ridges and through the valley floor, thereby connecting New Westminster and Vancouver eastwards to the BC Interior and southwards to Washington State. The Semiahmoo Trail (1872), Yale Road (1875), and McLellan Road (1874-5) (later King George Highway, Fraser Highway, and No. 10 Highway, respectively), connected the uplands to the lowlands and stimulated early organic development along the ridges and dryer portions of the lowlands.[1] Early district lot subdivision created a loose gridiron framework based on 160-acre parcel units (see ***Figure 2.1***).

2.2 Clayton's Cultural History

Formerly called Serpentine Flats, or Serpentine Valley, Clayton was named in 1889 by the postmaster, John George, for his native Clayton, Ohio. Begun in 1871, Yale Road (now Fraser Highway), was for many years the lifeline to New Westminster and Vancouver. The construction of the Fraser River Bridge in 1904, and the gravelling and extension of the Clover Valley Road (renamed the Pacific Highway) as far as the US border by 1913, established Clayton's role as a major Surrey transportation hub. This role was further enhanced in 1923 by the paving of the Pacific Highway (176th Street as of 1957). The first Crown land grant was granted to John Wesley Pickard in 1883. By 1891, with a population of about 300, Clayton had two churches, at least one paid school teacher, and a train service to New Westminster.

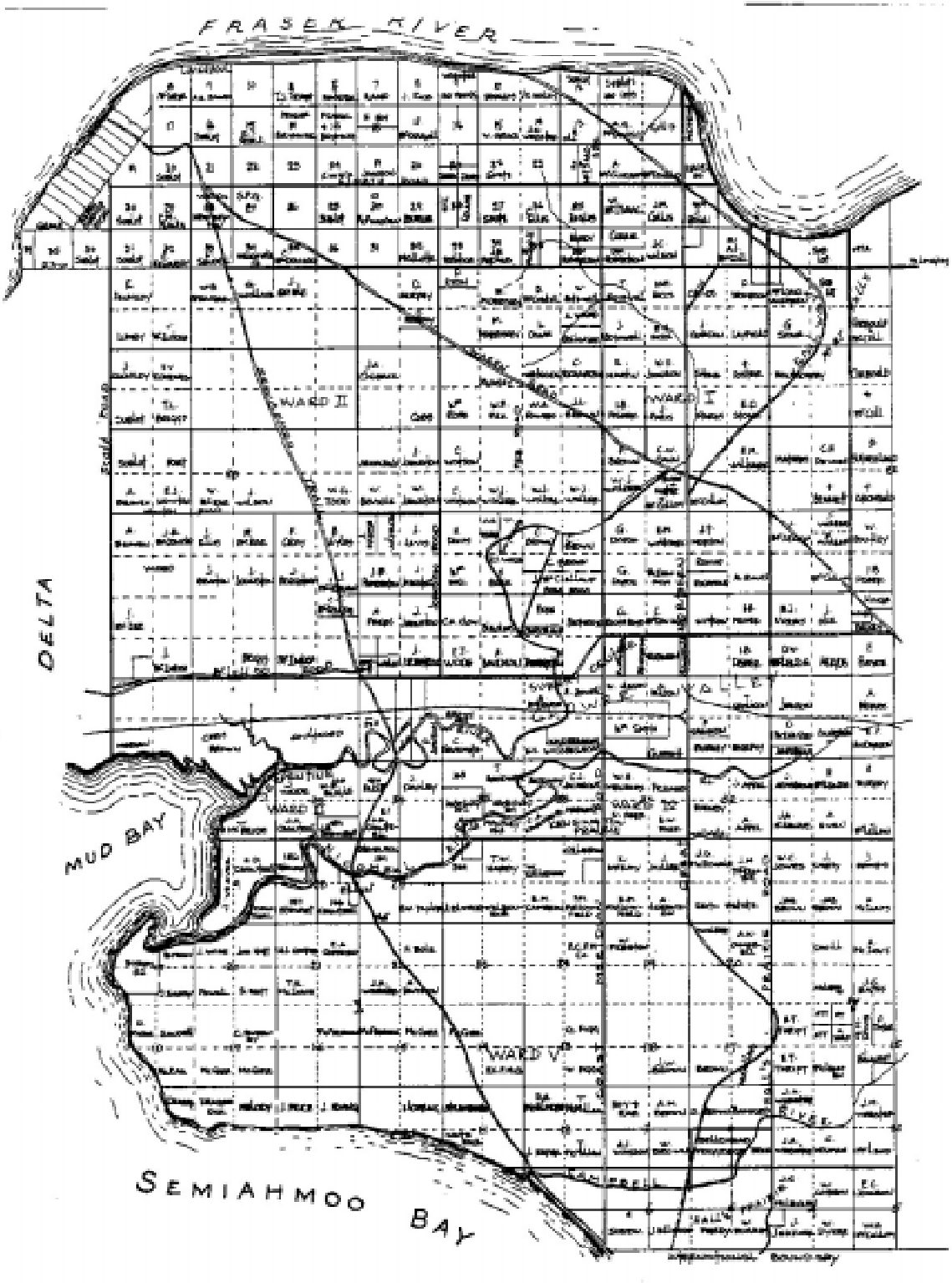
Topographically, Clayton Centre lies on the high ground known as Clayton Hill (above the flats of the Serpentine River to the south and west, and the Nicomekl River to the south and east). Its main industry was farming. Before the end of the First World War, most farming in Surrey was carried out on the Serpentine flood plain; however, returning soldiers could only purchase on higher ground. These new residents practised poultry farming, as it required less capital investment and land than did other types of farming. Dairy farmers and the growers of feed crops prospered on the "flats" below.

