CAMPBELL HEIGHTS

LOCAL AREA PLAN REVIEW

SURREY
CITY OF PARKS

APPROVED BY CITY COUNCIL ON

DECEMBER 11, 2000

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This is a consolidated document including the following reports:

1. *Campbell Heights Local Area Plan Review,* Surrey Planning & Development Department, October 2000.

2. *Campbell Heights - Local Area Plan Review, Corporate Report No.* CO 18, from General Manager, Planning & Development and Considered by City Council on December 11, 2000.

3. *Synopsis of Engineering Servicing and Financing Issues for the Campbell Heights Industrial Area,* Based on *Corporate Report No. C017* from General Manager, Engineering and Considered by City Council on December 11, 2000.

4. *Campbell Heights Servicing Study Executive Summary Report,* New East . Consulting Services Ltd., July 2000.

5. Extract of Minutes of Regular Council Meeting on December 11, 2000.

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CAMPBELL HEIGHTS - LOCAL AREA PLAN REVIEW

1. INTRODUCTION

The Campbell Heights area comprises about 798 hectares (1,971 acres) of land in the south-east part of Surrey. It is located south of 44 Avenue, east of 186 Street, north of 18 Avenue, and west of the Surrey/Langley border along 196 Street. The area lies outside the Agricultural Land Reserve (Figure 1).

The area is designated Industrial, except for some lands at the periphery which are designated Agricultural, in the Official Community Plan (Figure 1). The Industrial designation for most properties in the area has been in place since 1966 when the Surrey Official Community Plan By-law No. 2465 was adopted.

The Campbell Heights area is covered by the South-East Surrey Local Area Plan which was prepared in 1980. The Plan envisages business park and industrial development in this area to provide employment opportunities for the growing workforce. The Plan designates the centre of the area for high-impact industrial development, surrounded by general industrial uses to the east, agro-industrial enterprises to the north, and industrial parks in the remaining area (Figure 2). The great majority of the land in the area is still zoned General Agriculture (A-1) and Intensive Agriculture (A-2) (Figure 3). Industrial development has not taken place mainly due to a lack of engineering services.

The South-East Surrey Plan was formulated twenty years ago. With the rapid development of the City in the past ten years and the recent interest in business development catering to high-tech industries in Campbell Heights, it is considered appropriate to review the local area planning policies and land use concept for the area to reflect the present economic trends and to meet the economic development objectives of the City.

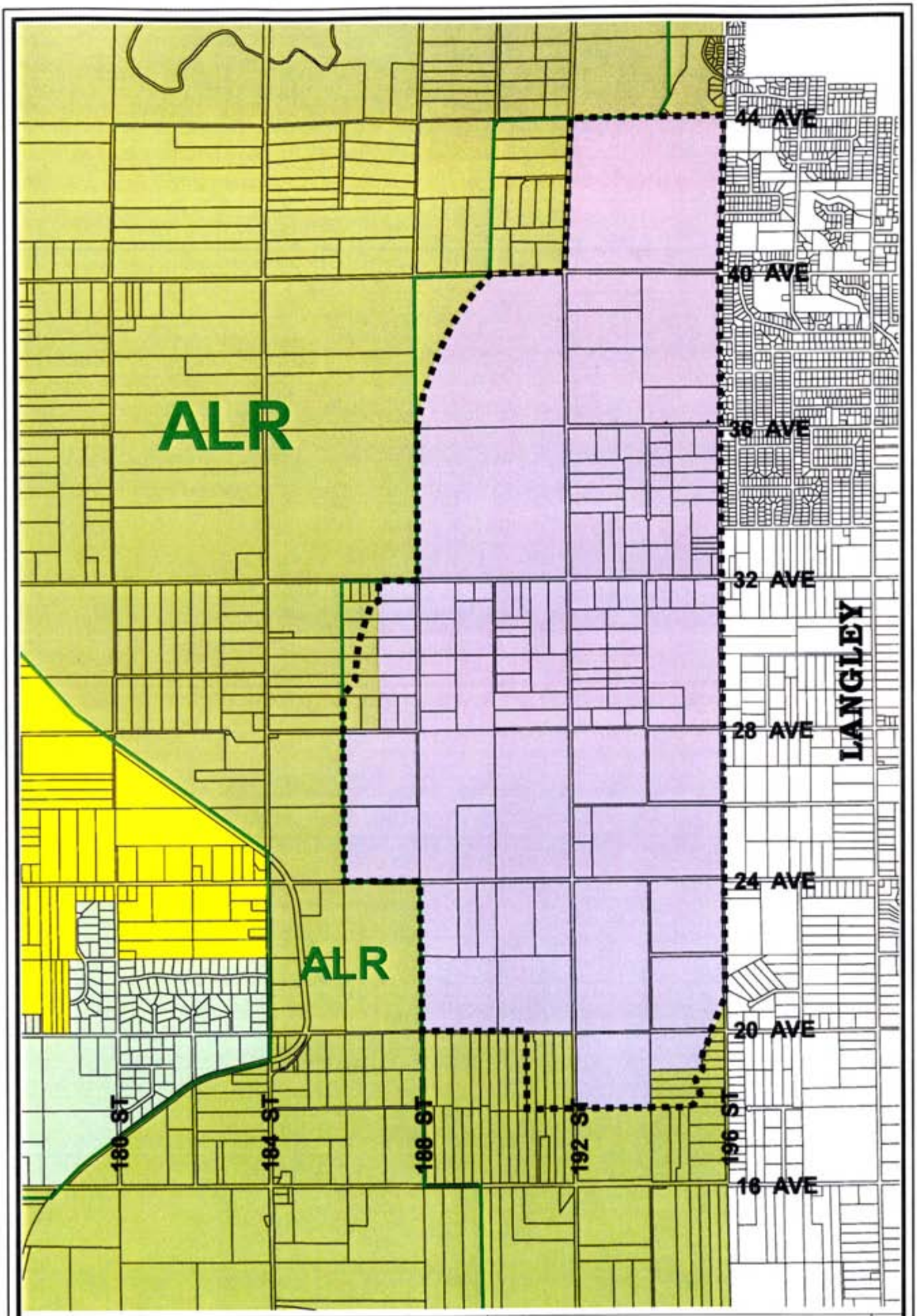


FIGURE 1 **OFFICIAL COMMUNITY PLAN DESIGNATIONS AND AGRICULTURAL LAND RESERVE BOUNDARIES**

City of Surrey Planning & Development Department

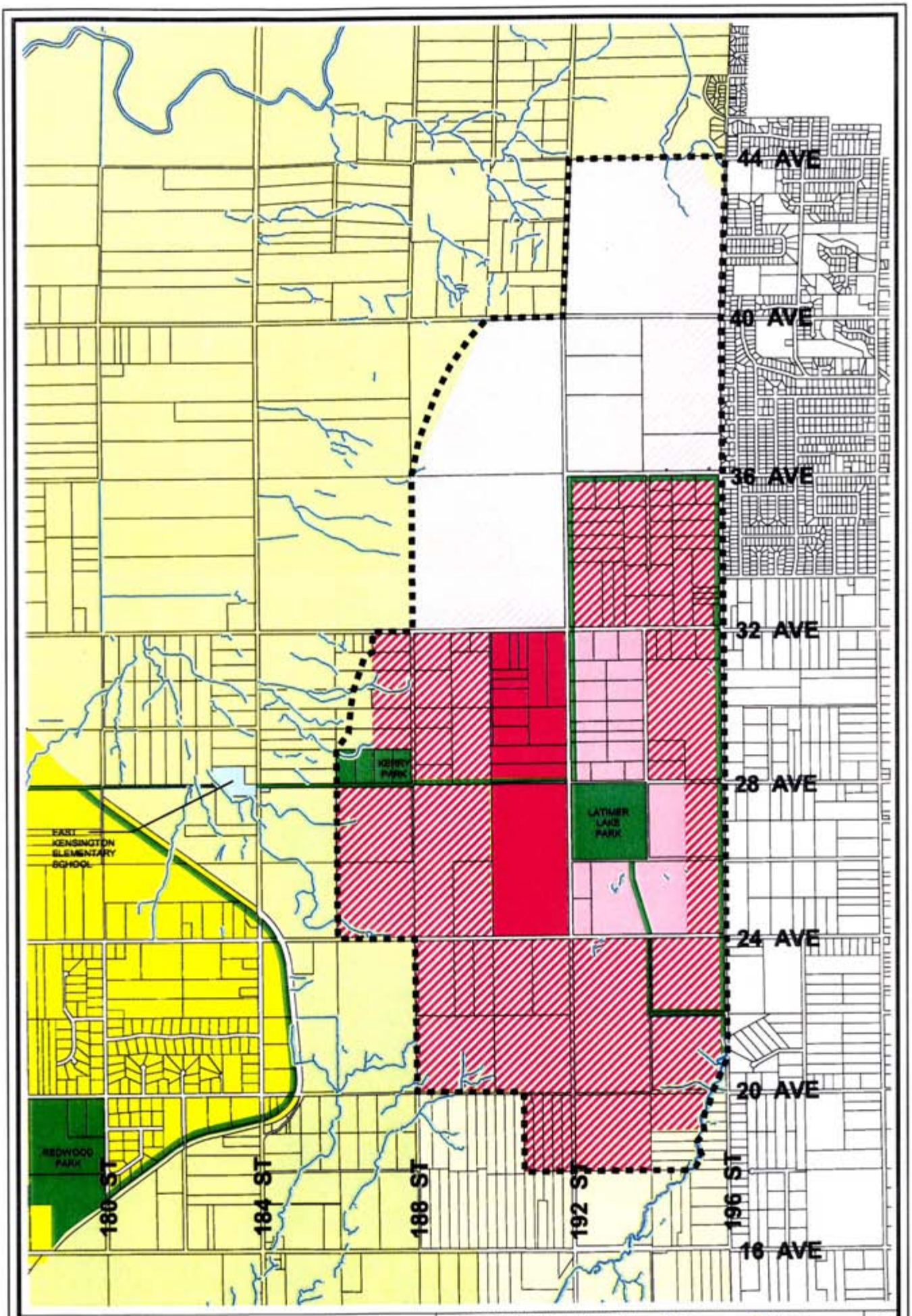


FIGURE 2 **SOUTH - EAST SURREY LOCAL AREA PLAN (1980) DESIGNATIONS**

City of Surrey Planning & Development Department

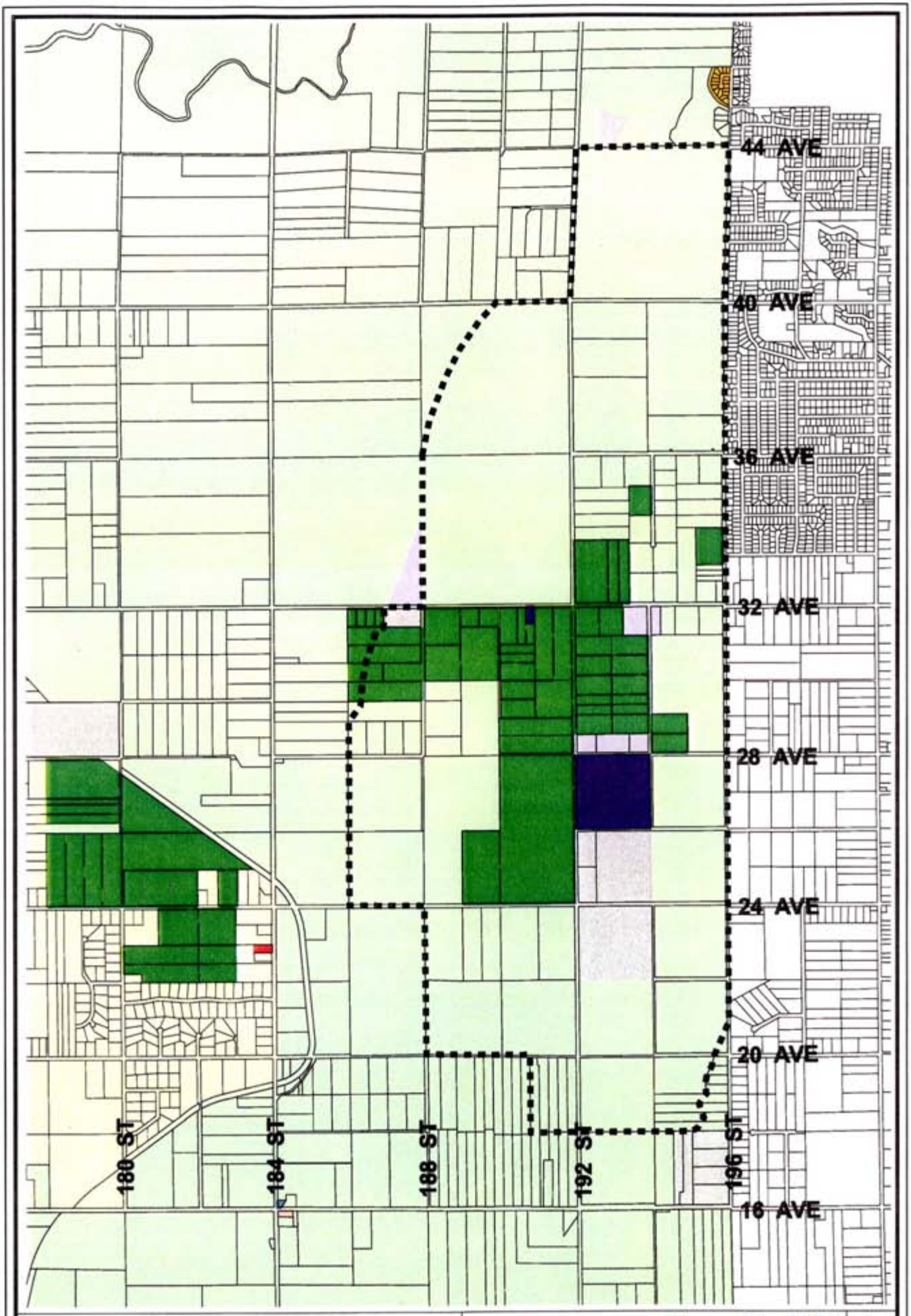


FIGURE 3 ZONING MAP

City of Surrey Planning & Development Department

2. OBJECTIVES OF THE LOCAL AREA PLAN REVIEW

The objectives of the Local Area Plan Review for Campbell Heights are:

1. To review and refine land use, economic and other development policies for the area so as to position it favourably in the global market for the promotion and attraction of high-tech businesses;

2. To formulate a land use concept plan in parallel with a servicing strategy, including a major road layout, a phasing plan and financing options;

3. To identify environmentally sensitive areas for protection; and

4. To prepare design guidelines including measures to provide an appropriate interface with adjacent land uses such as the Agricultural Land Reserve and current and proposed land uses in Langley Township immediately to the east.

3. LOCAL AREA PLAN REVIEW PROCESS

The Local Area Plan Review was undertaken by the Planning & Development Department, the Engineering Department and an Engineering Consultant. The process which commenced in January 2000 is illustrated in Figure 4.

To facilitate departmental consultation, an inter-agency working group was formed to discuss issues and provide input on plan options. The participating agencies included Industry Canada, Public Works and Government Services Canada, B.C. Assets and Land Corporation, Ministry of Forests, Land Reserve Commission, B.C. Hydro, Ministry of Transportation and Highways, Greater Vancouver Regional District, Township of Langley Planning & Development Department, Surrey Parks, Recreation & Culture, Engineering, Fire, and Planning & Development Departments, and Surrey Economic Development Office. A total of 4 working group meetings were held between February and June 2000. Representatives from the development industry and Campbell Heights Properties Ltd. (Operating Engineers Realty), a private landowner in the area, were also invited to the meetings.

In addition, meetings were held with the Ministry of Environment, the Department of Fisheries and Oceans and the School District to obtain their input.

The preliminary land use concept plan was also referred to the City's Agricultural Advisory Committee for comment in March 2000.

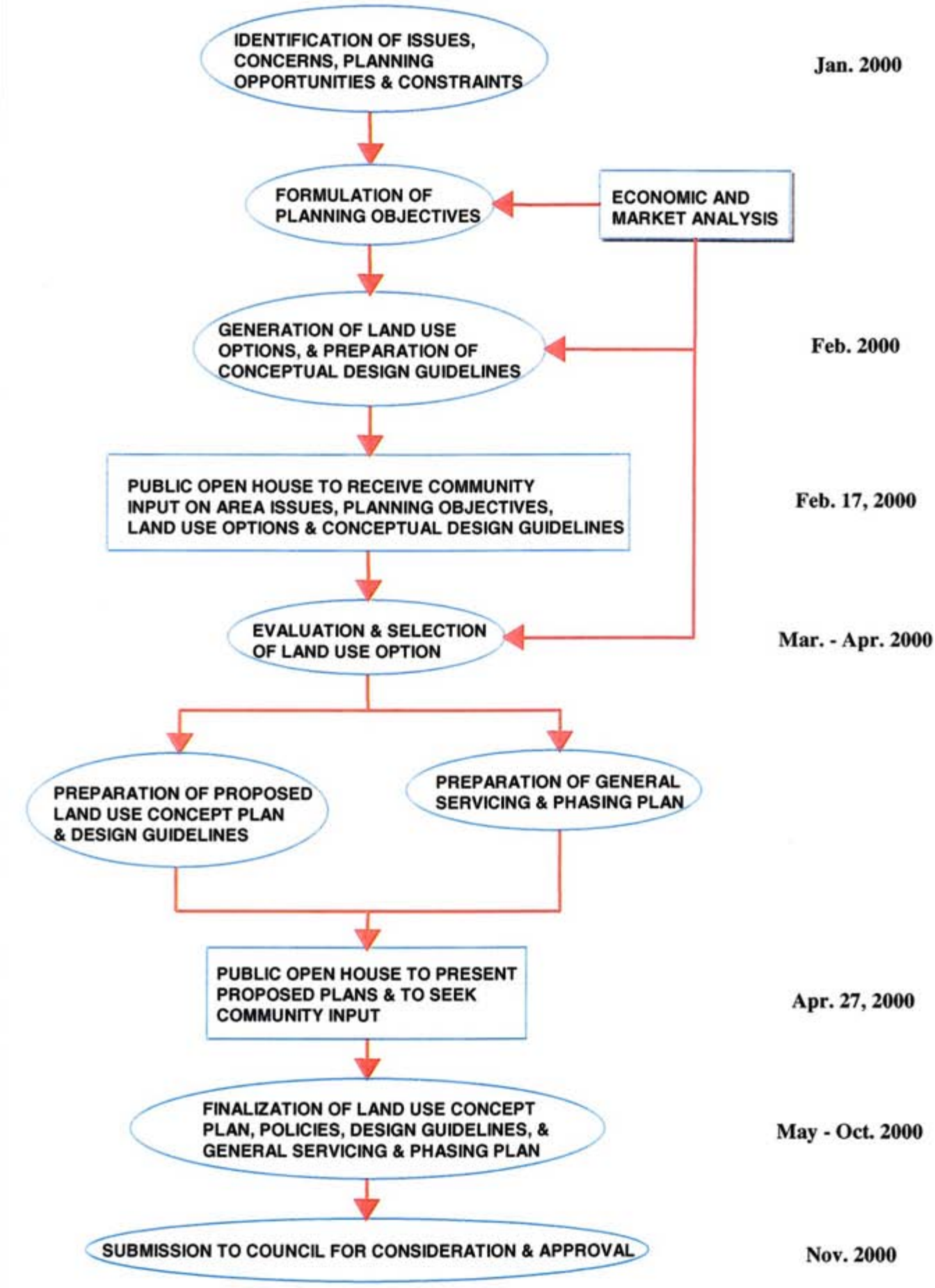


FIGURE 4 LOCAL AREA PLAN REVIEW PROCESS

Two public open houses were held on February 17 and April 27, 2000 respectively to present information and receive community input. The public open houses were accompanied by questionnaire surveys to identify issues and solicit feedback. Both open houses were attended by over 200 residents from Surrey and Langley. A total of 72 residents responded to the first open house survey and 96 residents to the second open house survey. Comments from residents were also received through their written submissions, and telephone discussions and meetings with staff. All input from the public was reviewed and considered carefully in the planning process, from identification of area issues, concerns, planning opportunities and constraints, through formulation of planning objectives, to evaluation of plan options and finalization of the land use concept plan.

To ensure the Local Area Plan for Campbell Heights would respond to the needs of the market, an economic and market analysis on the global, regional and local economic trends and investment market was carried out by an economic consultant to provide input to the planning process from a market perspective.

4. PLANNING OBJECTIVES

Building on the potential of Campbell Heights, the following planning objectives have been established:

- To increase the supply of serviced industrial land in the City;
- To create job opportunities for the growing workforce;
- To provide opportunities for a variety of business activities, ranging from high-tech and science-based industries, research and development activities, support industries and services, offices, to light impact industrial and warehouse uses;
- To provide adequate support services such as local commercial, recreational, accommodation and child care services to cater to the needs of the working population;
- To manage growth and to ensure adequate provision of services and facilities for development;
- To promote compatible and cohesive development in the area and high quality design with extensive green space;
- To provide an appropriate interface with adjacent residential and agricultural uses;

- To preserve and enhance the environmentally sensitive areas including significant creeks and forested areas;

- To promote energy efficient and environmentally sensitive developments by applying sustainable development principles;

- To improve accessibility and the road network, and provide alternative modes of transportation, including walking and cycling; and

- To plan for adequate provision of services to meet the demand of technology and business park and other light industrial developments by determining servicing requirements for water, sanitary sewer, storm sewer, drainage facilities, other major utility infrastructure and roads, and staging and financing of service provision.

5. PLANNING OPPORTUNITIES AND CONSTRAINTS

5.1 The Plan Area

Since 1966 the City has retained the Industrial designation of the Campbell Heights area, and has kept it in the industrial land bank which is to be put into use to support the economic development of the City.

Located in the south-eastern part of Surrey, Campbell Heights comprises about 798 hectares (1,971 acres) of land encompassing 130 properties. It is endowed with many features which give it uniqueness in character and potential.

Centrally located in the Greater Vancouver Region, Surrey, being one of the largest and fastest growing cities, shares many of the locational and business advantages offered by the Region as an international trade centre (Figure 5). Surrey has good access to the international and regional transportation networks, including the Vancouver International Airport, secondary airports at Boundary Bay and Abbotsford, port facilities, ferries, rails, highways, roads and telecommunication systems. Campbell Heights is located within a short distance from the United States border which is significant in trade relationships and skill exchanges. In addition to University of British Columbia, Simon Fraser University and British Columbia Institute of Technology, Technical University of British Columbia, Kwantlen University College and Trinity Western University which are located in close proximity to Campbell Heights provide the necessary resources in research activities and higher education and training to a highly qualified workforce. Similar to the Greater Vancouver Region, Surrey is home to a dynamic multi-cultural population, enjoying a quality lifestyle. Amenities in Surrey include an abundance of parks, some of the Region's best golf courses, ocean

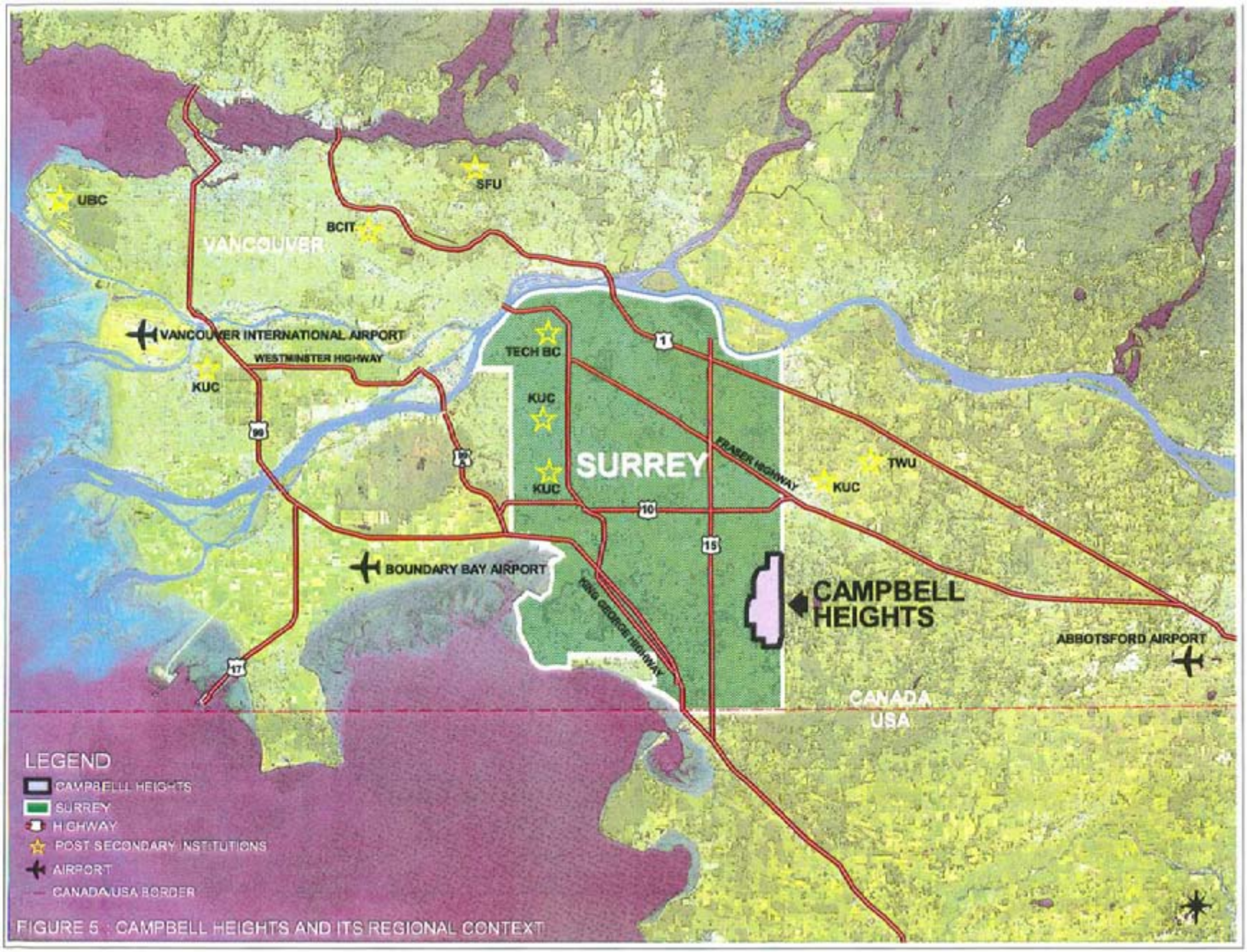


FIGURE 5 : CAMPBELL HEIGHTS AND ITS REGIONAL CONTEXT

beaches, rivers, conservation areas, heritage and vibrant town centres in different parts of the City.

Campbell Heights is situated on a plateau at elevations between 40 and 50 metres geodetic, with a ridge descending to the lowland in the northwest, and commanding a mountain and pasture view in this direction. It offers a number of amenities including rivers and creeks at the periphery, several wooded areas, and Latimer Lake which is popular for outdoor recreation and particularly fishing, all of which contribute to Campbell Heights' natural beauty (Figure 6).

About 32% of the land (247 hectares or 610 acres) in Campbell Heights is owned by the City. The Provincial and the Federal Governments own about 15% (115 hectares or 284 acres) and 16% (120 hectares or 297 acres) of the land respectively. The remaining 37% (280 hectares or 693 acres) of the land is privately owned. Campbell Heights Properties Ltd. (Operating Engineers Realty) is a major stakeholder in the area, having in their ownership about one-third of the privately owned land (Figure 7).

Industrial development has not taken place in the area mainly due to a lack of services. The existing major land uses include the Provincial tree nursery operation, potato and carrot farms, turkey farms, chicken farms, mink farms, cold storage and gravel extraction (Figure 8). Other private businesses include automotive services, greenhouses, nurseries, kennels, building supplies, wood waste and recycling.

While Campbell Heights is located outside the Agricultural Land Reserve, it is bounded to the north and west by wooded areas and agricultural land in the Reserve. Immediately adjacent to Campbell Heights, on the west side of 192 Street north of 40 Avenue are two subdivisions which have a total of nine 2-hectare (5-acre) lots and very high quality houses built on some of the lots. To the south of Campbell Heights is a rural community comprised of residential uses, care facilities and agricultural operations. Beyond the eastern boundary of Campbell Heights (Le. 196 Street) is the Brookswood/Fernridge urban area of the Township of Langley, with commercial nodes on 200 Street at 24 Avenue, 32 Avenue and 40 Avenue.

5.2 Planning Opportunities

The planning opportunities that Campbell Heights offers include the following:

- Well-defined industrial area as designated in the Official Community Plan and Local Area Plan;
- Availability of large tracts of land under single ownership, thus facilitating development, especially that which requires a sizable land area, and minimizing the time taken to assemble land;

FIGURE 6 CAMPBELL HEIGHTS AND ITS NATURAL AMENITIES

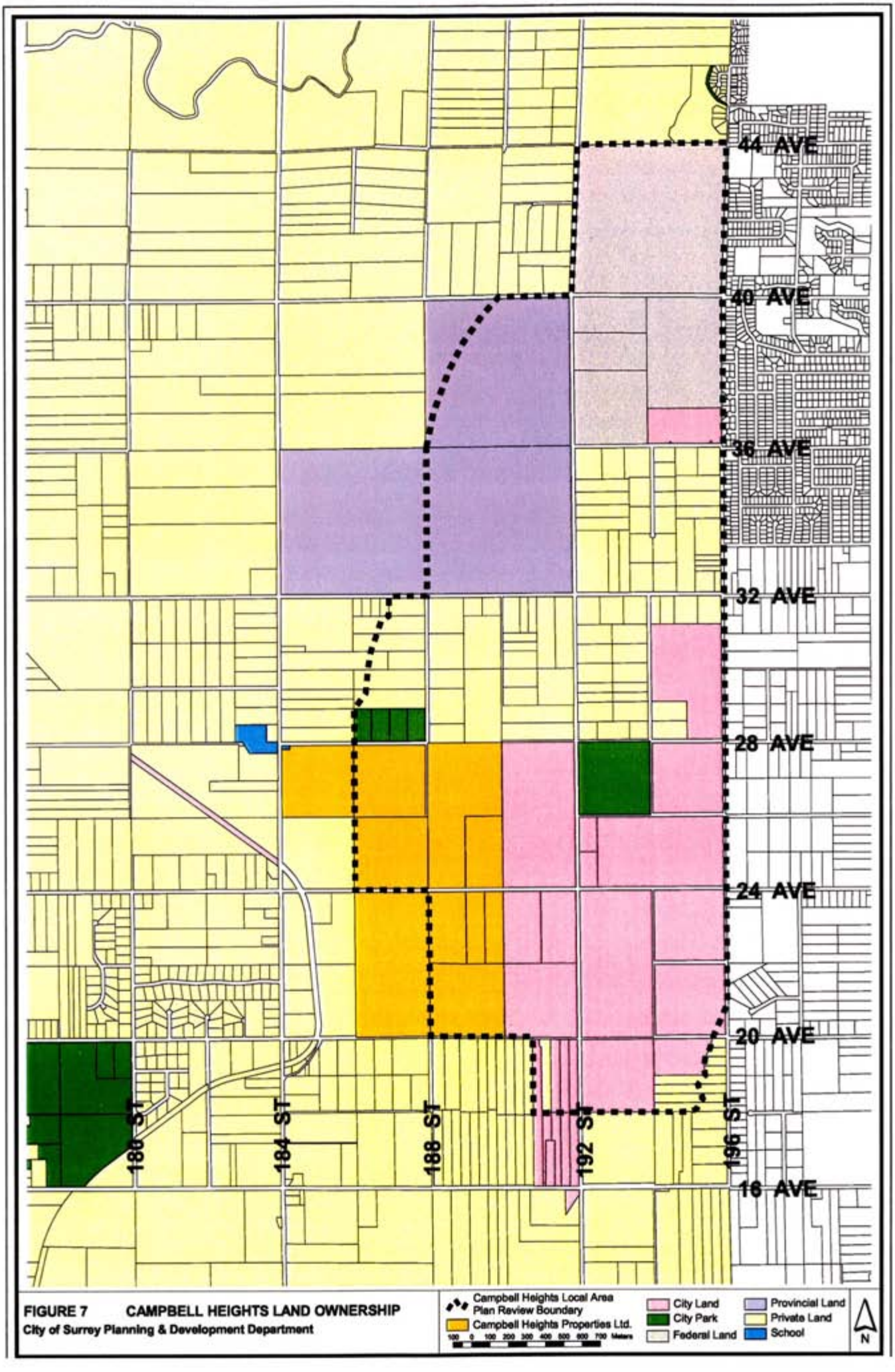


FIGURE 7 CAMPBELL HEIGHTS LAND OWNERSHIP

City of Surrey Planning & Development Department

FIGURE 8 EXISTING LAND USES IN CAMPBELL HEIGHTS

- Fairly level ground surface, except the slopes along the western ridge which provide an effective buffer from the adjacent agricultural land;
- Existing natural amenities including the wooded areas, Campbell River, Anderson Creek and other watercourses which provide habitat for a variety of wildlife species;
- Existing open space such as Latimer Lake which is a recreational amenity in the area;
  Accessibility to regional transportation networks, such as Highway 99, Highway 1, and Vancouver International Airport, which enhances inter-regional and international trading opportunities;
  Proximity to urban areas where retail services and housing are available, in addition to those available in Surrey.

5.3 Planning Constraints

On the other hand, the Local Area Plan Review must address the following planning constraints:

- Providing engineering services infrastructure;
  Potential conflicts between new business park development and established farming operations in the area;
- Retention of new and well maintained single family houses constructed at sporadic locations within the area;
- Interface and buffering requirements from adjacent residential areas and the Agricultural Land Reserve;
  Uncertainty related to the timing and location of the future Highway 1 - Highway 99 Connector which may impact vibration-sensitive industries;
- Existence of environmentally sensitive features requiring protection; and
- Groundwater table problems in some areas which may not be suitable for certain types of development.

6. PLAN AND POLICIES

Aiming at achieving the planning objectives, taking advantage of the planning opportunities while addressing the constraints of the area, a local area plan which incorporates a land use concept plan and related policies has been formulated for Campbell Heights.

6.1 Economic Policies

6.1.1 Economic Development Objectives

The Local Area Plan for Campbell Heights responds to the following directives of the Official Community Plan and the Economic Action Plan of the City:

- Manage growth for orderly and economic development; Create
- jobs for local residents;
- Provide opportunities for a variety of business and employment activities;
- Increase the tax base related to industrial development;
- Improve the City's business attractiveness and its regional, national and global competitiveness;
- Facilitate business development and investment; and
- Take a proactive approach by making land available in the City so that the City is able to quickly respond to the economic trend, future demand, and changing market conditions.

By laying out the planning principles, land use designations, development policies and guidelines, servicing concepts, and marketing strategies, the Local Area Plan provides directions and a framework for development to take place in Campbell Heights while meeting the above-noted objectives.

6.1.2 Economic and Market Analysis

To ensure that the Local Area Plan will meet the needs of the market, a consultant was retained to carry out an economic analysis on the global, regional and local economic trends and investment market to provide input from a market and investment perspective. The major findings and conclusions of the economic and market analysis are summarized below:

1. To accelerate growth and development, Campbell Heights is recommended:

   (a) To take the role of a knowledge-based technology park, enhanced by effective marketing. By definition, a knowledge-based technology park does the following:

   - Affiliates with higher education institutions either through partnership, ownership or management to create and maintain the "knowledge base";
   - Promotes research and development through institutional-industrial partnerships, and stimulates growth of new ventures;

- Facilitates the transfer of technology and business skills between institutions and industrial tenants; and Drives
- technology-led economic development for the community.

(b) To target business sectors with high growth rates in the global market place. These sectors, which typically have a high level of research and development activities, include:

- Semiconductor fabrication and electronic equipment manufacturing;
- Information technology, software and telecommunications, and particularly applications in aerial surveying and the internet;
- Biotechnology including health care and biomedical services and manufacturing, agro-biotechnology, marine pharmaceuticals, and bioinformatics.

(c) To pursue large-scale inward investment projects. The ability of Campbell Heights to offer large sites for these projects is a major advantage.

(d) To capture cross-border businesses which require input from and/or distribute output to the US. Given its proximity to the US border, Campbell Heights may potentially become a reverse labour pool from the Seattle region.

(e) To provide new start initiatives to encourage the growth of indigenous technology companies, taking advantage of the potential of Tech BC as an incubator.

(f) To launch an aggressive marketing program carefully planned out, and based on a master development plan with dedicated marketing staff and resources.

2. While pursuing a technology park focus, the land use plan of Campbell Heights should allow sufficient diversity of high-tech, research, office and light industrial uses, and provide resortlike amenities including a hotel/conference centre, an attractive commercial village and fitness and recreational facilities.

A number of ~arketing-related initiatives that need to be addressed before a full marketing program is designed for Campbell Heights are discussed in Section 9.6 of this report.

6.1.3 Federal Government, Province and City as Catalysts

The economic and market analysis mentioned above also concludes that improved access and servicing are required to increase the attractiveness and competitiveness of Campbell Heights for technology and business park development. But costly infrastructure installation is not recommended prior to either securing a major tenant or designing a master development plan. It is considered extremely important, however, to have sufficient commitment from the Federal and Provincial Governments and any other parties involved to support the infrastructure development as soon as a major tenant is identified.

In order to ensure that infrastructure installation can commence as soon as an anchor tenant is secured and take place in tandem with the construction schedule of the tenant, all design work for the first phase infrastructure will be completed in advance.

In addition to infrastructure development, there are other opportunities for the City, the Province and the Federal Government, as major landowners in the area, to act as catalysts in the development of Campbell Heights. By providing lands for technology and business park development, by attracting investments, and by facilitating the development application review process, the three levels of the Government can achieve the wider economic development objectives which they share among themselves.

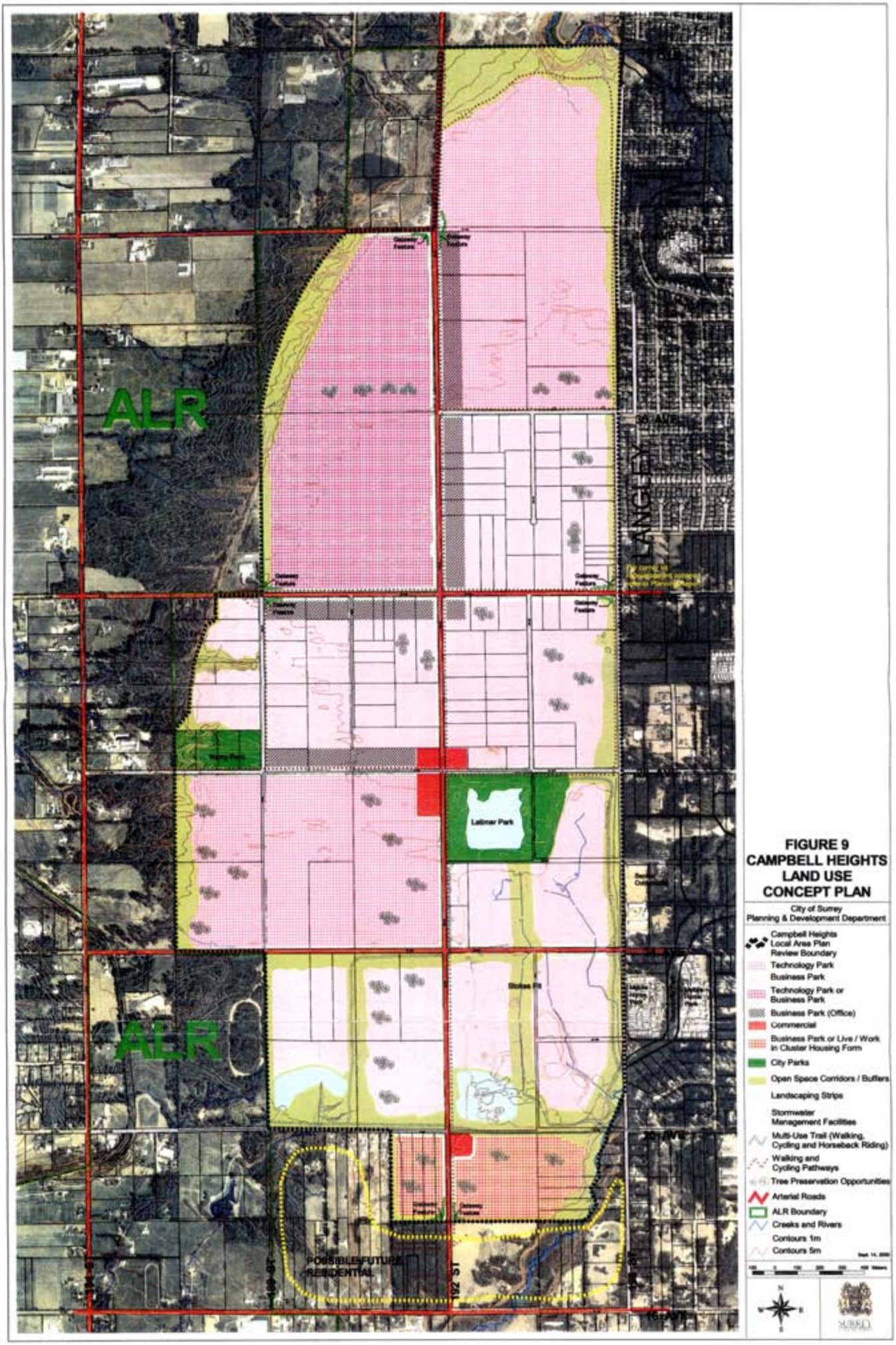
6.2. Land Use Pol icies

The Land Use Concept Plan which has been formulated for the Campbell Heights area is provided in Figure 9.