2.3 Site Location/Context

The East Clayton district is an approximately 250-hectare (617-acre) area located on the southeastern edge of the larger Clayton district, an approximately 909-hectare (2,250-acre) area on the Surrey/Langely border. Located within one of the Lower Mainland's fastest growing municipalities and in close proximity to several ecologically important areas, Clayton is a diverse planning area with a number of opportunities and constraints. It is bordered by the Agricultural Land Reserve on its north and west sides, by Fraser Highway on its south side, and by the Langley border (196th Street) on its east side. The East Clayton district lies east of 188th Street, and south of 72nd Avenue to Fraser Highway (see ***Figure 2.2***). Its low net densities, narrow curbless roads, and expansive views to the surrounding agricultural lowlands give Clayton its distinctive rural character.

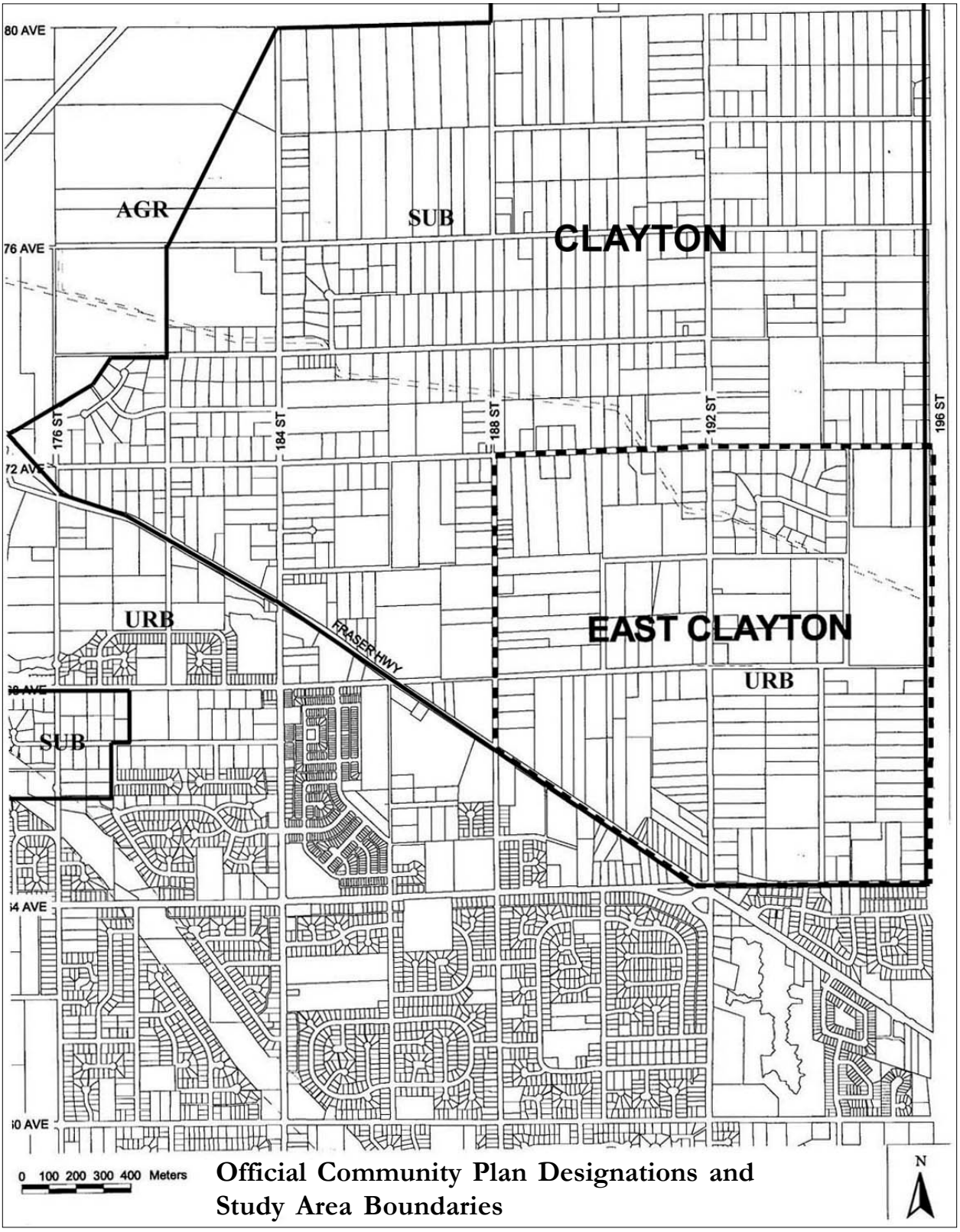
[1] G. Fern Treleaven, *The Surrey Story* (Surrey, BC: Surrey Museum and Historical Society. 1969).

Figure 2.1 Historic Settlement Pattern of Surrey



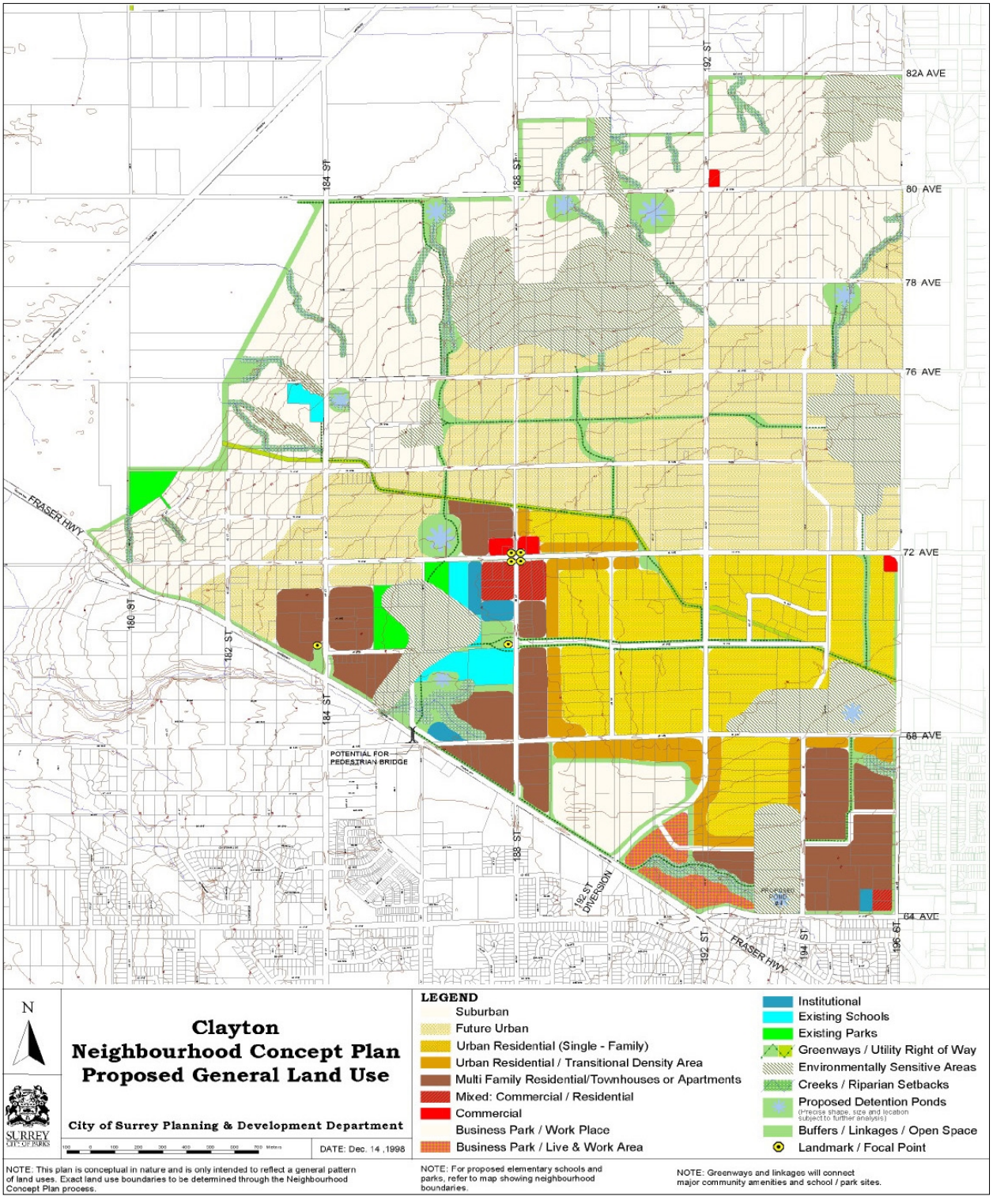
Source: G. Fern Treleaven, *The Surrey Story* (Surrey, BC: Surrey Museum and Historical Society. 1969).