6.2.1 Technology Park (276.9 hectares/684 acres)

Three Technology Park sites have been identified on the Land Use Concept Plan (Figure 9). These sites, ranging from 80 hectares (198 acres) to 101 hectares (249 acres) are particularly favourable for large anchor tenants such as a semiconductor plant which requires a 200-acre site or a research park housing singlestorey laboratories and other low-rise buildings. A medium scale (at least 16-hectare or 40-acre) single-tenant or multi-tenant technology park development under a comprehensive design may also be located on a Technology Park designated site.

Technology Park uses are high technology, science-based industries and industries with a significant research and


ALR
ALR
LANGLEY
Latimer Park
Stokes Pit
POSSIBLE FUTURE RESIDENTIAL
16 AVE
20 AVE
168 ST
172 ST
FIGURE 9
CAMPBELL HEIGHTS
LAND USE
CONCEPT PLAN
City of Surrey
Planning & Development Department
Campbell Heights Local Area Plan Review Boundary
Technology Park
Business Park
Technology Park or Business Park
Business Park (Office)
Commercial
Business Park or Live / Work in Cluster Housing Form
City Parks
Open Space Corridors / Buffers
Landscaping Strips
Stormwater Management Facilities
Multi-Use Trail (Walking, Cycling and Horseback Riding)
Walking and Cycling Pathways
Tree Preservation Opportunities
Arterial Roads
ALR Boundary
Creeks and Rivers
Contours 1m
Contours 5m
Sept. 14, 2010

development component which are carried out in a campus-like setting. Examples are the development and production of computer hardware and software, design and production of electronic and communication equipment and similar products, development and production of pharmaceuticals and medical devices, biotechnology and biomedical industries. Many Technology Park uses have specific site requirements such as low vibration levels, high air quality, and a reliable water and electricity supply. For example, the manufacturing of micro electronic components, precision instruments and medical devices typically requires an ultra-clean and vibration-free environment.

Two Technology Park sites are located in the northern part of Campbell Heights. The site on the west side of 192 Street is solely owned by the Province and is 95 hectares (234 acres) in size. The site on the east side of 192 Street is 101 hectares (249 acres) in size and is mostly owned by the Federal Government while the City owns about 8 hectares (20 acres) of the land. The third site is 80 hectares (198 acres) in size and is partly owned by City (about one-third) and partly held by the Operating Engineers, a major landowner in the area (about two-thirds). Working together, the three levels of Government play a very important role in managing and providing direction in the development of Campbell Heights.

One of the economic challenges is to respond to changing market conditions quickly and to always be prepared to meet future demands. To achieve this economic objective, flexibility has been built into the Land Use Concept Plan.

Two of the three Technology Park sites are provided with the flexibility to be developed for business park uses so as to allow for a change in target industries and the associated site requirements without an amendment to the Local Area Plan. This flexibility is particularly important as the Local Area Plan is a long-term plan and it is projected to take more than 40 years to build out the Campbell Heights area.

6.2.2 Business Park and Office Development (271 hectares! 670 acres)

To allow for a diversified industrial base, other areas have been designated for Business Park uses. These areas include the smaller private land holdings between 28 Avenue and 36 Avenue, the City-owned lands bounded by 28 Avenue, 192 Street and the 191 Street alignment, 20 Avenue and 196 Street, commonly known as Stokes Pit, and another 15-hectare (37 -acre) site to the west owned by the Operating Engineers.

While the Business Park designation allows light impact industrial, high-tech industrial, warehouse, office and service uses, these uses are to be carried out in enclosed buildings forming part of a comprehensively designed development.

Office buildings are encouraged along 192 Street, 32 Avenue and 28 Avenue in a business park development. Besides serving as an interface between the Technology Park sites and the Business Park uses, the higher design standards of office development will enhance the streetscape in the area.

6.2.3 Business Park or LivelWork (25.8 hectares/64 acres)

Live/Work is the integration of home and workplace in a dwelling unit regulated by zoning and design controls. Office activities and services carried out by self-employed consultants, researchers, software developers, analysts, graphic designers, writers and accountants, and secretarial services are some of the uses that can be considered in a live/work environment.

The area south of 20 Avenue is designated for either business park development or live/work development taking a cluster housing form. The live/work area could be ideal for technology incubators before they become mature and move onto the technology or business park space in other parts of Campbell Heights. Development in this area may take advantage of the natural amenities of the Campbell River, while offering opportunities to preserve and enhance this significant watercourse.

6.2.4 Commercial and Retail Services (4.8 hectares/12 acres)

A commercial node including hotel and conference facilities is proposed at the intersection of 192 Street and 28 Avenue, taking advantage of as well as enhancing latimer lake as an attraction in the area. Besides providing retail, dining and other services to the working population, this node is a focal point for social interaction. Building design will promote a pedestrian environment that is connected to different parts of Campbell Heights by a linear pathway system.

A small local commercial area is proposed at the entrance of the live/work area at 192 Street south of 20 Avenue to serve the dayto-day retail and service needs of the residents.

6.2.5 **Child Care Facilities**

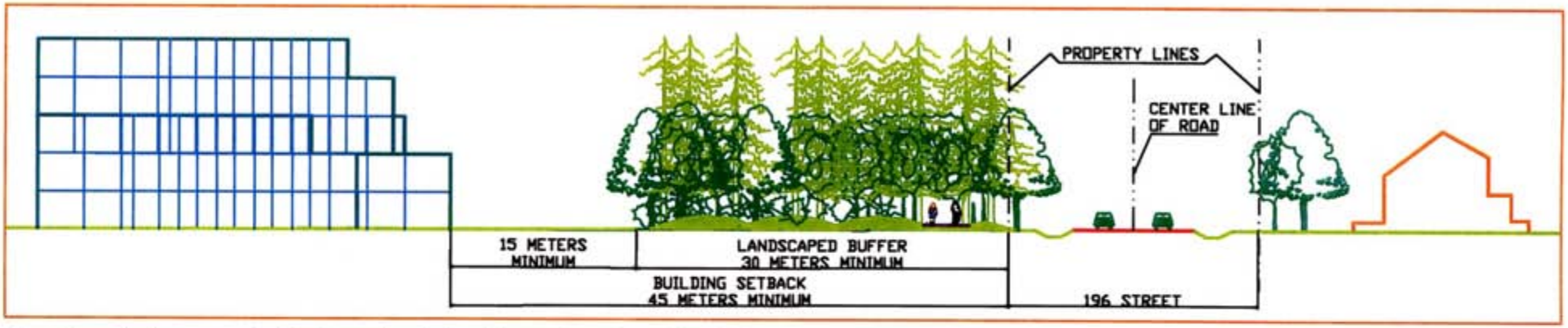
Child care is one of the essential support services to be provided to the employees in a technology or business park development. Child care centres will be permitted in the Technology Park and Business Park designations, as well as in the commercial node at 192 Street and 28 Avenue.

6.2.6 **Interface with Adjacent Agricultural Designated Lands and Residential Areas**

The Land Use Concept Plan respects the integrity and boundaries of the Agricultural Land Reserve (ALR). Development is not encouraged to encroach onto the ALR. A buffer from the edge of the agricultural land, made up of a minimum building setback of 30 metres (100 feet) within which a landscaped strip of a minimum width of 15 metres (50 feet) is provided, will be required of a technology park or business park development that abuts the ALR or Agricultural designated lands outside the ALR.

In order to provide an appropriate interface along 196 Street with the residential neighbourhoods in the Township of Langley, minimum building setbacks of 45 metres (150 feet) and 37.5 metres (125 feet) will be required of a technology park development and a business park development respectively. Within the respective building setbacks, a minimum 30-metre (100-foot) landscaped buffer should be provided (Figure 10). 196 Street is to be preserved as a residential street. Access to a technology park or business park development from 196 Street will not be allowed. A wider landscaped buffer should be considered where existing vegetation can be preserved.

In view of the limited lot area and lot width of the property at the north-western corner of 32 Avenue and 196 Street (19585 - 32 Avenue), two development options for this property are provided in the Plan. The first option is that it will be consolidated with the adjacent properties for a business park development with the required landscaped buffer along 196 Street provided through a major portion of this site. The second option is to develop the property for an integrated live/work use compatible with the single family uses across the street. The specific use, site layout and building design for the live/work development will be reviewed at the rezoning and development permit application stage. Alternatively, the property owner may choose to retain the existing General Agriculture (A-1) zoning of the property. In the case where the property owner decides to use or redevelop this property without consolidation with the adjacent properties, then the required building setback and landscaped buffer will be



Interface between a Technology Park development and residential areas along 196 Street north of 36 Avenue

Interface between a Business Park development and residential areas along 196 Street south of 36 Avenue

FIGURE 10 INTERFACE WITH RESIDENTIAL AREAS ALONG 196 STREET

provided as part of the business park development on the adjacent properties to the north and west.

6.2.7 Residential Areas Outside Campbell Heights

A variety of housing choices are available to the technology and business park employees in the surrounding areas. These areas include Cloverdale to the north, and Rosemary Heights and Semiahmoo Peninsula to the west in the City of Surrey, the City of White Rock to the south-west and the Township of Langley to the east.

During the. Local Area Plan Review process, an area immediately south of Campbell Heights has been identified as a possible future residential area. This area, which lies *outside* the Agricultural Land Reserve, is about 75.7 hectares (187 acres) in size. The area is currently designated Agricultural in the Official Community Plan, and zoned for General Agriculture (A-1) uses except for a care facility which is zoned Comprehensive Development (CD). An Official Community Plan amendment and rezoning will be required if a residential development is pursued in the future.

6.2.8 Other Community Services

To provide fire protection services for new developments in Campbell Heights, the existing fire hall facilities at 2016 - 176 Street will be upgraded. Fire halls in the adjacent areas will also provide back-up services. In the longer term, the Fire Department will plan for new fire hall facilities to meet the service demand from the increasing level of development in Campbell Heights. Furthermore, buildings and structures in a technology and business park development should be provided with automatic protection.

With respect to schools, the School District has confirmed that a school site is not required in the Campbell Heights area, and that the increase in student population projected for Campbell Heights will be absorbed in the existing schools of the area, including the East Kensington Elementary School and Halls Prairie Elementary School.

Table 1 summarizes the distribution of land, projected floor area and number of live/work units, and employment estimates in various land use designations in Campbell Heights.

Table 1 Land Area, Projected Floor Area, Projected No. of Live/Work Units and Employment Estimates by Land Use Designation

Land Use	Land Area (Approx.)	Projected Floor Area (Industrial/ Commercial)[1]	Projected No. of Live/Work Units[2]	Employment Estimates[3]
Technology Park	94.8 hectares 234 acres	284,000 sq.m. 3.06 million sq.ft.		5,100
Business Park	271.0 hectares 670 acres	1,084,000 sq.m. 11.67 million sq.ft.		26,300
Technology Park or Business Park	182.1 hectares 450 acres	546,000-728,000 sq.m. 5.88-7.84 million sq.ft.		9,800-17,600
Business Park or Live/Work	25.8 hectares 64 acres	103,000 sq.m. 1.11 million sq.ft.	510	765-2,500
Commercial	4.8 hectares 12 acres	24,000 sq.m. 0.26 million sq.ft.		400
City Parks	27.6 hectares 68 acres	Not applicable		
Open Space Corridors/Buffers/ Landscaping Strips	144.0 hectares 356 acres	Not applicable		
Stormwater Management Facilities	8.9 hectares 22 acres	Not applicable		
Roads	38.8 hectares 95 acres	Not applicable		
TOTAL	**797.8 hectares 1971 acres**	**1.94-2.22 million sq.m. 20.87-23.94 million sq.ft.**	**510**	**42,400-51,900**

[1] Assuming a floor area ratio of 0.3 for Technology Park (based on the average floor area ratio achieved in a number of existing technology park developments), 0.4 for Business Park, and 0.5 for commercial.

[2] Assuming a density of 8 units per acre.

[3] Assuming an average floorspace per employee ratio of 600 sq.ft./employee for Technology Park, 320 sq.ft./employee for the office component (50%) and 24 employees/acre for the light industrial component (50%) of Business Park, 500 sq.ft./employee for retail commercial, and 1.5 employees per unit for Live/Work.

6.3 Environmental Policies

To respond to the environmental values in the area and at the same time encourage sustainable technology and business park development to take place, the environmental management strategy for Campbell Heights focuses on the following areas:

- To protect and enhance, where practical, all areas having high environmental sensitivity as identified on Figure 11;
- To preserve and enhance the riparian ecosystems;
- To provide connectivity between the wildlife habitats in the Campbell Valley Regional Park to the south-east and the Nicomekl and Serpentine areas to the north and north-west by maintaining wildlife corridors through the Campbell Heights area; and
- To encourage, where practical, preservation of existing trees on development sites as green space which forms part of the project design.

6.3.1 Watercourses

A number of significant watercourses are located at the periphery of the Campbell Heights area (Figure 11).

Campbell River runs along the south-eastern boundary of the area towards the south-west. Several channels are found on the City-owned land in the south-east section of the site. These channels were created as a result of gravel excavation below the water table. .

On the south-western edge of Campbell Heights at 20 Avenue and 188 Street is found the headwater of one of the two creeks known as Twin Creeks, which flow south-west into the Campbell River.

Anderson Creek runs in a confined valley in the vicinity of the north-eastern boundary of Campbell Heights at 44 Avenue.

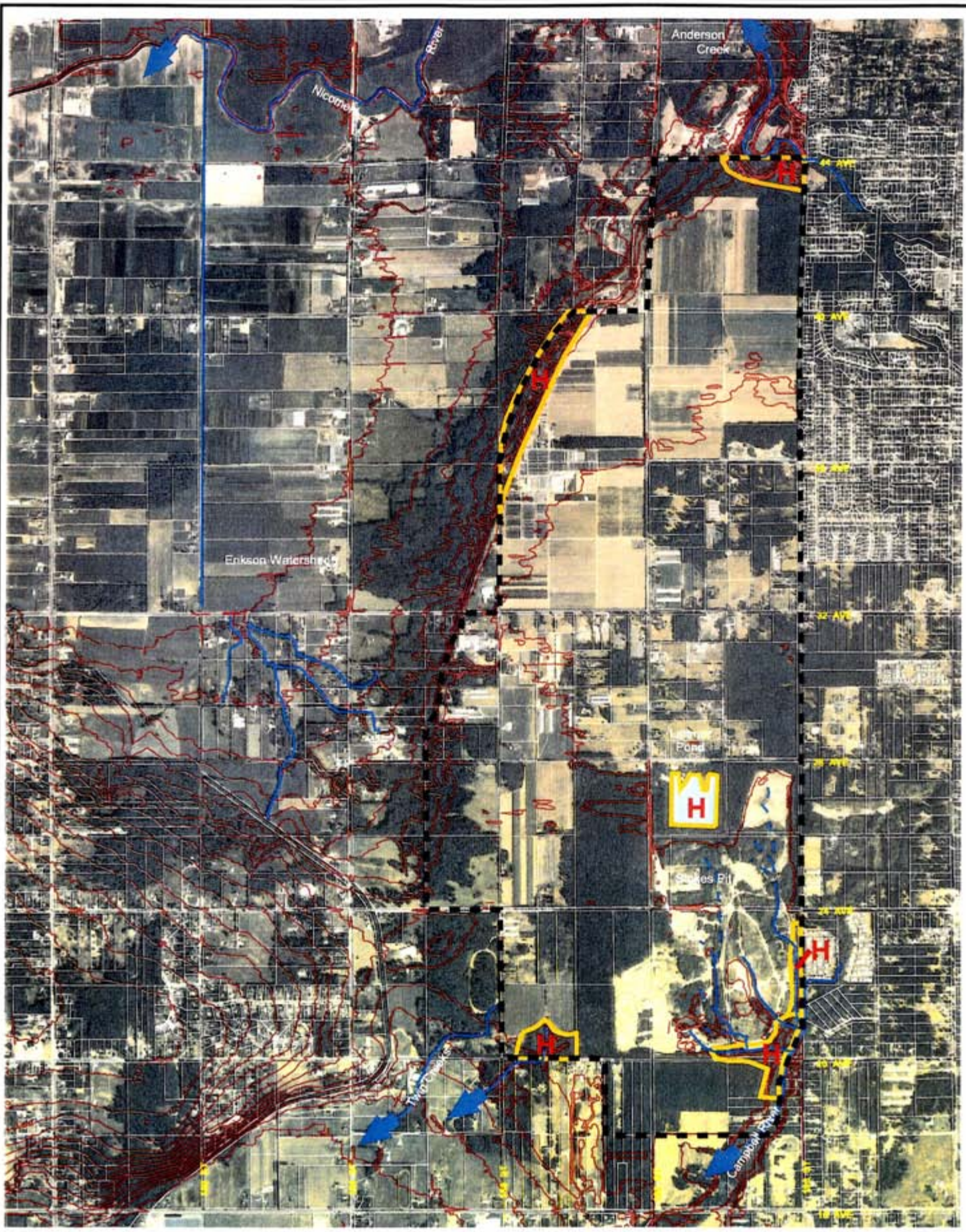


FIGURE 11 CAMPBELL HEIGHTS HIGH ENVIRONMENTALLY SENSITIVE AREAS

City of Surrey Planning & Development Department

Information above provided by Gartner Lee. Date issued March 27 2000

H HIGH Sensitivity

Campbell Heights Local Area Plan Review Boundary

Environmentally Sensitive Area Boundary

Surface Water (River/Lake); Flow Direction

100 0 100 200 300 400 500 Meters

N

The tributaries to Campbell River and Anderson Creek are high in environmental value in that they provide functions such as supporting salmonid populations, and/or providing nutrients, food and flows to downstream populations. These ecological functions should be maintained when development takes place in the area.

Campbell River

Anderson Creek

Preservation and enhancement of the environmentally significant watercourses are encouraged through the following policies:

(a) Protect and enhance the aquatic habitat and maintain fish passage.

(b) Maintain water flow and quality at an acceptable level for aquatic life.

(c) Maintain a riparian setback area from the top of bank of the watercourses in accordance with the Ministry of Environment and Department of Fisheries and Oceans Land Development Guidelines.

(d) Preserve and enhance the riparian corridor as an undisturbed, naturally vegetated area.

(e) On the Stokes Pit site (Le. the south-east section of Campbell Heights), consider options to realign some of the watercourses and at the same time provide fish and riparian habitat enhancement, subject to review and approval by the Ministry of Environment and Department of Fisheries and Oceans at the development application stage.

6.3.2 Other Environmentally Sensitive Areas

Several forested areas exist in Campbell Heights. These are undeveloped and undisturbed sites in the area (Figure **11).** They are located:

- At the northern end of Campbell Heights around Anderson Creek;
- Along the western ridge south of 40 Avenue; Around
- Campbell River in the south;
- Around Latimer Lake; and
- To the west and north of Stokes Pit.

Campbell Heights is located between two significant wildlife areas, the Campbell Valley Regional Park which is about 1 kilometre to the south-east and the Serpentine/Nicomekl River estuary which is approximately 10 kilometres to the north-west. The wooded areas, streams and riparian corridors surrounding Campbell Heights could provide connectivity between these two wildlife areas and provide habitat for a variety of wildlife species. Some additional connectivity will also be provided within Campbell Heights by way of planned open space corridors.

Wildlife habitat is characterized by various environmental conditions that allow species to sustain existence. These conditions include food sources, shelter, activity space, access, migration pathways and security cover.

In Campbell Heights, environmentally sustainable development is promoted through the following policies:

(a) Preserve existing vegetation in the highly environmentally sensitive areas as identified in the Campbell Heights Sensitive Areas Study (Figure **11).**

(b) Retain primary wildlife corridors and linkages (Le. open space corridors) of an average width of about 50 - 60 metres (165 - 200 feet) as identified in Figure 9; and establish a secondary corridor of an average width of about 30 metres (100 feet) along 196 Street.

(c) Preserve vegetative habitats in the wildlife corridors and enhance the areas by additional tree planting so as to provide and maintain the wildlife habitat.

(d) Preserve the shoreline areas and adjacent forests around Latimer Lake for wildlife habitat.

(e) Preserve the existing vegetation along the western ridge to maintain a wildlife corridor, prevent erosion and sustain groundwater flow.

(f) Design stormwater detention ponds such that they will be compatible with the ecological values and enrich the diversity of the habitat in the adjacent forested areas to be preserved.

(g) Retain, where practical, significant trees native to a development site in addition to providing high quality landscaping with focuses on native species which provide wildlife habitat.

While preserving the environment, new development is encouraged:

- to take advantage of and build on the high environmental value offered in Campbell Heights;
- to be integrated with the environmental qualities of the area; and
- to be identified with the enhancement offered by the natural environment.