Figure 2.2 East Clayton Context



Official Community Plan Designations and Study Area Boundaries

Figure 2.3 Clayton General Land Use Plan



2.4 Existing Land Uses

As part of its urban growth concept, the *Official Community Plan* for Surrey identifies East Clayton as "urban," meaning that it may be provided with the urban infrastructure (i.e., water, sewer, roads) necessary to support urban densities (of at least 6 dwelling units per acre).[2] The remainder of Clayton is identified as "suburban," meaning it is considered to have-long term development potential subject to land-use planning with local residents. ***Figure 2.3*** shows the general land use patterns for Clayton as proposed in the Clayton General Land Use Plan.

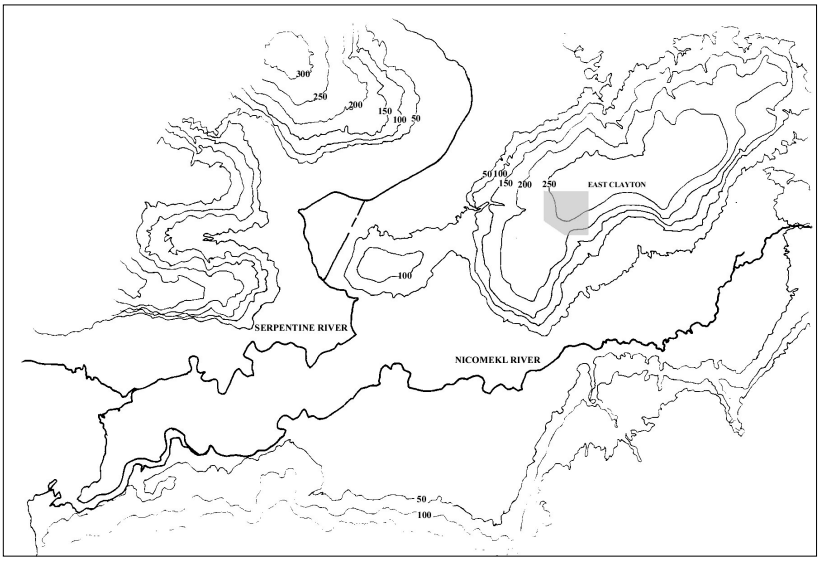
The primary existing land-use in the area covered by the East Clayton NCP is residential and contains 191 individual parcels. Most land is privately owned, and approximately 460 people currently live in the area. The area consists of parcels averaging three-quarters of an acre to 10 acres, with some parcels as large as 60 acres. Subdivision generally conforms to the historical agricultural grid, with the exception of Aloha Estates, a suburban subdivision of one-acre parcels built in the 1980s and located near the southeast corner of 72nd Avenue and 192nd Street.

Other new development that has occurred over the past 10 to 15 years has been centred around 192nd Street and Fraser Highway. Near the study area is a small service station/corner store located at 80th Avenue and 192nd Street, and a small commercial node at 184th Street and the Fraser Highway. There are a number of agricultural activities taking place in Clayton, including rangeland, hay, dairy, and poultry operations. Most of these operations are occurring within the agriculturally zoned land (ALR) to the north and west of Clayton; however some are dispersed within the site.

2.5 Topography

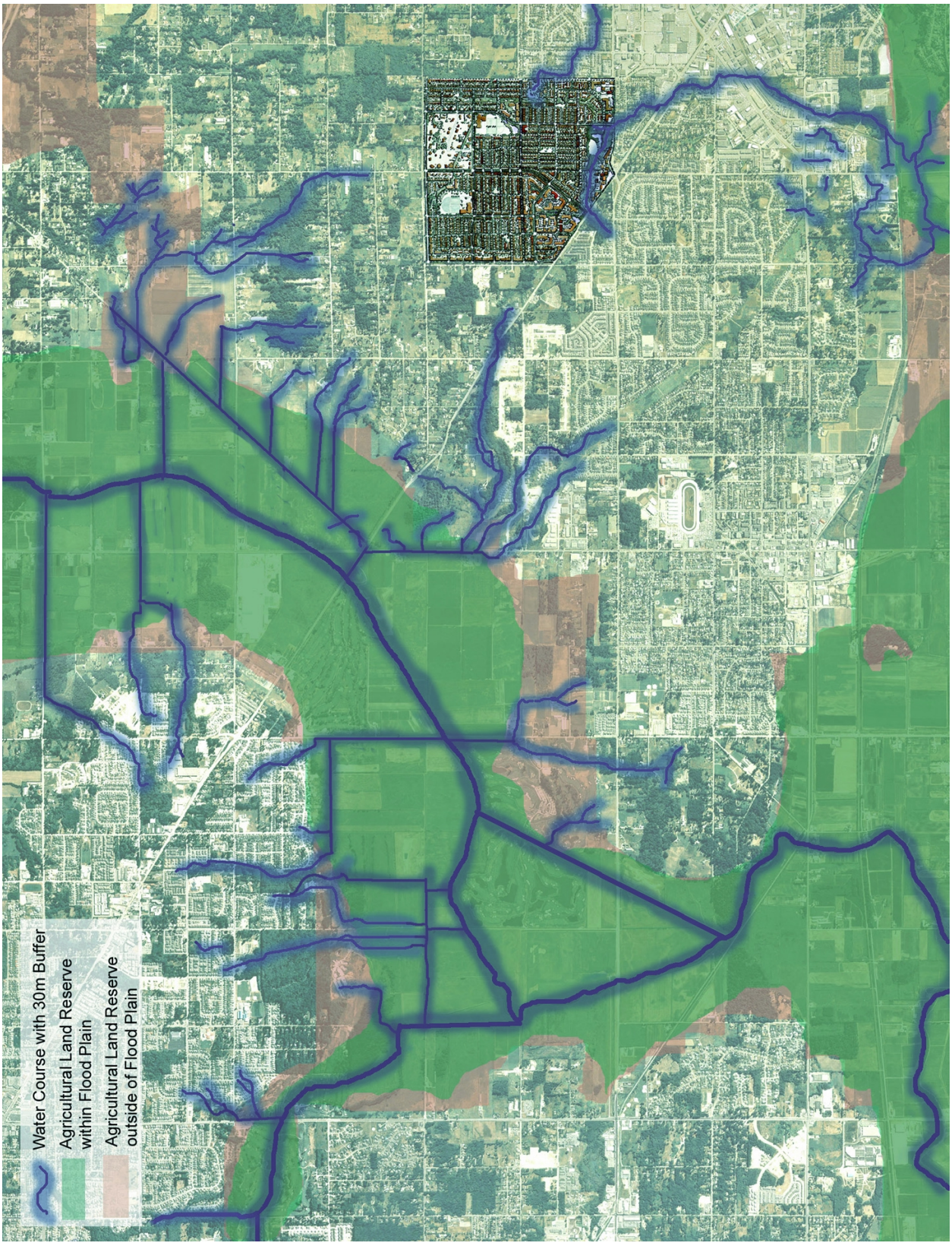
East Clayton is located on a gently sloping upland region at Surrey's far eastern edge. The area is defined primarily by two distinct ridgelines, the first of which runs approximately parallel to 192nd Street, and the second of which crosses the northern portion of the site diagonally. Following these ridge lines, the site drains, generally, in southerly direction to the Nicomekl River on the southeast, and in a westerly direction to the Serpentine River on the site's west (see ***Figure 2.4***). Significant slopes on the site range from 6 percent to 9 percent, with flat hilltop areas ranging from 0 percent to 2 percent. An uncharacteristically steep area, with slopes in excess of 10 percent, exists along a small portion of the eastern edge of the site (at the Horner Creek headwaters). Micro-topographical elements include roadside swales and ditches as well as natural drainage channels and ravines (occurring through wooded areas). With the exception of the less than 10 percent slopes ant the southeastern portion of the site, and individual channel and stream banks, no slopes present particularly difficult construction challenges.