6.4 Parks and Recreation Policies

The provision of amenities is part and parcel of a technology and business park development. Not only do amenities contribute to the aesthetics and sense of place of the technology and business park setting, but they also serve the recreational needs of the employees. Amenities have become an important marketing tool to attract new businesses as well as potential employees. In addition to the commercial and child care facilities and environmental features discussed in the previous sections, the following recreational amenities are proposed.

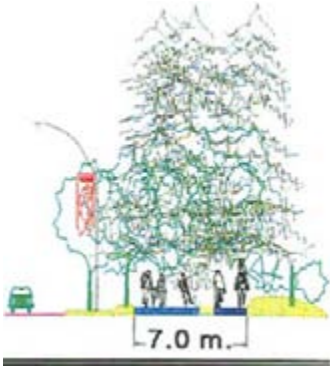
6.4.1 **Public Parks**

There are two existing park sites in Campbell Heights (Figure 9). Latimer Lake, where trout is stocked, is popular for sport fishing. It is also an attractive place for a stroll and bike riding. This outdoor recreational area will be retained and enhanced. It is proposed that the coniferous forest east of Latimer Lake be preserved and dedicated as park.

Kerry Park, located on 28 Avenue west of 188 Street, is an undisturbed treed site and will be retained for park use. It will be connected to other parts of Campbell Heights by way of a walking and cycling pathway system throughout the area.

6.4.2 **Other Recreational Facilities**

A multi-use trail will be developed to connect the existing trail system in Latimer Park with the linear open space corridors proposed in the south (Figure 9). This trail, of a width of about 7 metres (23 ft.), will be designed to accommodate walking, jogging, cycling and horseback riding along the open space corridors. The trail will also connect to the linear community park system and the Campbell Valley Regional Park in the Township of Langley. Linkages to the City's greenways in the west will be provided along 20 Avenue.



Opportunity also exists for the development of a linear golf course at the periphery of the Stokes Pit site if there are development interests expressed.

Moreover, a technology and business park development in Campbell Heights is expected to provide a workplace with extensive green space, including high quality landscaping design and treatment. In addition to its aesthetic value, this green space will serve as a passive recreational amenity for the employees.

6.5 Development Policies

6.5.1 Design Guidelines

The following Design Guidelines will apply to proposed developments in the Campbell Heights area. These Design Guidelines will complement the Development Permit Guidelines contained in the Surrey Official Community Plan (OCP) and the Land Development Guidelines of the Ministry of Environment and Department of Fisheries and Oceans. Development Permits will be required for all developments to ensure compliance with these policies and guidelines.

1. Objectives

- To ensure that private investments in Campbell Heights are enhanced through careful planning and design.
- To ensure that Campbell Heights will be developed as a unique technology and business park precinct with high quality urban design and amenities.
- To encourage the development of a comprehensively designed technology and business park in a campus-like/park-like setting.
- To encourage urban design excellence by promoting a high level of visual identity and quality.
- To promote and encourage street beautification measures.
- To facilitate co-ordinated development among buildings, landscaping and site features.
- To integrate urban design and environmental protection into the development process by maintaining, protecting and preserving important elements of the natural environment including creeks, wildlife corridors, topographic features and trees.
- To incorporate sustainable development principles.
- To provide for a pleasant, rich and diverse pedestrian experience within Campbell Heights.
- To create an interconnected network of open spaces in Campbell Heights with linkages to the surrounding areas.

- To provide an appropriate interface with adjacent land uses such as the Agricultural Land Reserve, and current and proposed land uses in Langley Township to the east.

2. General Guidelines

- *Site plans should be carefully designed to integrate the functional requirements of the project with existing site features, taking into consideration surrounding developed and undeveloped sites.*

- *A comprehensive design scheme should be prepared for the development site with due consideration given to architectural co-ordination and compatibility in terms of scale, massing and materials amongst the buildings on the site, as well as with the architecture of adjacent buildings.*

- *Special effort should be made at the site planning stage to co-ordinate and maintain the continuity of wildlife corridors, buffers, landscaped strips, walking and cycling pathways and multi-use trails from one development site to another.*

3. Technology Park

- *Each technology park site should include* a *comprehensive design scheme, creating* a *campus-like setting with associated amenities and extensive green space.*

- *Buildings should be designed with* a *generous amount of glazing.*

- *Specially lit and landscaped identification signs, ponds, fountains, decorative pavers, and enhanced landscaped medians should be provided on* a *technology park site.*

4. Business Park

- *The use of glass and high quality materials and finishes is required of buildings facing the streets. Blank walls should be avoided.*

- *Variations in massing and changes in height and horizontal planes are encouraged.*

- *On* a *corner site the principal building should be anchored at the comer and designed with consideration to visual prominence* as a *reference point or* a *landmark.*

5. <u>Business Park Office Development along 192 Street. 28 Avenue and 32 Avenue</u> (Refer to Figure 9 Land Use *Concept* Plan)

- *The design of office buildings facing* 192 *Street,* 28 A *venue and* 32 *Avenue needs to be co-ordinated with the architecture of buildings on the Technology Park side of the street.*

- *Compatibility of building design in terms of scale, architectural character, roof lines and building mass with other buildings on ne~hbouring sftes ~ required.*

· *Glazing is encouraged on all street facades.*

· *To create* a *strong architectural edge along the streets, minimum building setbacks in combination with rear and side yard parking are encouraged.*

· *Long and non-articulated buildings should be avoided.*

· *The main entrance to each building should be easily recognizable from the street.*

. *Site planning and building*

Ir~"",~

desi

gn should make provision for interesting outdoor urban spaces.

· *The exterior* of *buildings should be co-ordinated in* Ir-iN *design on all elevations with regard to colours, materials, architectural form and detailing to achieve design harmony and continuity. All doors and windows should be trimmed whenever such treatment would be compatible with the architectural style* of *the buildings. Painted or false detailing that detracts from the integrity* of *structures should be avoided.*

· *All exterior mechanical units or equipment including roof top units that may be visible from the streets should be enclosed.*

· *Loading bays and overhead garage doors will not be permitted to face the streets. All loading and material handling areas should be located at the rear* of *the buildings.*

6. Streetscape Guidelines

- *Buildings along the streets should be designed to include glazing and high quality finishing materials.*

- *The principal building on* a *corner property should be located* so as *to anchor the corner, and be designed to be visually attractive from both abutting streets.*

- *Locating parking lots at street corners should be avoided.*

- *Parking within the front yard setback is generally discouraged. However, where it is proposed, it must be visually screened from the street by* a *combination of berming and high quality landscaping.*

- *All loading, service or storage areas should be screened in relation to the view from any public street. Screening of at least* 2.5 *metres* (8 *ft.) in height is recommended and it should be composed of substantial landscaping and/or materials compatible with the materials used on the principal building on the site.*

- *Fences along property lines that abut streets will, in general, not be permitted. A fence may be permitted provided that it is set back the same distance* as *the principal building and substantial landscaping is provided on the street side of the fence.*

7. Gateways

- *Key public street entry points to Campbell Heights should be identified by gateway design that signifies a high tech business park theme. These gateways should be developed at key locations within Campbell Heights (Refer to Figure 9 Land Use Concept Plan).*

- *Gateways must be developed with high quality soft and hard landscaping.*

- *Gateway features should incorporate unique lighting and landscaped medians.*

- *Main entry signs or major area identification signs should be of high quality, durable materials, and should be co-ordinated with the architecture of buildings in the area.*

- *Public art, sculptures, fountains, etc., are encouraged at gateways and other prominent locations.*

8. Commercial Nodes

- *Commercial areas should be designed to cater to pedestrians by creating a pleasant outdoor commercial environment.*

- *Buildings should generally be located close to the street frontage to create a strong architectural edge.*

- *The massing, setbacks, and orientation of buildings should reinforce a pedestrian environment.*

- *All commercial buildings should have their primary facades oriented toward the street.*

- *Commercial buildings on comer lots should include architectural detailing that addresses both streets.*

- *Shop windows, awnings, canopies, and signage should be designed to add life to the streets and encourage pedestrian activities.*

- *Outdoor extensions of cafes and restaurants are encouraged where the context is appropriate.*

- *Sidewalks adjacent to retail uses should be provided with rain protection.*

9. Sustainable Development

- *New development should be designed to preserve, integrate with, and enhance important elements of the natural environment.*

- *Significant natural characteristics of the site such as creeks, trees, topographic features and large rocks, etc., should be integrated into the site design plan whenever possible.*

- *Creek preservation areas ", must be maintained in an undisturbed state, in accordance with the specifications of the Ministry of Environment and the Department of Fisheries and Oceans.*

- *Land located within the creek setback areas that require restoration must be improved, landscaped and planted to the specifications of and satisfaction of the Ministry of Environment and the Department of Fisheries and Oceans.*

- *Excessive cuts of the natural terrain of* a *site should be avoided. The proposed grades should follow the natural contours of the land* as *much* as *possible.*

- *Consideration should be given to roof top detention* as *one of the means to manage storm water in the building design.*

- *Innovative building design incorporating energy efficient measures is encouraged.*

10. Landscaping

- *Landscaped buffers are required to be provided* as *an interface between different uses (Refer to Figure* 9 *Land Use Concept Plan).*

- *A combination of* a *berm and high quality landscaping, incorporating preservation of existing trees, is recommended for* all *buffers.*

- *Buffers should be designed to mitigate the visual impact of a technology park! business park development on the adjacent residential areas and Agricultural designated lands.*

- *Existing stands of mature trees provide visual interests and environmental values. Consideration should be given to incorporating them in the site design.*

- A *high quality landscaped frontage is required along public streets.*

- A *double row of trees is recommended to be planted to achieve* a *canopy effect over side walks on public streets.*

- *Blank walls facing streets are generally not encouraged. Where they* 11,>", *are unavoidable, substantial* r" *landscaping should be used to mitigate their visual impacts.*

- *Parking lots should be broken up with landscaped islands. It is recommended that* a *landscaped island planted with trees be provided for every six parking spaces in* a *row.*

- *Islands at the ends of double parking rows should be planted with at least two shade trees. Islands at the end of single parking rows should be planted with at least one shade tree.*

- A *landscaped median planted with trees is* ,,,*recommended between long rows of parking spaces.*

- *Special paving materials, such* as *tiles, brick, exposed aggregates, etc. should be used to identify building entrances, pedestrian pathways, plazas and seating areas.*

-

- *All unpaved areas not planted with shrubs, ground cover, or flowers should be planted with grass.*

- *Shrubs, flowers, and ground covers should. be grouped together in clusters rather than in individual scattered locations.*

- *Selection of plant materials should be based on their year-round interests* as *well* as *their form, texture and shape. The use of native species that enhance environmental qualities and provide wildlife habitat is encouraged.*

- *All plant materials must conform to the Development Permit Area Guidelines for Landscaping outlined in the Official Community Plan.*

- *Site elements such as. outdoor lighting, signage, garbage storage, and fencing should be included on the landscaping plans since they are integral elements of the landscape.*

11 .

Parking

- *To reduce visibility of vehicles and pavement surfaces from the street, surface parking areas should be screened by the use of berming and landscaping.*

- *Parking lots and driveways should be designed* so as *to minimize conflicts between vehicles and pedestrians.*

. *Parking spaces at the end of the row should be protected from turning movements of other vehicles with curbed landscaped islands.*

- *Handicapped parking should be located near building entrances, and preferably abutting* a *landscaped island.*

. *Bicycle parking facilities should be provided at grade and close to building entrances.*

12. Exterior Lighting

. *Lighting along pedestrian pathways is recommended and should not exceed* 4 *metres* (13 *ft.) in height. Fixtures and poles should be in* a *colour that complements the building architecture and parking lot lighting.*

- *Parking lot light standards should not to exceed* 9 *metres (30 ft.) in height. Fixtures and poles should be in* a *colour that complements the building architecture.*

- *For consistency between developments, the type of street lamps on public streets, their height, intensity, and spacing, etc., will be co-ordinated by the Engineering Department through the servicing agreement process.*

13. Signage

- *The design of signs should relate to the rchitectural character of he buildings on the same site.*

- *Free-standing signs should be integ~ated into th~ site landscapmg and des/gnedto complement the architecture of the buildings on the same site.*

- *Single-pole free-standing pylon signs are not permitted.*

- *The maximum height of any free-standing sign is* 2.4 *metres* (8 *ft.) above grade. The grade at the base of the sign should not exceed the average adjacent grade by more than 0.6 metre* (2 *ft.).*

- *Fascia signs facing the street may be permitted provided they are integrated and/or co-ordinated with the architecture of the building and overall design of the development.*

- *Standardized or corporate signage that does not relate to the building architecture is discouraged.*

- *Small directional signs may be used when necessary to direct vehicular and pedestrian traffic within* a *particular site.*

- *All signs must be maintained in good condition and repair at all times.*

14. Live/Work Areas

The following general design guidelines for the proposed live/work areas in Campbell Heights will be used to guide development, until more detailed design guidelines are developed upon the completion of a *study being undertaken by the Planning & Development Department on City-wide planning and policy considerations regarding live/work uses. Specific density, form of development, design and layout will be reviewed at the rezoning and development permit application stage.*

- *Live/work areas should be comprehensively designed including architecturally coordinated building facades, signs, exterior lighting and landscaping.*

- *The site design of the development should take into consideration preservation of important elements of the natural environment, such* as *mature trees and watercourses.*

- *Live/work areas should be designed to create an "attractive residential look. "*

- *Building design and siting should provide a pleasant, pedestrian friendly outdoor environment.*

- *Separate entrances to the work space and the living area within the building should be provided.*

- *Adequate parking provision should be made for residents and visitors/customers.*

- *Buildings, outdoor space and landscaping should be designed and arranged to allow maximum opportunity for informal surveillance.*

- *Loading areas, refuse/recycling areas and mechanical equipment should be located out of view from public streets, and be appropriately screened from the view of public streets and adjacent properties.*

6.5.2 **Amenity Contributions**

To address the amenity and service needs of new developments in the area, developers will be required to make a monetary contribution towards the provision of new police and fire protection services, park improvements, trail and pathway development on public lands and the City's greenway system in the area. In addition, live/work developments will be required to contribute towards the provision of library materials for the residents in the live/work area.

Amenity contributions will also be required when the possible future residential area south of Campbell Heights is rezoned for development, subject to an Official Community Plan amendment.

The rates of the amenity contributions are given in Table 2.

Table 2 Amenity Contributions by Land Use Category

	Technology Park, Business Park or Commercial Development	Live/Work Development	Residential Development Outside Campbell Heights
Police Protection	$205.64/acre	$205.64/acre	$51.42/unit
Fire Protection	$888.46/acre	$888.46/acre	$222.11/unit
Park & Pathway Development	$2,127. 99/acre	$2,127.99/acre	$2,127. 99/acre
Library Materials	Not applicable	$115.68/unit	$115.68/unit
Total Contribution	**$3,222.09/acre**	**$3,222.09/acre** *plus* **$115.68/unit for library materials**	**$389.21/unit** *plus* **$2,127 .99/acre for park & pathway development**

Notes:

. *The amenity contributions are at March* 1, *2000 rates which will be adjusted annually based on Vancouver's Annual Average Consumer Price Index.*

. *Amenity contributions are payable at building permit stage for industrial, commercial, institutional and multiple residential uses, and at subdivision stage for single family and duplex zones.*

6.5.3 Land Use Patterns in Transition

Because of the size of Campbell Heights, it is anticipated that it will take more than 40 years to build out the entire area. There are very well maintained residential properties and economically viable agricultural and other operations in the area. These uses may stay or even expand as permitted under the existing zoning of the properties, until the owners decide to redevelop their properties consistent with the Land Use Concept Plan for Campbell Heights.

At rezoning and development permit stage, consideration should be given to providing adequate buffering on the development site in order to mitigate impacts on the adjacent properties. Tenants in the new development should also be made aware of the existing land uses on the adjacent properties as well as the land use patterns, which are in transition, in the wider area.

6.5.4 Soil Salvage

Some of the sites in Campbell Heights contain fertile soil which is a valuable agricultural resource. When development takes place, developers are encouraged to salvage the topsoil and deposit it in agricultural areas outside the flood plain, subject to the provisions of the Surrey Soil Removal and Depositing Regulation By-law, 1979, No. 5880, as amended.

6.6 Circulation Policies

6.6.1 Major Road Network

Accessibility is one of the prime considerations in planning for development in Campbell Heights. The area is served by a number of arterial roads, including 40 Avenue, 32 Avenue, 24 Avenue, and 16 Avenue for east-west traffic, and 192 Street and 184 Street for north-south movements (Figure 9). These roads will be upgraded to 4 lanes in phases, and 192 Street will be further widened to 6 lanes ultimately. Highway 15 in the west and

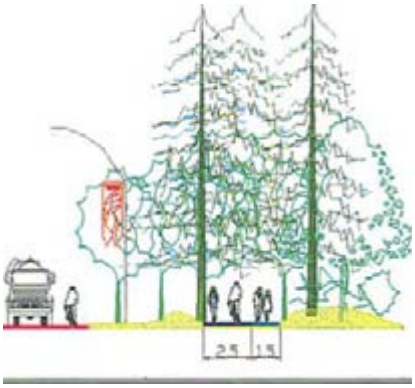
Highway 10 in the north, which are within the jurisdiction of the Ministry of Transportation and Highways, are located about 2.4 kilometres (1.5 miles) away from Campbell Heights.

A study to determine the alignment and corridor requirements for the Highway 1 - Highway 99 connector planned in the vicinity of Campbell Heights is under way. This connector, which will further improve the regional accessibility of Campbell Heights, is one of the major infrastructure projects for the area.

6.6.2 Walking and Cycling Pathway System

Major activity nodes in Campbell Heights include Latimer Park and the proposed commercial area at 28 Ave and 192 Street, and the multi-use trail system proposed in the southern part of Campbell Heights. These activity focuses will be connected from various parts of Campbell Heights through a walking and cycling pathway system. The walking and cycling pathways, which are about 4 metres (13 feet) wide, are proposed to be incorporated in the landscaping strips to be provided along 28 Avenue, 32 Avenue, 192 Street, 196 Street, and the section of 188 Street between 28 Avenue and 32 Avenue (Figure 9). The pathways will also connect to an existing trail system in the vicinity of Anderson Creek in the north.

The walking and cycling pathway system not only provides an alternative mode of transportation, but also serves an outdoor recreational function for the technology and business park employees and the surrounding residents.



6.6.3 Public Transit

Although public transit is not currently available in Campbell Heights, consideration will be given to providing alternative transit services when the area starts to develop. The alternative transit services identified in the Surrey Transportation Plan for low demand areas or low time periods include dial-a-bus, community bus and taxi feeder services. In the longer term, improved public transit services will be planned with Translink, to respond to the needs of the employees of the technology and business park development.

7. SERVICING PLAN, PHASING PLAN AND FINANCING OPTIONS

A servicing and phasing plan, providing general concepts for major road improvement, traffic signalization, stormwater management, sanitary sewer, water supply and other major utility infrastructure requirements, has been prepared as part of the Local Area Plan Review for Campbell Heights. This plan, together with a discussion on service financing options, is presented in a separate report prepared by the Engineering Department.

8. EMPLOYMENT

The total employment that developments in Campbell Heights will generate is estimated to be in the range of 42,400 - 51,900 individual jobs at build-out.

It is estimated that the optional Live/Work area will house about 510 dwelling units and 765 jobs (Refer to Table 1).

9. PLAN IMPLEMENTATION

To implement the Campbell Heights Plan, the following actions are recommended.

9.1 Zoning By-law Amendments

Pursuant to Section 904 of the Local Government Act, an amendment to the Zoning By-law No. 12000 is required to implement the amenity contribution component of the Local Area Plan, and specifically to allow bonus densities in exchange for contributions towards the amenities identified in the Plan. Subject to Council's direction, an amendment bylaw will be prepared for consideration by Council.

9.2 Technology Park Zone

The existing Business Park (IB) Zone in the Zoning By-law No. 12000 permits uses ranging from light impact industries, warehouses, offices, general service uses to accessory uses such as personal services, eating establishments, community service, assembly halls, etc. To cater to the requirements of high tech uses, including a more stringent selection of permitted uses in the zone, and to achieve the planning intent of

reserving sizeable land parcels for large users, it is recommended that a new Technology Park zone be introduced. On the other hand, the new zone should be drafted so as to provide maximum flexibility to facilitate technology park developments. Issues such as mix of uses, density, building setbacks, and building height will be addressed in the new zone. Subject to Council's direction, a Technology Park zone will be drafted for consideration by Council.

9.3 Pre-zoning

To improve the attractiveness and competitiveness of Campbell Heights, and to facilitate business development and investment, one of the strategies is to pre-zone lands for development. The advantages of pre-zoning include:

- increasing the supply of zoned industrial land available for development;
- providing increased certainty to developers and the community at large; and
- shortening the approval process (Development Permit and Building Permit) by removing rezoning from the development approval process;

all of which contribute to strengthening the competitiveness of the City. This is also consistent with Council's policy to allow industrial rezoning applications to be completed without concurrent processing and approval of development permits.

It should be noted that even with the pre-zoning, Council will still retain control over the form of future development through the Development Permit approval process and the implementation of design guidelines which have been developed for Campbell Heights as part of the Local Area Plan Review.

As a subsequent step after the completion of this Plan, staff will look into the possibilities of pre-zoning some lands in Campbell Heights, such as the Provincial site, to facilitate development.

9.4 Policies and Design Guidelines

To promote sustainable development, to achieve high quality and co-ordinated design with extensive green space and to provide amenities, all development proposals will be required to comply with the policies and design guidelines which form part of the Local Area Plan for Campbell Heights. Considerations should be given to pursuing public art projects at various gateway locations.

9.5 Official Community Plan Amendments

The Campbell Heights Local Area Plan Review boundaries include certain properties or portions of properties at the periphery which are designated Agricultural in the Official Community Plan. These include:

(a) 5 properties between 18 Avenue and 20 Avenue west of 192 Street which are designated Industrial Park in the South-East Surrey Local Area Plan (1980);

(b) The rear portions of 4 properties on 196 Street north of the 18 Avenue alignment which may be consolidated with the properties to the north and west for development as they are divorced from their front portions by Campbell River that straddles the properties;

(c) The 2 westerly properties of Kerry Park; and

(d) Portions of 5 properties north of Kerry Park and west of 188 Street which are situated at an elevation of about 40 metres geodetic similar to the lands in the east, and before the land slopes down to the lowland in the west. Although the lands are outside the Industrial designation in the Official Community Plan, it is considered appropriate to include them in the Local Area Plan Review boundaries in view of their topographic characteristics.

An amendment to the Official Community Plan is required to re-designate the above properties or portions of properties from Agricultural to Industrial (Figure 12) when these properties are rezoned for development.

9.6 Marketing Directions and Initiatives

In the Economic and Market Analysis for Campbell Heights, the consultant recommends the following actions be undertaken:

- Assign dedicated staff and resources for the marketing of Campbell Heights, including a full time marketing director with a technology background, well versed in marketing industrial properties and knowledgeable of technology park development.

- Form a technology park development corporation to provide directions in the development, financing, marketing and management of Campbell Heights. The organization may be comprised of representatives from the Federal, Provincial and City Governments,

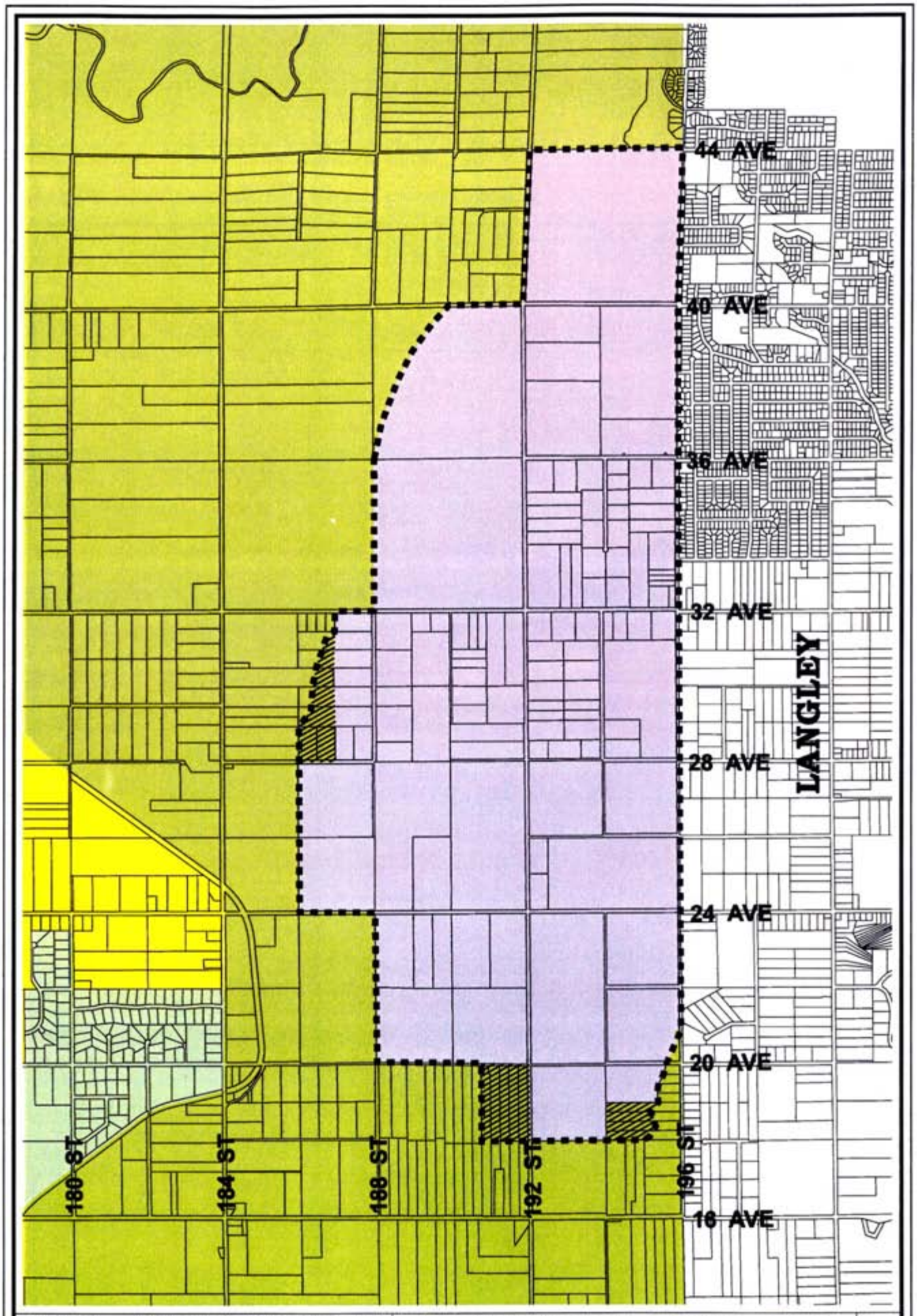


FIGURE 12 **PROPOSED OFFICIAL COMMUNITY PLAN AMENDMENTS**

City of Surrey Planning & Development Department

the financing, real estate, marketing, business and industry sectors as well as the higher education institutions and research institutes, who are committed to the development goals of Campbell Heights and achievement of the goals.

- Develop working relationships with a consortium of knowledge-based institutions in order to identify and cultivate interest in research and development, foster collaboration, establish partnerships with business sectors, stimulate growth of new ventures, and determine research facility requirements. The City is recommended to establish contact and enter into discussion with Tech BC, Kwantlen University College, Trinity Western University, BCIT, SFU and USC as well as chambers of commerce.

- Carry out a detailed evaluation of the target business sectors and to identify their sub-sectors as specific targets for marketing Campbell Heights in the context of the knowledge-based environment created through the working dynamics of the technology park development corporation and the consortium of higher education institutions.

- Prepare a master development plan for Campbell Heights, including site plans, development standards, a development schedule, a financing plan, an operational structure and budget, and a marketing program.

At the same time, it is recommended that the City and the Province continue with the pursuit of the semiconductor initiatives in the shorter term.

10. CONCLUSION

A Local Area Plan which incorporates a Land Use Concept Plan, planning and development policies, design guidelines, an engineering servicing and phasing strategy, and marketing directions, has been formulated for the Campbell Heights area. The Plan lays out the planning principles and a policy framework, and provides general land use and servicing concepts for development to take place in the area.

The Plan proposes that Campbell Heights be developed as a knowledge-based technology and business park, providing an environment which attracts large anchor tenants, fosters the growth of indigenous technology companies, promotes partnerships and transfer of technology and business skills between higher education institutions and industrial tenants, and allows for a diversified industrial base. Concerted efforts and commitment from all parties concerned, including various levels of Government, higher education institutions, the business sectors and the marketing team, including realtors, are required to bring the Plan to fruition.

SURREY
CITY OF PARKS

Corporate Report

NO: C018

COUNCIL DATE: Dec. 11, 2000

COUNCIL-IN-COMMITTEE

TO:	**Mayor & Council**	DATE:	**November 22, 2000**
FROM:	**General Manager, Planning & Development**	FILE:	**2350-011**
SUBJECT:	**Campbell Heights - Local Area Plan Review**		

RECOMMENDATION

The Planning & Development Department recommends that Council:

1. Approve the Local Area Plan for Campbell Heights, including the Land Use Concept Plan, related policies and design guidelines as presented in Appendix I as a means of managing development and the general provision of services, amenities and facilities in the area;

2. Amend the South-East Surrey Local Area Plan by replacing the part related to Campbell Heights with the Land Use Concept Plan and Policies contained in Appendix I;

3. Authorize staff to draft an amendment to Zoning By-law, 1993, No. 12000, as amended, to include an amenity contribution provision for the Campbell Heights Plan Area;

4. Authorize staff to draft a new Technology Park Zone and bring forward for By-law Introduction the necessary amendments to the Zoning By-law and other City By-laws in conjunction with the rezoning of the Provincial or other lands to the new zone; and

5. Authorize staff of the Economic Development Office to follow up on the recommendations of the Campbell Heights Economic and Market Analysis, and bring forward a report on the development and launching of a marketing program for Campbell Heights.

INTENT

The intent of this report is:

1. To provide an overview of the Campbell Heights Local Area Plan Review process, including a summary of the planning and public consultation process, and highlights of the Economic and Market Analysis;

2. To present the proposed Land Use Concept Plan and policies; and

3. To seek Council's approval of the proposed Campbell Heights Local Area Plan and implementation measures.

DISCUSSION

The Plan Area

Campbell Heights comprises about 798 hectares (1,971 acres) of land located south of 44 Avenue, east of 186 Street, north of 18 Avenue, and west of the Surrey/Langley border (196 Street). The area lies outside the Agricultural Land Reserve. It is designated Industrial in the Official Community Plan except for some lands at the periphery which are designated Agricultural (Appendix II).

The Campbell Heights area is covered by the South-East Surrey Local Area Plan which was prepared in 1980. This previous plan envisaged business park and agro-industrial development in the area to provide employment opportunities for the growing workforce. With the rapid development of the City in the past ten years and the recent interest in business development in Campbell Heights, it was considered appropriate to review the local area planning policies and land use concept for the area to better reflect the present economic trends and to meet the economic development objectives of the City. Council approved a terms of reference for the review on December 13, 1999. A copy of the terms of reference is attached as Appendix III.

Objectives of the Local Area Plan Review

The objectives of the Local Area Plan Review for Campbell Heights are:

1. To review and refine land use, economic and other development policies so as to position Campbell Heights in the global market for the promotion and attraction of high-tech industries;

2. To formulate a land use concept plan in parallel with a servicing strategy, including a major road and servicing layout, possible phasing and a review of the costs and financing of the servicing;

3. To identify environmentally sensitive areas for protection; and

4. To prepare design guidelines including measures to provide an appropriate interface with adjacent land uses such as the Agricultural Land Reserve, and the current and proposed land uses in Langley Township immediately to the east.

Local Area Plan Review Process

Pursuant to Council's direction to undertake a review of the Local Area Plan for Campbell Heights, the planning process commenced in January 2000. The planning component of the Local Area Plan Review consisted of the following steps:

1. Identification of area issues and concerns;
2. Identification of planning opportunities and constraints;
3. Formulation of planning objectives;
4. Generation of plan options;
5. Evaluation of plan options;
6. Selection and refinement of the preferred plan option; and
7. Finalization of the land use concept plan and design guidelines.

In concert with the planning component, an engineering consultant, under the direction of the Engineering Department, undertook the analysis for and preparation of the servicing component of the Local Area Plan Review. Issues relating to servicing and financing are addressed in an accompanying report prepared by the Engineering Department.

Inter-agency Consultation

An inter-agency working group was formed to discuss issues and provide input at various stages of the planning process. The participating agencies included:

- Industry Canada
- Public Works and Government Services Canada
- RC. Assets and Land Corporation
- Ministry of Forests
- Land Reserve Commission
- RC. Hydro
- Ministry of Transportation and Highways
- Greater Vancouver Regional District
- Township of Langley Planning & Development Department
- Surrey Parks, Recreation & Culture Department
- Surrey Engineering Department
- Surrey Fire Department
- Surrey Planning & Development Department
- Surrey Economic Development Office.

A total of 4 working group meetings were held between February and June 2000. Representatives from the development industry and the Operating Engineers Realty Section, a major private landowner in the area, were also invited to the meetings.

In addition, meetings were held with the Ministry of Environment, the Department of Fisheries and Oceans and the School District to obtain their input. The preliminary land use concept plan was also referred to the City's Agricultural Advisory Committee for comment in March 2000.

During the process, two preliminary land use concepts were generated. The first option was a predominantly technology park and business park development to maximize creation of job opportunities and business development. The second option included a technology park and business park development and a residential component taking the form of live/work areas along the Surrey/Langley border north of 32 A venue and south of 20 Avenue at different densities and in different building forms.

Public Consultation

The two land use options were presented at the first public open house on February 17, 2000 together with planning information including the planning process, the Official Community Plan and Local Area Plan designations, zoning, land ownership, environmentally sensitive areas, planning opportunities and constraints and the proposed planning objectives. Over 220 residents including 45 from the Township of Langley attended the open house. Copies of a questionnaire were distributed to solicit input on area issues, concerns, planning opportunities and constraints, and comments on the planning objectives and the two preliminary land use concepts. Completed questionnaires from 72 respondents were received and analyzed to provide input to the planning process.

The second public open house was held on April 27, 2000. At this open house, the proposed land use concept plan, design guidelines, general servicing concepts, a phasing plan, amenity contribution requirements and the main findings of the first public open house survey were presented. Over 270 residents including 99 from the Township of Langley attended the open house. Copies of a questionnaire were distributed to the participants to obtain their feedback on the proposed land use and servicing concepts. 96 completed questionnaires were received. Results of the questionnaire survey were taken into consideration to finalize the Local Area Plan.

Comments from residents were also received by way of written submissions, telephone discussions and meetings with staff throughout the planning process. All input from the public was reviewed and carefully considered.

The major issues and concerns raised by the residents in different areas are summarized below:

Campbell Heights Residents:

- Lack of services in the area
- Timing of development
- Impact on environmentally sensitive areas and loss of trees

Surrey Residents outside Campbell Heights:

. Increase in traffic
. Upgrading of 24 Avenue
. Altering the existing character of the area
. Loss of farmland and impact on existing farming operations in the area .
Impact on environmentally sensitive areas and loss of trees

Langley Residents:

. Impact on environmentally sensitive areas and loss of trees
. Increase in traffic
. Air and noise pollution
. Changing the existing land uses in the area to industrial
. Loss of farmland and impact on existing farming operations in the area .
Reduction in property value
. Width of the landscaped buffer along 196 Street (should be increased)

The issues regarding servicing requirements and timing of development are addressed in the servicing plan prepared by.the Engineering Department. While capturing large anchor tenants is required to open up Campbell Heights for development, it should be noted that the Campbell Heights Plan is a long term plan. Given the size of Campbell Heights, it is anticipated that it will take more than 20 years to build out the area.

Road improvement requirements to accommodate the increased traffic from development in Campbell Heights are provided in the servicing plan developed by the Engineering Department. The concern about upgrading of 24 A venue was raised by the Redwood Park Neighbours' Association. Staff met with representatives of the Association in May 2000 to explain why 24 A venue needed to be widened to 4 lanes in the future. It was noted that 24 Avenue has been classified and shown on the City's road network plan as an arterial road for many years. The timing of the upgrading of 24 A venue to the arterial standard (4-lane) will be determined by the growth in traffic over time. As traffic demand increases with development in the future, road upgrades in the area will be carried out in stages. However, it is anticipated that 24 A venue will be among the last of the arterial roads to be upgraded in the area.

One of the objectives of the Local Area Plan review is to identify environmentally sensitive areas for protection. To this end, an environmental study was carried out by a consultant. The Local Area Plan addresses the environmental protection requirements in the proposed Land Use Concept as well as in a set of environmental policies.

The Local Area Plan also deals with interfacing issues between new development and existing land uses within Campbell Heights and in the adjacent agricultural and residential areas. Results of the questionnaire survey show that most residents prefer the landscaped buffer option, as opposed to the live/work option, along 196 Street between 32 A venue and 36 A venue. The Plan proposes a landscaped buffer along the entire length of 196 Street, except for a small corner property on the north side of 32 Avenue where an optional live/work use may be considered. The minimum width of the

landscaped buffer along 196 Street (the boundary between Surrey and Langley Township) is proposed to be 30 metres (100 feet),

The following features of the proposed Land Use Concept Plan were well received by the public:

- Preservation of environmentally sensitive areas;
- Maintenance of green space;
- Retention and enhancement of Latimer Park;
- Multi-use trail system;
- Landscaped buffer provided for the adjacent residential and agricultural areas;
- The proposed development creating jobs for the residents;
- High-tech and business park uses;
- Live/work uses allowing people to live and work in the same area; and
- Promotion of high quality design through the use of design guidelines.

Economic and Market Analysis

To ensure that the Campbell Heights Plan responds to the needs of the market and achieves the objective of promoting and attracting high-tech industries, an economic and market analysis on the global, regional and local economic trends and investment market was carried out by an economic consultant to provide input to the planning process. An executive summary of the analysis is provided in Appendix IV. (A full report is filed with the City Clerk,)

From the Economic and Market Analysis, it is concluded that a projection of the current industrial market trends would produce a slow land take-up rate in Campbell Heights, in the range of 5 - 25 acres per year in the first 10 years and 30 - 50 acres per year in subsequent years. Not only does this approach fall short of meeting the economic development objectives of the City, it would not be economically viable given the high upfront servicing costs required. The alternative approach that this Plan contemplates is to put emphasis on attracting large anchor users, especially in the high-tech sectors, to kick start development in Campbell Heights.

Campbell Heights' inherent strengths should enable it to take an advantageous position in attracting high-tech industries. These strengths include:

- Well defined industrial area as designated in the Official Community Plan and Local Area Plan; .
- Availability of large sites for large land-based anchor tenants such as semiConductor manufacturing plants;
- Large development area for high-tech clusters and other support industries and serVIces;
- Fairly level ground surface and good foundation characteristics for development;
- Proximity to the US and Pacific Rim markets;
- Proximity to high quality residential developments providing housing choices for employees; and

- Proximity to research resources and training opportunities offered in Tech B.C. and other higher education institutions.

To accelerate growth and development and to take advantage of its unique site attributes and strengths, the City of Surrey should:

(a) Position Campbell Heights in the role of a knowledge-based technology park, enhanced by effective marketing. A technology park is a planned development with lands and buildings intended primarily for private and public research and development facilities, high-tech and science-based companies, and support services. By definition, a knowledge-based technology park does the following:

- Affiliates with higher education institutions either through partnership, ownership or management to create and maintain the "knowledge base";
- Promotes research and development through institutional-industrial partnerships, and stimulates growth of new ventures;
- Facilitates the transfer of technology and business skills between institutions and industrial tenants; and
- Drives technology-led economic development for the community.

(b) Target business sectors with high growth rates in the global market place. These sectors, which typically have a high level of research and development activities, include:

- Semiconductor fabrication and electronic equipment manufacturing;
- Information technology, software and telecommunications, and particularly applications in aerial surveying and the intemet; and
- Biotechnology including health care and biomedical services and manufacturing, agro-biotechnology, marine pharmaceuticals, and bio-informatics.

(c) Pursue large-scale inward investment projects for Campbell Heights. The ability of Campbell Heights to offer large sites for these projects is a major advantage.

(d) Pursue cross-border businesses for Campbell Heights which require input from and/or distribution of output to the US.

(e) Pursue new start initiatives for Campbell Heights to encourage the growth of indigenous technology companies, taking advantage of the potential of Tech BC as an incubator.

(f) Launch an aggressive marketing program carefully planned out, and based on a master development plan with dedicated marketing staff and resources.

While pursuing a technology park focus, the land use plan for Campbell Heights should allow for diversity of high-tech, research, office and light industrial uses, and provide resort-like amenities including a hotel/conference centre, an attractive commercial village and fitness and recreational facilities.