Figure 2.4 Topography and Landform



[2] City of Surrey, *Official Community Plan* (Surrey, BC: Surrey Planning Department, 1996).

Figure 2.5 East Clayton in Relation to ALR and Flood Plain

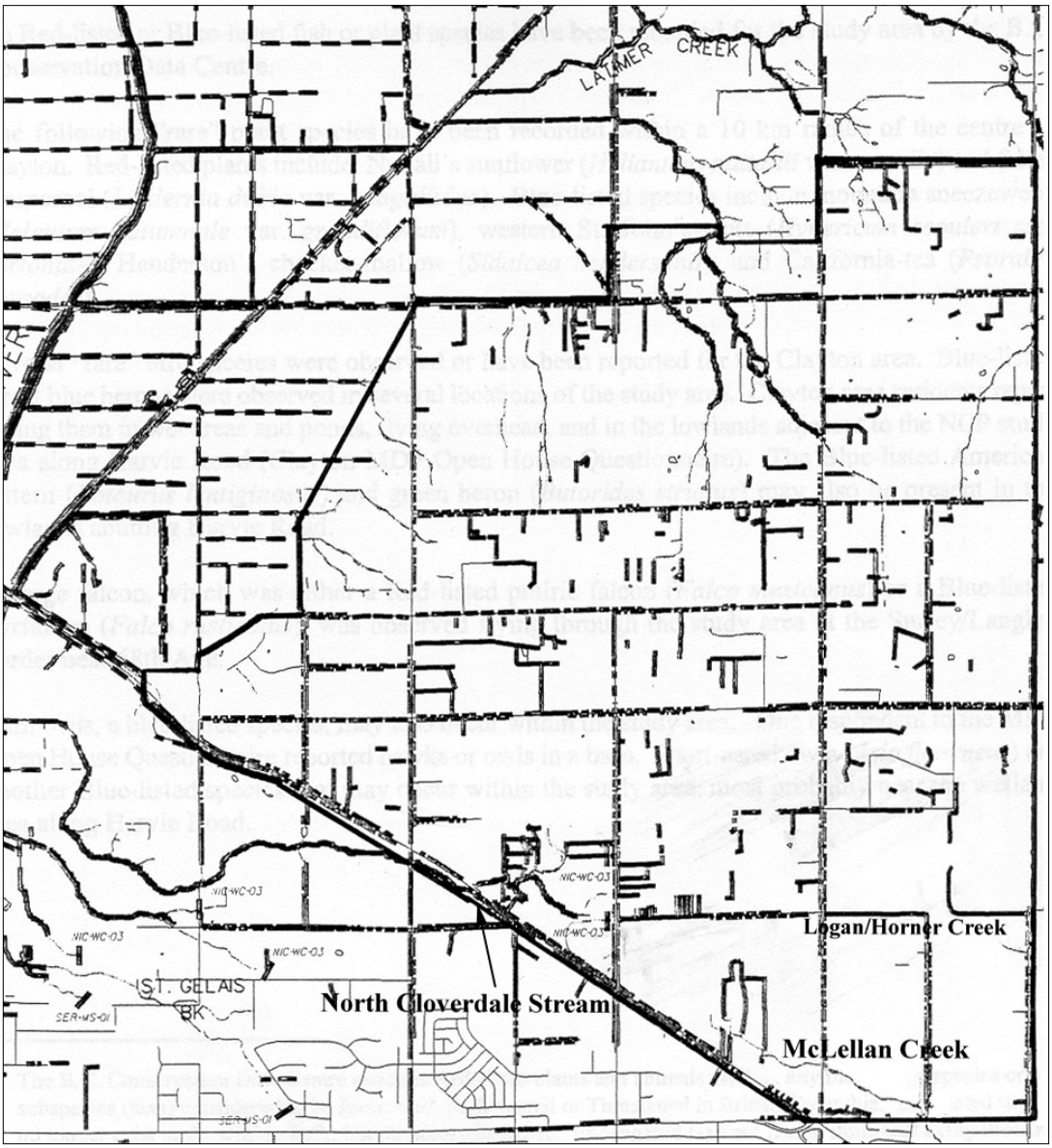


2.6 Vegetation

Clayton is primarily a mixture of fields and relatively young stands of mixed forest. Historically, vegetation conformed to that found in the Coastal Western Hemlock (CWH) biogeoclimatic zone, which covers much of the Lower Mainland region and consists of Western helmock, Douglas fir, and western red cedar. However, logging activity between 1912 and 1930, together with more recent clearing and suburban development, has resulted in the formation of younger forest blocks dominated by red alder, paper birch, black cottonwood, and big-leaf maple, with conifers occurring as individuals or in small clusters.

The report entitled *Clayton Area Neighbourhood Concept Plan: Environmental Report* (from this point referred to as the Dillon Report), completed by Dillon Consulting Limited and Strix Environmental Consulting, provides a detailed bio-inventory and assessment of the sensitivity and significance of Clayton's

Figure 2.6 Stream Classification Map for Clayton



[6] Dillon and Strix, *Clayton Area Neighbourhood Concept Plan*, 30.

[7] Ibid, 33.

terrestrial habitat, using forest blocks and watercourses as the primary study units.[3] In general, most large and small forest blocks are in a relatively early stage of development and are located in the least disturbed portions of the East Clayton area. They are distinguished by their high level of species diversity and large proportions of introduced species as compared with the largest and most established forest blocks located to the north and west of the study area. The Dillon Report located a number of "highest valued natural areas", designated as requiring priority for protection based on several criteria. These criteria include, but are not limited to: supporting or potentially supporting significant wildlife, plant or fish species; providing nesting, roosting and/or foraging habitats for various raptors; and facilitating groundwater recharge and discharge important or potentially important to downstream aquatic systems. ***Figure 2.3***, the Clayton Land Use Plan, shows areas of environmental sensitivity within the larger Clayton district.