Land Use **Concept Plan**

The Land Use Concept Plan proposed for Camp bell Heights is attached as Appendix V. The main features of the Plan are summarized below:

Land Uses

- Based on the plan, Campbell Heights will be predominantly a technology park and business park development to maximize creation of job opportunities and business development.
- 3 Technology Park sites ranging from 80 hectares (198 acres) to 101 hectares (249 acres) in land area are proposed. Sites of this size are not available elsewhere in the Region and are particularly attractive to large land-based anchor tenants in the technology and research and development sectors.
- 2 of the 3 Technology Park sites are designated for either technology park use or business park use to provide flexibility so that changing market conditions can be managed. This flexibility is particularly important as the Local Area Plan is a long-term plan and it is projected that it will take more than 20 years to build out the Campbell Heights area.
- To allow for a diversified industrial base, other areas, including Stokes Pit and the smaller private landholdings, have been designated for business park uses.
- Office buildings are encouraged along 192 Street, 32 A venue and 28 A venue in a business park development. Besides serving as an interface between the Technology Park sites and the business park uses, the higher design standards of office development will enhance the streetscape in the area.
- A commercial node, including hotel and conference facilities, is proposed at the intersection of 192 Street and 28 Avenue, taking advantage of as well as enhancing Latimer Park as an attraction in the area. In addition to providing retail, dining and other services to the working population, this node is a focal point for social interaction.
- The area south of 20 A venue is designated for either business park development or a live/work area taking a cluster housing form. Development in this area may take advantage of the natural amenities of the Campbell River, while offering opportunities to preserve and enhance this significant watercourse. A small local commercial area is proposed at the entrance to the live/work area to serve the day-today retail and service needs of the residents.

Land Use Interface

- The Plan respects the integrity and boundaries of the Agricultural Land Reserve (ALR). Development is not allowed to encroach onto the ALR. Consistent with the Official Community Plan guidelines, a buffer (building setback) of a minimum width of 30 metres (lOO feet) comprising a minimum 15 metre (50 foot) wide landscaped strip will be maintained in a technology park or business park development abutting Agricultural designated lands.

- To provide an appropriate interface along 196 Street with the residential neighbourhoods in Langley, minimum building setbacks of 45 metres (l50 feet) and 37.5 metres (l25 feet) wilI be required of a technology park development and a business park development respectively. Within the respective building setbacks, a minimum 30-metre (lOO-foot) landscaped buffer should be provided. A wider landscaped buffer should be considered where existing vegetation can be preserved.
- 196 Street is to be preserved as a residential street. Access to a technology park or business park development from 196 Street will not be anowed.

Environmental Protection

- Significant watercourses and riparian corridors in the area will be preserved, and enhanced through development.
- Existing vegetation in highly environmentaIIy sensitive areas wilI be preserved.
- Preservation of existing trees and use of native species in the landscaping design are encouraged on development sites.
- Wildlife corridors wilI be maintained through CampbeII Heights to provide connectivity between the wildlife habitats in the Campben VaIIey Regional Park to the south-east and the Nicomekl and Serpentine areas to the north and north-west.

Recreational Facilities

- Latimer Park wilI be preserved and enhanced as a recreational amenity in the area. The adjacent forested area is proposed to be dedicated and/or acquired as park and incorporated into the Latimer Park site.
- A multi-use trail for walking, jogging, cycling and horseback riding is proposed in the southern part of CampbeII Heights, with connections to the City's greenways in the west and the linear community park and Campbell Valley Regional Park in the Township of Langley.
- Each technology and business park development in CampbeII Heights is expected to provide a workplace with extensive green space, including high quality landscaping design and treatment. In addition to its aesthetic value, this green space will serve as a passive recreational amenity for the workers.

Other Features

- The arterial roads serving the area include 40 A venue, 32 A venue, 24 A venue, 16 Avenue, 192 Street and 184 Street. They will be upgraded to 4 lanes in phases, and 192 Street will be further upgraded to 6 lanes ultimately.
- A pedestrian and cycling pathway system is proposed in the area to provide for alternative modes of transportation.
- A number of sites are identified for stormwater management facilities in the area.
- The area south of the CampbeIl Heights Local Area Plan Review boundary outside the Agriculture Land Reserve may be considered ~s a possible future residential area.

- A set of design guidelines has been developed to promote high quality and co-ordinated developments.
- Amenity contributions towards police and fire protection, park and pathway development, and library materials will be collected at the time of development (Appendix VI).

The distribution of land, projected floor area and number of live/work units, and employment estimates in various land use designations are summarized in Appendix VII.

Plan Implementation

To implement the Campbell Heights Local Area Plan and to prepare the area for development, the following actions are recommended:

1. *Zoning By-law amendment*

An amendment to the Zoning By-law, 1993, No. 12000 is required to enact the amenity contribution requirements for the Campbell Heights Plan Area.

2. *Technology Park Zone*

The existing Business Park (IB) Zone in the Zoning By-law No. 12000 permits uses ranging from light impact industries, warehouses, offices, general service uses to accessory uses such as personal services, eating establishments, community service, assembly halls, etc. To cater to the requirements of high-tech uses and to achieve the planning intent of reserving sizeable land parcels for large users, it is recommended that a new Technology Park zone be introduced. The new zone should be drafted so as to provide maximum flexibility to facilitate technology park developments. Issues such as mix of uses including residential dormitories, density, building setbacks, and building height will be addressed in the new zone. Subject to Council's direction, a Technology Park zone will be drafted for consideration by Council.

3. *Policies and design guidelines*

To promote sustainable development and to achieve high quality and co-ordinated design with extensive green space and amenities, all development proposals will be required to comply with the policies and design guidelines which form part of the Local Area Plan for Campbell Heights. Considerations should be given to pursuing public art projects at various gateway locations.

4. *Marketing*

Concurrently with the pursuit of the semiconductor industry, it is recommended that the directions provided in the Campbell Heights Econo~c and Market Analysis be pursued by the Economic Development Office with a view to developing and launching a marketing program for Campbell Heights. This will involve the establishment of a task force with dedicated staff resources (including the hiring of

consultants) and partnerships with the business and industry sectors, higher education institutions and research institutes as well as continued support from the senior governments. Economic Development Office staff will work with other departments and bring forward a report regarding the development and launching of a marketing program for Campbell Heights.

CONCLUSION

The proposed Local Area Plan for Campbell Heights, incorporating a Land Use Concept Plan, planning policies, design guidelines and servicing strategies, has been developed with extensive consultation with the public, City departments and external agencies. The Plan addresses the objectives of the Local Area Plan Review and meets the planning objectives established for the Campbell Heights area.

Subject to Council's endorsement of the complementary report submitted by the Engineering Department, it is recommended that the Local Area Plan for Campbell Heights and the related implementation measures be approved.

Murray D. Dinwoodie
General Manager
Planning & Development Department

YL/kms

Appendices

I Campbell Heights - Local Area Plan Review (Bound Separately)
II Official Community Plan Designations and Agricultural Land Reserve Boundaries
III Campbell Heights Local Area Plan Review Terms of Reference
IV Campbell Heights Economic and Market Analysis Executive Summary
V Campbell Heights Land Use Concept Plan
VI Amenity Contributions by Land Use Category
VII Land Area, Projected Floor Area, Projected No. of Live/Work Units and Employment Estimates by Land Use Designation

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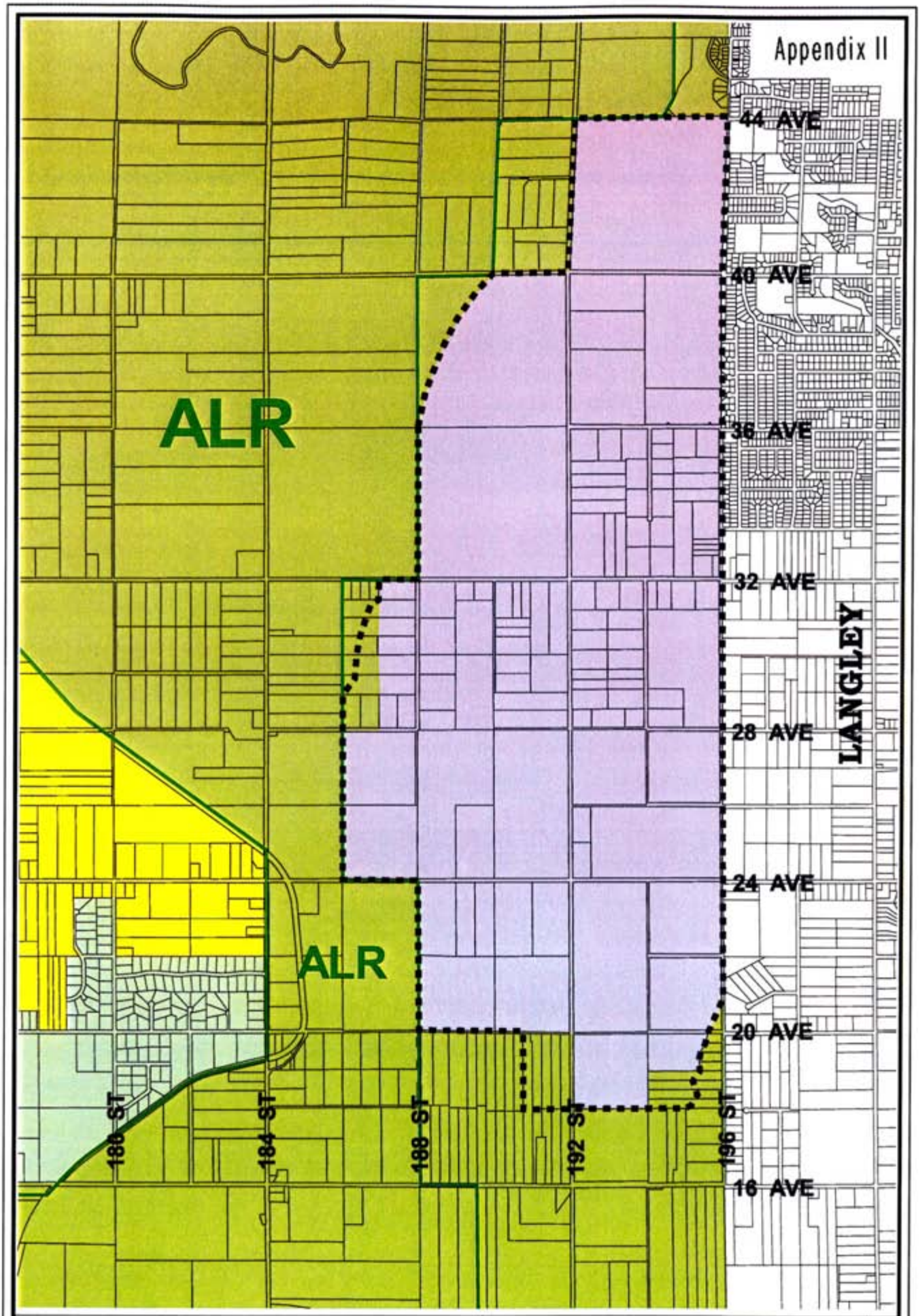

Appendix II
44 AVE
40 AVE
36 AVE
32 AVE
28 AVE
24 AVE
20 AVE
16 AVE
ALR
ALR
LANGLEY
180 ST
184 ST
188 ST
192 ST
196 ST
FIGURE 1
OFFICIAL COMMUNITY PLAN DESIGNATIONS AND AGRICULTURAL LAND RESERVE BOUNDARIES
City of Surrey Planning & Development Department
Campbell Heights Local Area Plan Review Boundary
Agricultural Land Reserve (ALR)
OCP Designations
Agricultural
Industrial
Rural
Suburban
500
0
500
1000 Meters
N

CAMPBELL HEIGHTS LOCAL AREA PLAN REVIEW
Terms of Reference.

Background

The CampbelI Heights area comprises about 784 hectares (1,937 acres) of land located south of 44 Avenue, east of 186 Street, north of 18 Avenue, and west of the Surrey/Langley border along 196 Street. The area lies outside the Agriculrural Land Reserve (Appendix I).

The area is designated Industrial, except for a number of properties between 18 A venue and 20 Avenue to the west of 192 Street which are designated Agriculrural, in the Official Community Plan (Appendix I). The Industrial designation for most properties in the area has been in place since 1966 when the Surrey Official Community Plan By-law No. 2465was adopted.

The Campbell Heights area is covered by the South-East Surrey Plan which was prepared in 1980. The Plan envisages business park and industrial development in this area to provide employment opportunities for ~e grovv:ing workforce. The Plan designates the centre of the area for high-impact industrial development, surrounded by general industrial uses to the east, agro-industrial enterprises to the north, and industrial parks in the remaining area (Appendix II). The great majority of the land in the area is still zoned General Agriculrure (A-I) and Intensive Agriculrure (A-2). Industrial development has not taken place mainly due to a lack of engineering services.

The South-East Surrey Plan was formulated about 20 years ago. With the rapid development of the City in the past 10 years and the recent interest in business development SJlch as high-tech and science parks in Campbell Heights, it is considered appropriate to review the local area planning policies and land use concept for the area to reflect the present economic trend and to meet the economic development objectives of the City.

Objectives of Plan Review

The objectives of the CampbelI Heights Plan Review are:

1. To review, refine and formulate land use, economic and other development policies for the area so as to position it favourably in a global context, particularly with respect to attracting high-technology businesses;

2. To fonnulate a land use concept plan in parallel with a servicing strategy, including an infrastructure program, a financing strategy and a phasing plan;
3. To identify environmentally sensitive areas for protection; and
4. To prepare design guidelines including measures to provide an appropriate interface with adjacent land uses such as the Agricultural Land Reserve and current and proposed land uses in Langley Township immediately to the east.

Plan Area

The Plan Area will include all lands designated Industrial in the Official Community Plan and a small area designated Agricultural in the Official Community Plan but Industrial Park in the South-East Surrey Local Area Plan (Appendix 1).

Plan Preparation and Consultation Process

The Plan Review process will commence with an assessment of the supply and demand of industrial land in Surrey, and will include the development and evaluation of land use and development policies and strategies, a land use concept plan, and design guidelines for the Plan Area. The plan preparation process will involve the following steps:

1. Identifying area issues and concerns as well as planning opportunities and constraints;
2. Setting planning goals and objectives;
3. Generating land use and development options;
4. Selecting the preferred land use and development option;
5. Developing a comprehensive plan incorporating land use and development policies, a detailed land use plan including major road layout, design guidelines; and servicing, financing and phasing strategies.

The Plan Review process will be undertaken by the Planning & Development Department, in conjunction with the servicing study managed by the Engineering Department. A communication consultant will be engaged to undertake the public consultation process.

Public infonnation meetings will be held at Steps 1 and 4 to receive pubic input, and a final public meeting will be held before the finalized plan is presented to Council for consideration.

An internal working group will be formed, comprised of City staff from the Planning & D~velopment Department, Engineering Department, Parks,_Recreation & Culture Department, and Economic Development Office, representatives from the School District, Ministry of Environment, B.C. Assets & Land Corporation, RC. Forestry and the Federal Government as well as major landowners in the area. The working group will meet to identify issues, review and provide comments on plan options and resolve issues. Referral to the Agricultural Advisory Committee may be needed. A separate economic analysis on the global, regional and local economic trends and investment market will also be undertaken to provide input to the Plan Review process.

The plan preparation process is illustrated in Appendix ill.

The approved plan will provide the basis for the development of a marketing strategy to promote investment opportunities in the City, and particularly in Campbell Heights, focused on world-renowned high-tech companies as well as supporting business and servIces.

Plan Contents

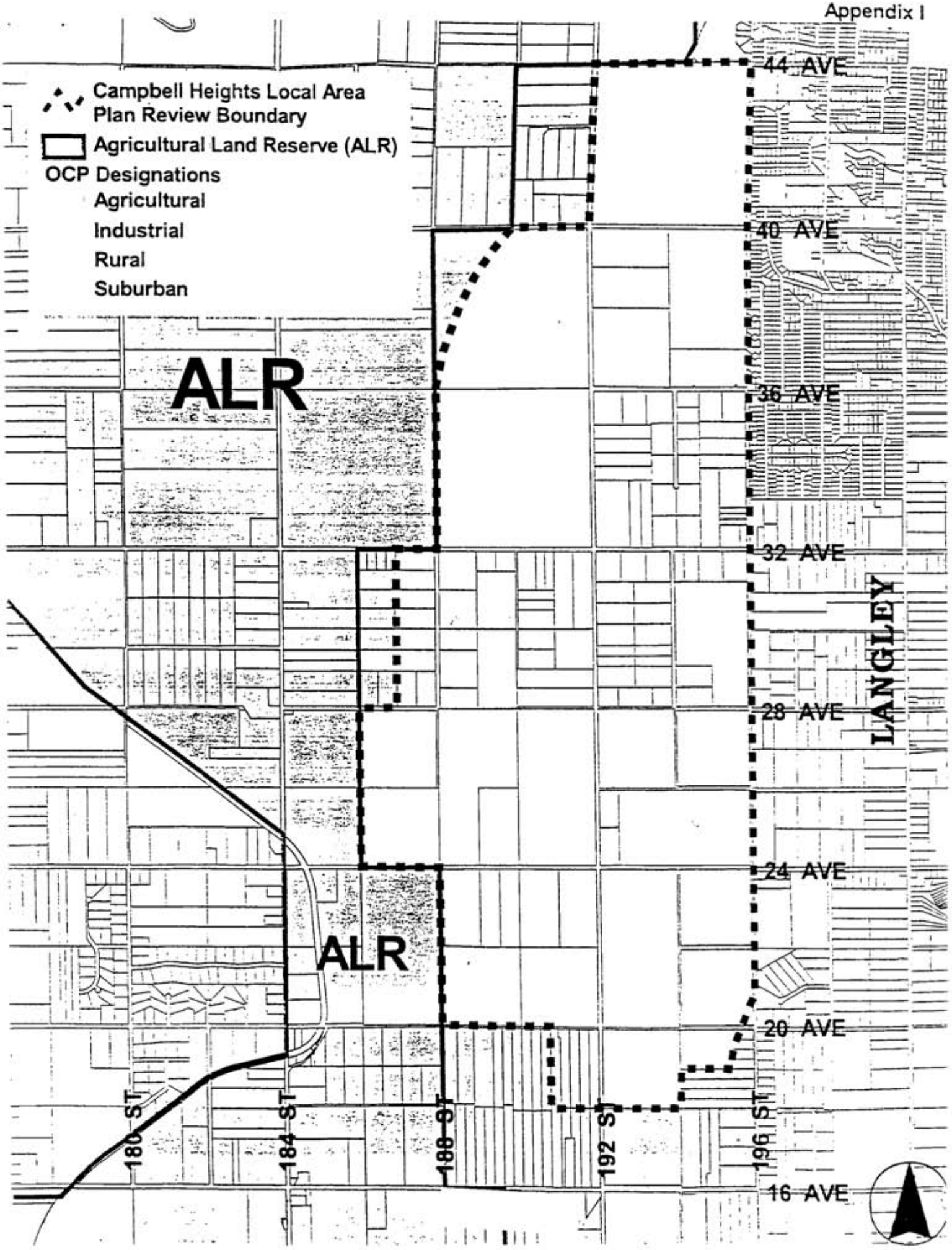
The Campbell Heights Plan will contain the following components:

1. A statement of planning goals and objectives;
2. Land use, economic, environme~ta1, open space and circulation policies;
3. A land use concept plan showing specific land use and density designations;
4. Design guidelines for new development;
5. Major road layout; and
6. A servicing and financing strategy including a phasing plan.

Timeframe

It is estimated that the Plan Review process will take approximately 4 months, with various milestones to be coordinated with the schedule of the servicing study commissioned by the Engineering Department. The Plan Review will commence upon Council's approval of the planning process (Appendix Ill).

Appendix I


Campbell Heights Local Area Plan Review Boundary
Agricultural Land Reserve (ALR)
OCP Designations
Agricultural
Industrial
Rural
Suburban
ALR
ALR
44 AVE
40 AVE
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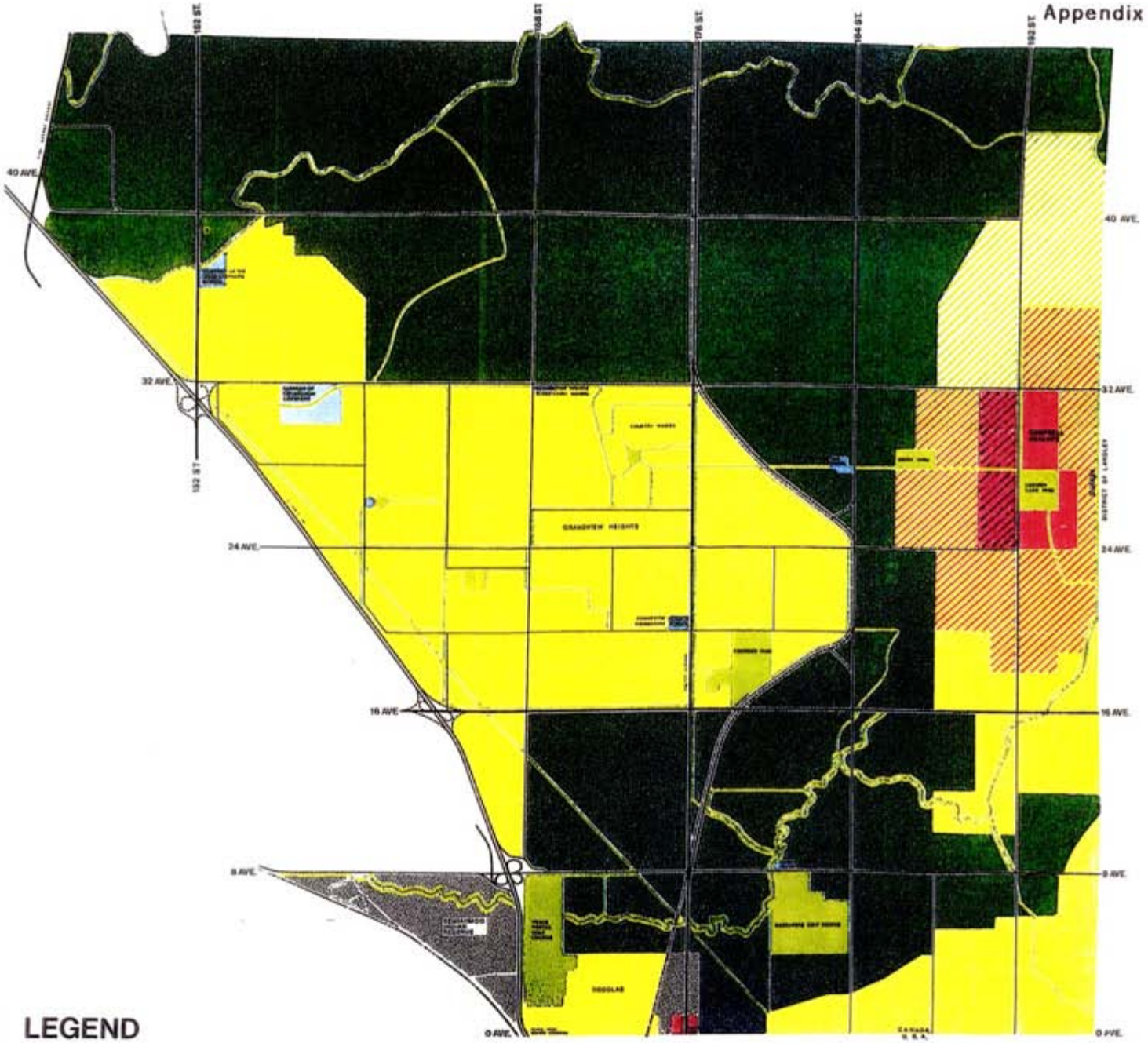
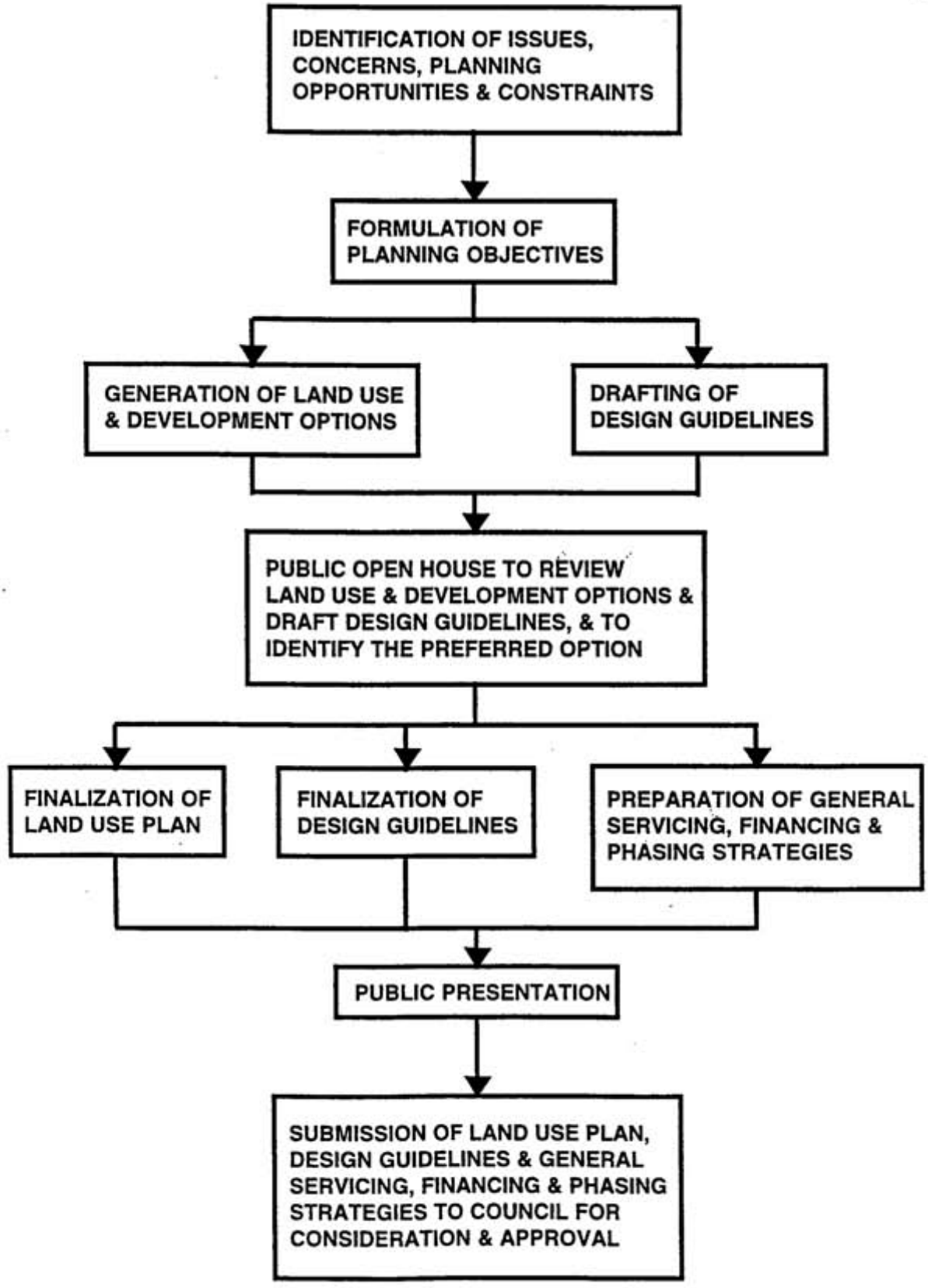


LEGEND

- AGRICULTURAL
- SUBURBAN RESIDENTIAL (5 ACRE)
- SUBURBAN RESIDENTIAL (1 ACRE)
- SUBURBAN RESIDENTIAL (1/2 ACRE)
- URBAN RESIDENTIAL
- MOBILE HOME
- MULTIPLE RESIDENTIAL (TOWNHOUSE)
- MULTIPLE RESIDENTIAL (MEDIUM RISE)
- MULTIPLE RESIDENTIAL (HIGH RISE)
- INSTITUTIONAL
- SCHOOL
- CEMETERY
- SHOPPING CENTRE
- RETAIL COMMERCIAL
- TOURIST COMMERCIAL
- HIGHWAY COMMERCIAL
- CORE COMMERCIAL
- SERVICE INDUSTRIAL
- GENERAL INDUSTRIAL
- HIGH IMPACT INDUSTRIAL
- SALVAGE INDUSTRIAL
- INDUSTRIAL PARK
- AGRO INDUSTRIAL
- RECREATIONAL
- OPEN SPACE
- SPECIAL STUDY AREA

SOUTH-EAST SURREY PLAN

Campbell Heights Local Area Plan Review
Plan Preparation Process



E~ecutive Summary

The Campbell Heights area in the southeast part of Surrey, British Columbia includes about 800 hectares (2,000 acres) of land designated for Industrial use in the City's Official Community Plan (OCP). The majority of this land is currently zoned for agricultural uses and is not serviced for development.

There has been development interest expressed in the Campbell Heights area by a number of organizations and the City has, therefore, commenced a comprehensive planning process to formulate a land use plan, a servicing strategy and a marketing plan for the area. Preliminary conceptual planning for the lands includes a mix of business park, technology park, office, and commercial uses. In addition, live/work and some recreational uses are being considered for a portion of the lands.

To meet economic development objectives of the City of Surrey and of the Province of British Columbia, including the development of a strong industrial base, ANGLE Technology LLC has been retained to conduct an economic and market analysis to help ensure that the Campbell Heights Plan will respond to the needs of the market.

Campbell Heights' competitive advantages include among others:

. Its size, terrain, and surrounding uses make the area an attractive location for light industrial, business and technology park uses.

- The size of the individual parcels allows flexibility to accommodate large users.
- The conceptual development plan includes high quality urban design and recreational amenities.
- Its proximity to the US border makes it attractive to businesses that distribute to the US or rely on goods from the US.

Campbell Heights' main disadvantages are:

- Its relatively remote location and its currently limited vehicular access from a regional perspective. It is clear from the existing distribution of good quality light industrial and business park space that firms have generally chosen locations in more central areas with high vehicular accessibility.
- The lack of servicing and infrastructure are negative marketing factors.
- The lack of speculative development to help "kick-start" the development.

The report examines the real estate absorption rates and industry trends in the Greater Vancouver Regional District (GVRD) to determine potential rates of growth of Campbell Heights as an industriallbusiness park with a technology focus. The absorption analysis assumes:

- Access to both Highway 99 and Highway 1 will be significantly improved to overcome issues of remoteness and accessibility.

- The necessary zoning and servicing will be in place to permit the development of a light industrial, business and technology park.

- Camp bell Heights will be developed to a high level of quality, similar to or surpassing other high quality light industrial and business parks in the region.

- Land values and lease rates will be competitive.

Analysis of the total business and light industrial park market in the GVRD

Based on historic growth of industrial space in the region, it is expected that the regional light industrial and business park inventory will grow at an average annual rate between 3.0% and 4.0% over the long term. This is consistent with growth since 1991. At this rate of growth the regional inventory will grow from about 104 million sq.ft. at the end of 1999 to between 187 million and 227 million sq.ft. by the end of2019.

Surrey currently has a very limited supply of vacant, serviced land zoned for light industrial or business park use. However, the City has a good supply of vacant land that is designated and/or zoned for industrial use that could be serviced in the short to medium term.

It is expected that Campbell Heights will face significant competition from other light industrial locations in Surrey as well as industrial lands in both Delta and Langley. Given this competitive context, we do not expect Campbell Heights to capture a high share of light industrial and business park growth in Surrey over the next 10 years or so. A maximum annual land absorption of about 5 to 10 acres per year in the first five years is expected with a maximum of 15 to 25 acres per year in the following five years.

As the Campbell Heights area becomes established as a light industrial and business park location, and as the supply of vacant land in highly accessible parts of Surrey (as well as Delta and Langley) diminishes, Campbell Heights will achieve much higher rates of land absorption. A verage absorption rates could reach between 30 and 50 acres per year during years 11 to 20.

In the broader context of this report, however, it is anticipated that accelerated rates of growth could occur if the City of Surrey were to differentiate Campbell Heights from the

general business and industrial markets and look at the opportunity of developing a knowledge-based, university and/or academically affiliated science and technology park.

Analysis of existing GVRD technology market

It is estimated that the GVRD contains about 11 million sq.ft. of floorspace that is occupied by technology companies. Therefore, tech space accounts for roughly 10% of the total GVRD business park and light industrial market (104 million sq.ft.).

The total tech market has been growing at a minimum average rate of 7% per year since 1990, with more rapid growth during 1998 and 1999 (i.e., closer to 9% or 10%). High rates of growth are expected to continue in the technology market in the foreseeable future. However, it should be noted that in the very long term, growth at historic rates will be difficult to sustain and growth rates could level off.

At least 85% to 90% of the largest tech companies in the GVRD began operations in the GVRD. Very few tech firms moved to the Vancouver area after establishing their operations in other markets. This suggests that the GVRD tech market has not experienced substantial growth due to the relocation of firms from other parts of Canada or from other countries.

Development potential for Campbell Heights

The higher growth rates from the analysis above indicate that there is potential for *accelerated* development of Campbell Heights by creating a science and technology park component for all or part of Campbell Heights and by marketing the development accordingly. However, there will still be significant competition in the GVRD in the medium term which suggests that a conservative approach to development of the area may be prudent.

From an extra-regional perspective, SurreyNancouver was compared to five other competitive markets in metropolitan areas in the US, UK, Sweden, and Taiwan that have comparable characteristics for access to transportation, educationlknowledge base, workforce, population, unemployment, and existing science park(s). The data from this comparative analysis suggest that a focus on Campbell Heights as a science and technology park is feasible and will 1) enhance its marketability, 2) accelerate its growth, and 3) help to support the economic development goals of the City of Surrey and the Province of British Columbia. In addition, the Province performed an analysis of a site in Campbell Heights and an opportunities and market evaluation of the region, and concluded that the site was an **ideal location** in the GVRD to host semiconductor fabrication and equipment manufacturing facilities.

Costly infrastructural installation is not recommended, however, prior to either securing a tenant or designing a master plan for the development, but instead a "fast-track" process and the necessary commitments to install the necessary infrastructure quickly should be

developed. This should address the servicing and infrastructure disadvantage in the immediate future.

With regard to speculative space, it is often more effective to market a physical development (which demonstrates real commitment by the sponsors) to prospective tenants than a concept. However, many of today's technology companies develop rapidly. These small and medium sized firms generally require flexible, short-term leases that will allow variable, but often fast growth. Commercial developers should be encouraged to develop speculative multi-tenant office buildings or incubation centers based on short term commitments.

Campbell Heights should be actively promoted based on such strengths. The City should. actively pursue such opportunities utilizing a marketing approach that directly targets those markets most likely to select Surrey and the GVRD as a location for business; however, it should be recognized that many other organizations are also pursuing such opportunities and therefore the City and its development partners will need to carefully consider the sort of incentives it will offer a company to relocate or to set up a new operation in Camp bell Heights.

To take a more pro-active approach and to accelerate development, Campbell Heights will need to enhance its marketability with suitable initiatives to alter the existing dynamics. Key components to altering the dynamics include:

1. Pursuing and securing a large scale inward investment project and developing the park initially based around this "anchor" tenant and its spin-off industries.

2. An aggressive, but carefully planned marketing strategy based on a fully master planned development with dedicated marketing staff and a Development Board made up of those committed philosophically and financially to the development goals.

3. Developing relationships with the local research institutes and higher education institutes to enable the development of a knowledge-based, institutionally affiliated, science, research or technology park. This may include assisting a particular organization with the development of a research center or laboratory facility that can achieve international standing to be an originator of spin-outs and an attractor for companies working in related fields. This should also build on Tech BC's small business incubator and "graduation" requirements, and any other incubator developments in the Surrey, Langley, Richmond, and Burnaby area.

4. Implementing new start initiatives to help grow indigenous technology companies. Speculative build for smaller high tech firms but with enhanced telecoms and networking capability or specialist facilities for biotech companies etc based on detailed industry market analysis would be an element of this plus factoring in potential graduates from the Tech BC incubator.

Without these kinds of proactive initiatives, the development will not mature as rapidly as the City might like in order to meet its economic objectives for the next ten years. However, the City also needs to have realistic development objectives such that development runs in parallel with demand and recognizes that a site of this size will take many years to develop.

Marketing Campbell Heights

This report serves as an introduction to the opportunities and assets available in the City of Surrey that will allow the City to effectively market Campbell Heights. It provides a basis of understanding for the semiconductor, biotechnology, information technology (IT) and telecommunications fields as those technologies reflecting high growth in the global marketplace and also those that reflect local industrial and research strengths. Within these markets are sub-industries that will warrant closer evaluation as candidates for location in Surrey, but it will be necessary to assess these markets in the context of the kinds of academic relationships that the City can foster for the Campbell Heights development.

The quality of the research base is the foundation of the emerging high tech clusters, and helps to generate a skilled workforce. The City of Surrey should develop a consortium of knowledge-based institutions to identify strengths and gauge interest and commitment in creating an environment that can serve the natural growth of start-ups. Tech BC is already serving the early needs of these start-ups, particularly for the IT -related companies. Given the areas of expertise in veterinary medicine, healthcare, agriculture and IT of Kwantlen and TWU, Surrey has an opportunity to provide a creative environment through the co-operation of these institutions and with the assistance and co-operation of BCIT, SFU and UBC. The creation of such an environment then becomes a strong marketing tool.

As the marketing team for Campbell Heights begins to gather more succinct information from its university and research partners, and leverage their commercial contacts, it can begin to target more specifically those sub-industries within the industry sectors that are most appropriate for the technology park's development.

It should be noted that one of the major constraints facing technology companies these days is the lack of suitably qualified staff. Surrey should evaluate its workforce skills and availability and use this as a key component of its marketing. Compared to many US cities, Surrey has a competitive advantage in that it has a highly skilled workforce plus the labour market is not as tight as the US. Unfortunately this is currently reflected more in a brain-drain to the US by qualified individuals who cannot find a local technology job that pays a good wage. The development of local highly skilled jobs through an increased focus on technology development should help to mitigate this.

Marketing cannot be effectively undertaken, however, without I) fully defining the "product," 2) determining the development schedule according to a master plan for the site, 3) assigning leadership roles and support staff to marketing, 4) forming a

consortium, and 5) constructing a full action plan based on a marketing strategy relevant to,this activity and reflective of specific analyses of the .commercializable intellectual property from research centers in the region.

In this report some initial marketing steps have been outlined so that the City does not risk losing the momentum currently provided by the semiconductor initiative. As the designated marketing team begins its research, establishes collaborations and partnerships, and advertises the broader picture of technology in Surrey, it will actually be engaging in an indirect, but significant marketing and promotion activity. Feedback from this process will help to define not only the product, but also the means to further promote the product.

Our findings overall, backed up by Coriolis Consulting of Vancouver, suggest that Camp bell Heights is an ideal location for industrial, research and development, high technology and business office use, especially if the project is developed and marketed as a knowledge-based technology park. If Campbell Heights is developed and marketed as a multi-use, business and technology park, regardless of affiliation, it will not see, in the immediate future, the same level of growth seen by other industrial and business parks in the region because of its current lack of servicing and infrastructure and lack of access to main highways and thoroughfares. Moreover, a marketing plan will do little to foster any real growth in Campbell Heights *until* the project is defined through a master plan that reflects the involvement of the universities and organizations that would need to be integral components of knowledge-based science and technology parks.

If the City of Surrey takes a proactive approach, however, and addresses infrastructure weaknesses; puts in place an effective marketing program; secures a major anchor tenant and/or leading edge research facility; and provides an environment conducive to technology industry growth, then Campbell Heights has *strong* potential to be developed as a technology park over the medium term.