The area to the north of 68th Avenue is described as a large forest block and field, and consists of a combination of habitats suitable for nesting and hunting by raptors. Evidence of several species has been observed in this area including Great horned owl, Red-tailed hawk, and Douglas' squirrel.
The area to the north of Fraser Highway is characterized by mixed vegetation including bigleaf maple, Sitka spruce, Douglas-fir, western hemlock, and several large black cottonwoods. Wildlife species observed include Red-tailed hawk and eastern cottontail.

2.7 Soils

The subsurface geology in the uplands of east Surrey consists largely of Capilano sediment, which is composed of deposits ranging from moderately coarse-textured glacial till to moderately fine-textured glaciomarine sediments. The primary soil unit is Bose, a soil typically found on the upland areas of the Sunshine Coast, Delta, and Surrey municipalities.[4] Bose is characterized by a sandy loam or gravelly, loamy sand surface texture. This surface texture may be up to 10 centimetres (3.9 inches) thick and is underlain with a deeper, coarser gravelly sand or sandy subsurface. Immediately below this is a more impervious layer, approximately 50 centimetres (19.6 inches) thick, of glacial till or glaciomarine deposits, which is composed of either red cemented sand or silty clay loam. Undisturbed and uncompacted, the heavy soils of the substrata can normally absorb approximately 1.0 millimetre (.039 inches) of water per hour during winter conditions and approximately 1.0 millimetres to 2.0 millimetres (.039 inches to .8 inches) per hour during summer conditions.

With a low water-holding capacity, extensive agricultural and forestry use are limited. However, with depths of up to 1.5 metres (5 feet) , the soil-bearing capacity is able to support moderate urban development, although low subsoil permeability and high water tables limit septic tank use.

2.8 Streams and Hydrology

Positioned on a high point within the larger Fraser River Basin, the uplands of Clayton are separated by the Serpentine Basin to the west, and the Nicomekl Basin to the southeast, each of which drains directly into Boundary Bay to the south. Once covered by forests, peat bogs, and marsh lands, this upper area functioned as a sponge, absorbing a large percentage of runoff and controlling discharge to sensitive aquatic systems. More recent suburbanization and forest clearing along the ridges and high areas has altered the integrity of these systems, resulting in ever lower base flows in upland watercourses, and

[3] Dillon Consulting Limited and Strix Environmental Consulting, *Clayton Area Neighbourhood Concept Plan: Environmental Report* (Surrey, British Columbia: City of Surrey. 1997).
[4] H.A. Luttmerding, *Soils of the Langley – Vancouver Map Area* (Kelowna, British Columbia: Province of British Columbia Ministry of Environment, Lands and Parks, Assessment and Planning Division. 1984).
[5] Susan Abs, Catherine Berris, Alan Ferguson, Sarah Groves, *Finding the Balance: Environmnetally Sensitive Areas in Surrey* (Surrey, British Columbia. District of Surrey Planning and Development Services. February, 1990):6.

flooding, erosion, and land wasting along the slopes and in the lower floodplain areas.[5] Within the Serpentine lowlands and the Langley Township, increased flooding, protracted periods of springtime soil saturation caused by storm flow from upland urban areas, and poor water quality are issues of rising public concern.

The hydrological regime for the East Clayton district consists primarily of ditched and piped channels running along roadways and property lines. The sources of natural channel flows in the Clayton area vary from groundwater discharge in forested areas to storm sewers in more developed areas. There are several natural stream channels occurring within this area, many of which have had their source of flow altered due to increased development and conventional stormwater systems. Often, alterations to sources of flows lead to changes in stream hydrology and morphology, resulting in loss of aquatic life, increases in peak flows, and reductions in base flows.

The Dillon Report utilizes Surrey's existing stream classification system in order to identify and rank aquatic habitats according to their sensitivity to physical disturbance. It found that the site's existing drainage network provides the best opportunity for habitat connectivity through the restoration of natural riparian habitat, and identifies three watercourses within the East Clayton area that warrant special consideration. The first is North Cloverdale Creek, which is located on the southern boundary of the study area which drains into the Serpentine Basin. This stream is primarily a channelized, low-gradient ditch of between 0.75 metres (2.5 feet) and 2.0 metres (6.5 feet) in width, and between 1.0 metres (3.3 feet) and 2.0 metres (6.5 feet) in depth and it provides important overwintering habitat for juvenile salmonids.[6] Horner Creek (located to the east of the site above 68th Avenue and also referred to as Logan Creek), and McLellan Creek (located just north of Fraser Highway), are of a lower classification and do not currently support young fish, although they do supply significant food/nutrient value to downstream fish populations. Figure 2.6 show the location of these three water courses in addition to the ditch network.

In addition, the network of roadside ditches and swales running adjacent to roadways and property lines provides, during periods of intermittent flow, for the conveyance of nutrients to more valuable fish habitats downstream as well as habitat areas for terrestrial and avian wildlife. These ditches are also valued for their capacity to enhance the infiltration of runoff into the ground during periods of low flow.[7]

The riparian zones associated with these watercourses are essential components of a healthy aquatic environment, providing food, cover, shade, bank stability, and erosion control. Many of these areas, due to their relatively mature and diverse vegetation and their proximity to water, are also important habitat areas for wildlife . The Ministry of Environment, Lands and Parks (MELP) Land Development Guidelines require preservation zones (setbacks) of at least 15 horizontal metres from the top-of-bank of all waterways that support fish habitat. Accordingly, all streams and their riparian setbacks must be permanently protected either through registration of a restrictive covenant, through dedication as park land, or through purchase by the municipality, which shall itself agree to restrict the use of these setbacks to maintain ecological function therein.

Reflecting the recommendations of the Dillon Report for the protection and enhancement of areas of high natural value, the East Clayton NCP recommends that development proceed in ways that balance multiple objectives while ensuring that impacts to existing and expected species are mitigated.