Appendix V

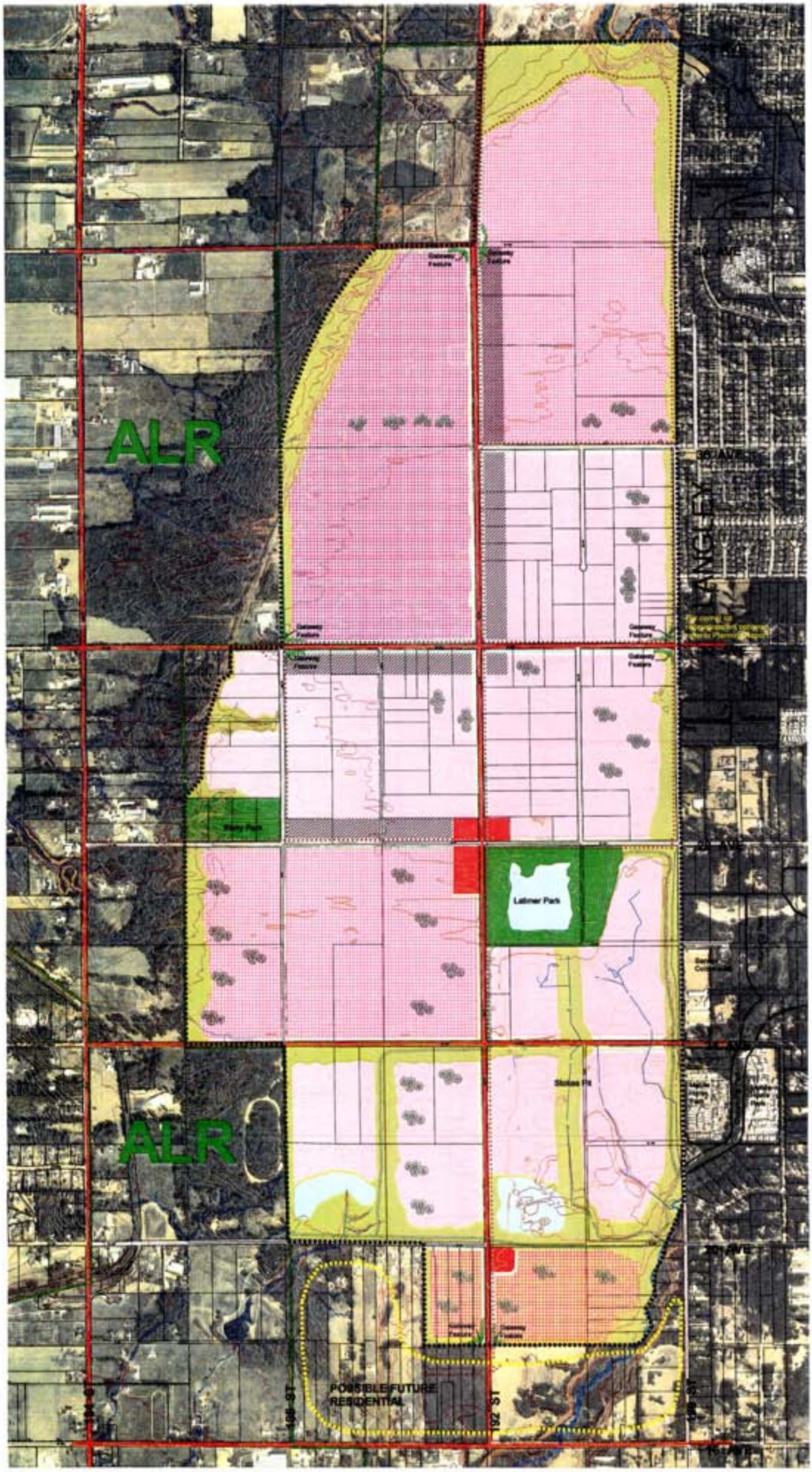


FIGURE 9
CAMPBELL HEIGHTS
LAND USE
CONCEPT PLAN

City of Surrey
Planning & Development Department

- Campbell Heights Local Area Plan Review Boundary
- Technology Park
- Business Park
- Technology Park or Business Park
- Business Park (Office)
- Commercial
- Business Park or Live / Work in Cluster Housing Form
- City Parks
- Open Space Corridors / Buffers
- Landscaping Strips
- Stormwater Management Facilities
- Multi-Use Trail (Walking, Cycling and Horseback Riding)
- Walking and Cycling Pathways
- Tree Preservation Opportunities
- Arterial Roads
- ALR Boundary
- Creeks and Rivers
- Contours 1m
- Contours 5m

Sept. 14, 2009

Meters

Amenity Contributions by Land Use Category

	Technology Park, Business Park or Commercial Development	Live/Work Development	Residential Development Outside Campbell Heights
Police Protection	$205.64/acre	$205.64/acre	$51.42/unit
Fire Protection	$888.46/acre	$888.46/acre	$222.11/unit
Park & Pathway Development	$2,127 .99/acre	$2,127.99/acre	$2,127.99/acre
Library Materials	Not applicable	$115.68/unit	$115.68/unit
Total Contribution	$3,222.09/acre	$3,222.09/acre *plus* $115.68/unit for library materials	$389.21/unit *plus* $2,127 .99/acre for park & pathway development

Notes:

- *The amenity contributions are at March* 1, *2000 rates which will be adjusted annually based on Vancouver's Annual Average Consumer Price Index.*
- *Amenity contributions are payable at building permit stage for industrial, commercial, institutional and multiple residential uses, and at subdivision stage for single family and duplex zones.*

Land Area, Projected Floor Area, Projected No. of Live/Work Units and Employment Estimates by Land Use Designation

Land Use	Land Area (Approx.)	Projected Floor Area (Industrial/ Commercial)[1]	Projected No. of Live/Work Units[2]	Employment Estimates[3]
Technology Park	94.8 hectares 234 acres	284,000 sq.m. 3.06 million sq.ft.		5,100
Business Park	271.0 hectares 670 acres	1,084,000 sq.m. 11.67 million sq.ft.		26,300
Technology Park or Business Park	182.1 hectares 450 acres	546,000-728,000 sq.m. 5.88-7.84 million sq.ft.		9,800-17,600
Business Park or Live/Work	25.8 hectares 64 acres	103,000 sq.m. 1.11 million sq.ft.	510	765-2,500
Commercial	4.8 hectares 12 acres	24,000 sq.m. 0.26 million sq.ft.		400
City Parks	27.6 hectares 68 acres	Not applicable		
Open Space Corridors/Buffers/ Landscaping Strips	144.0 hectares 356 acres	Not applicable		
Stormwater Management Facilities	8.9 hectares 22 acres	Not applicable		
Roads	38.8 hectares 95 acres	Not applicable		
TOTAL	**797.8 hectares 1971 acres**	**1.94-2.22 million sq.m. 20.87-23.94 million sq.ft.**	**510**	**42,400-51,900**

[1] Assuming a floor area ratio of 0.3 for Technology Park (based on the average floor area ratio achieved in a number of existing technology park developments), 0.4 for Business Park, and 0.5 for commercial.

[2] Assuming a density of 8 units per acre.

[3] Assuming an average floorspace per employee ratio of 600 sq.ft./employee for Technology Park, 320 sq.ft./employee for the office component (50%) and 24 employees/acre for the light industrial component (50%) of Business Park, 500 sq.ft./employee for retail commercial, and 1.5 employees per unit for Live/Work.

SYNOPSIS OF ENGINEERING SERVICING & FINANCING ISSUES for the CAMPBELL HEIGHTS INDUSTRIAL AREA

INTENT

The purpose of this report is to provide an overview of the engineering servicing and financial strategies for Campbell Heights.

BACKGROUND

Campbell Heights is the last major undeveloped industrial area in the City of Surrey. Responding to Council's wish to accelerate industrial development and the considerable interest in this area from local and international companies, Land Use and Engineering Servicing Plans have been prepared.

A separate report prepared by the Planning & Development Department outlines the preferred land use for the Campbell Heights Area. This plan, which allows for Hi- Tech business park use including two potential chip plants, was used as the basis for the Engineering Study. Servicing impacts and the associated financial issues were identified and analyzed. The details of the engineering analysis are contained in a separate report available in the Engineering Department.

The engineering services discussed in the report relate only to major infrastructure. Localized site servicing requirements of individual developments are not analyzed in the report as responsibility for their construction rests with adjacent benefiting land owners.

DISCUSSION

Sanitary Sewer

Campbell Heights is remote from the nearest sanitary sewer system. The area will be serviced by extending a pressure sewer from Campbell Heights north wards to the GVRD sanitary sewer at 184 Street and 52 Avenue in Cloverdale. Sanitary sewer trunks will generally follow the road grid to service the industrial area. The area south of 28 A venue will be serviced by sanitary sewer trunks in the road right-of-way and a sanitary sewage lift station. The conceptual layout for the sewer servicing is shown in the attached Executive Summary.

Water

The GVRD water system bisects the Campbell Heights area. A reservoir is required to provide balancing flows to the area. A pump station will be required to deliver the water to the area at an appropriate pressure. Water distribution mains will generally follow the road grid to service the properties and are as shown in the attached Executive Summary.

Transportation

The Campbell Heights area will require strong transportation links to the municipal arterial and Provincial Highway network. Currently, the area is serviced by two-lane rural roads. A transportation study was completed as part of the engineering report. Arterial and collector roads were reviewed and, where necessary, upgrades and additional elements have been identified. Substantial upgrading of the existing road network is required and is shown in the attached Executive Summary. These works are over and above what is needed for growth external to Campbell Heights. The identified road system will function together with the future Highway 1-99-D.S. Border connector roads to provide a high level of access to Campbell Heights. However, as the delivery mechanism for the Hwy. 1-99-USA Connector roads has not yet been determined their cost is not included in the overall road costs. As identified in the economic and market analysis, without the high quality access of the Hwy. 1-99-USA Connector road system, the pace of development of Campbell Heights will be impeded.

Storm Water

A comprehensive storm water study was included as part of the engineering study. Two different storm water management strategies are proposed for Campbell Heights depending on ground conditions. The core area around Latimer Lake (please see the attached Executive Summary) has a high ground water level and requires a conventional storm sewer and detention pond system. The larger area around the perimeter has conditions very conducive to ground water recharge. Here it is proposed that both the City and private systems be constructed to exfiltrate water into the ground, reducing the size of the storm sewer system and eliminating the need for detention ponds. This approach will recharge the aquifer and maintain the base flows in the streams that emanate from the base of the northwest face of the Campbell Heights slope and, subsequently, feed into the Nicomekllowlands. This is the same approach that has been used in the neighbouring area of Brookswood in Langley, which has very similar soil conditions. Extensive soils testing has been carried out to confirm the functionality of the proposed infiltration system and the initial construction will be monitored to assess performance and revise the design for future works as appropriate.

The proposed use of groundwater recharge substantially reduces the costs for drainage SerVICIng.

The Ministry of Environment and Department of Fisheries have reviewed the NCP. The proposed storm water management plan has received general support from these agencies. A more detailed review of the environmental issues is included in the report prepared by the Planning and Development Department.

Development Phasing

The sanitary sewer system is the primary limiting factor to the phasing of development. Since the sanitary sewer will discharge to the north, phasing will more than likely proceed from north to south.

Regional Servicing Impacts

An area the size of Campbell Heights will have impacts on regional water and sewer servicing. Details on these regional impacts are provided in Appendix 1. Briefly summarized we will not know whether the City will need to allow for funding for sharing on additional water supply capacity until the type and rate of industrial is determined. There will be sufficient time to track the rate of development and include any necessary works in future servicing plans.

For sewer there may be the requirement for heavy water users (i.e. chip plants) to temporarily store on-site waste process water during times of heavy rainfall due to current inflow / infiltration problems combined with extensive regional capacity constraints. Such storage can be achieved by storing the clean process water in a lined open pond. Additional regional capacity is in process and is funded through the overall regional sewer DCC.

FINANCING

Context

The financing of the servicing for Campbell Heights presents unique challenges compared with other NCP's within the City both in terms of the magnitude of the costs and the fact that there are four major land owners, three of which are the Federal, Provincial and City governments.

The following table summarizes the projected DCC revenues and construction costs for each engineering service. For water and sewer services, the DCC cost includes, where applicable, just the upsizing cost. This is in line with all other NCPs. The revenues are based on the current DCC By-law.

Projected DCC Revenues and Expenditures at Buildout

	Projected Trunk (DCC) Servicing Costs	Projected DCC Revenues	Balance
Major Collectors	8,525,000	3,930,000	(4,595,000)
Sanitary Sewer	9,000,000	3,210,000	(5,790,000)
Water	8,800,000	3,440,000	(5,360,000)
Storm Water Management	12,860,000	24,150,000	11,290,000
TOTAL	39,185,000		(4,455,000)

This table shows that the cost of trunk DCC servicing exceeds the potential DCC collections for the area. This is owed in most part to the following:

- The existing undeveloped road network in the area.
- The isolation of Campbell Heights from the nearest sanitary servicing.
- The total lack of existing servicing in the area. Most areas of Surrey have some existing servicing which can be built upon as development proceeds.
- The requirement of a dedicated water reservoir and pump station for the area.

The costs for arterial rods are not shown in the above table as the arterial road program is developed based on overall City needs and funded by the overall City-wide DCC. Consequently, the program cannot be looked at on a strictly NCP-by-NCP basis.

Because of the size and relative isolation of the Campbell Heights area, the servicing study did review the impact of this NCP on the City arterial road network. This analysis indicated that the arterial road costs, both within and outside the NCP boundaries, over the full 30 to 40-year build-out timeframe, is $60 million. This figure needs to be looked at in the context of the City's overall growth related arterial road works, over a similar timeframe, which is estimated to be in excess of $500 million. Consequently, Campbell Heights represents approximately one-tenth of the City's overall arterial program over the longer term.

While the costs appear large in comparison to the DCC generation, when looked at in comparison to the overall 1200 acres of developable land, the servicing costs even including the long-term arterial road costs are in the range of $100,000 per acre. This, when added to the current raw land costs, results in a final serviced land cost in line with other industrial areas. These overall servicing costs allow for two chip plants. If these plants, which are high water users and waste water generators, are not allowed for, then sewer and water costs can be reduced by $2.5 million.

Financial Strategies

In view of the above factors and significant costs involved, a different financing strategy is required for Campbell Heights compared with other NCPs. An additional factor is that the time frame involved for build-out of Campbell Heights is anticipated to be in the range of 20 to 30 years, compared with the other NCPs which are in the 5 to 15 year range. Consequently, it is proposed only to include the trunk DCC elements required for the first phase of development in the new 10 Year Servicing Plan. This first phase would include the servicing of the lands along 192 Street from 40 to 32 Avenues and the land immediately south of 32 Avenue from 192 Street to the westerly boundary of the NCP, an area of approximately 400 acres. The cost of these works and the projected DCC revenues are estimated as follows:

	Projected Trunk (DCC) Servicin2 Costs	Projected DCC Revenues
Arterial Roads	6,700,000	5,392,000
Major Collectors	--	1,312,000
Sanitary Sewer	7,300,000	1,072,000
Water	*5,300,000*	1,148,000
Storm Water Management	2,500,000	8,064,000
TOTAL	21,800,000	17,000,000

As can be seen from the above table, for servicing to proceed there will have to be a net inflow of DCCs from other areas of Surrey into Campbell Heights. However, DCCs are operated on a municipal wide basis and it is not possible to ensure that there is a perfect balance between DCC revenues and expenditure in all areas of Surrey.

In addition to the above identified, cost of municipal services are the costs to provide electrical transmission lines for large power users such as chip plants. The costs for electrical transmission lines for heavy power users, such as a chip plant, are in the range of $17 to $25 million.

Council has approved the inclusion of the first phase works in the 1 0 Year Plan. It is also proposed that in conjunction with the Province, a major hi-tech industrial development for this area would be pursued. Once there is a commitment for a first major developer, then the financing for the first phase of servicing could be coordinated with this developer, the City, the Provincial Government, and other major land owners in the area.

CONCLUSION

The servicing plan for Campbell Heights provides a comprehensive servicing and phasing plan for the area. The engineering plan has been presented to the public and received general support. There still remain issues relating to the significant start-up costs involved, which would require a major development to be able to finance or justify such costs.

Appendix 1

Regional Servicing Issues

An area the size of Campbell Heights will impact regional water and sewer services.

Water

Based on anticipated growth projections, the regional water supply will be adequate for one chip plant plus the development of the immediately adjacent areas, (approximately 5 million gallons a day). If this level of demand is exceeded before 2011 then the City is responsible to cost share to help provide additional regional capacity, which could be provided via an in-line booster station. If this level of demand is exceeded after 2011 then the provision of extra capacity is the responsibility of the GVRD. As the determination of whether additional supply be required will not be known until the rate of development becomes clear, it is proposed that at the next update of the 10 Year Plan, in approximately 3 to 4 years, the need for the in-line booster will be re-evaluated and included if necessary.

Sewer

With regard to sewer there is adequate capacity for the initial phases of development except during periods of extremely wet weather when inflow and infiltration causes the regional system to reach or exceed its capacity. The GVRD is in the process of providing additional capacity and a new section of trunk is proposed *from* Highway #10 to King George Highway in the next *few* years which will help alleviate these capacity issues. Additionally Surrey, Langley and Langley Township are working to reduce the levels of inflow and infiltration.

Due to these wet weather capacity concerns heavy water users such as chip plants, will have to store waste process water during periods of heavy rainfall. This storage process of wastewater could be achieved through on-site storage which is a feasible and practical solution. Overall additional regional capacity is funded through the regional sewer DCC.

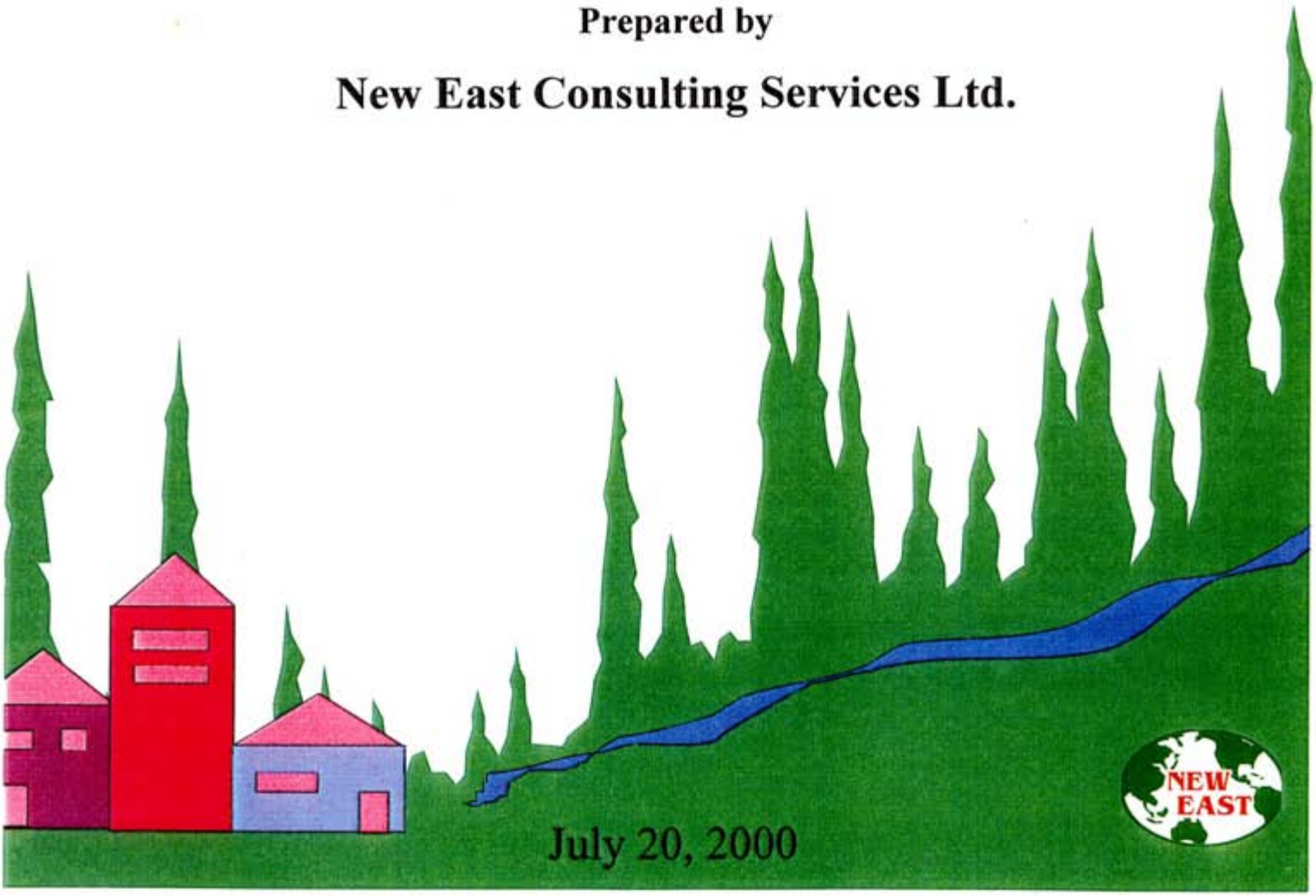
Campbell Heights Servicing Study
Executive Summary Report

Prepared for

The City of Surrey

Prepared by

New East Consulting Services Ltd.



CAMPBELL HEIGHTS SERVICING STUDY
EXECUTIVE SUMMARY REPORT

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CAMPBELL HEIGHTS SERVICING STUDY
EXECUTIVE SUMMARY REPORT

1.0 INTRODUCTION

The Campbell Heights area encompasses approximately 785 ha in southeastern Surrey. The area generally lies between 18 and 44 Avenues to the south and north, and 186 and 196 Streets to the west and east. The western boundary follows the top of a ridge which descends to the Nicomekl River lowland plain.

The City of Surrey Official Community Plan (OCP) designates all of Campbell Heights as an industrial area. Current land use is predominately agricultural or agro-industrial with greenhouses, henneries, fur farms, and tree nurseries utilising approximately one-half of the land within the study area. The remaining lands are occupied with treed areas and quarry operations.

The City of Surrey prepared an Economic Development Action Plan 1999 - 2000. One of the key recommendations of the plan was to provide pre-serviced industrial lands to overcome the shortage that currently exists in the city. One of the areas identified for pre-servicing was Campbell Heights. This area has attracted several foreign companies, including a semiconductor manufacturer, whom are seeking large parcels of land. Through these recent contacts, it has become clear that modem businesses prefer pre-serviced land to start a new operation as it reduces the uncertainties involved in servicing and allows a new facility to commence operation in a shorter time frame.

Prompted by the interest of a semi-conductor manufacturer seeking a large parcel of land the City decided to devise a servicing scheme for Campbell Heights. The City retained the services of New East Consulting Services Ltd. to prepare the servicing plan. The study was commissioned in March 1999 but required a land use plan before it could be completed. The Terms of Reference for the study is presented as Appendix A.

The Planning Department devised two concepts for the Campbell Heights Local Area Plan. These were presented at a public open house on February 17, 2000 at East Kensington Elementary School. After receiving the public and stakeholder input the Planning Department has revised the land use plan. The revised plan was presented in a second open house on April 27,2000. Since then the proposed land use plan has been further refined to reflect the input form various stakeholders and the public. This report is prepared to identify an order of magnitude estimate for the servicing requirements based on the proposed land use plan.

The Executive Summary Report is a distillation of the design issues and assumptions regarding a particular facet of servicing. Complete details may be found in the Campbell Heights Servicing Study -- Technical Report and its separately bound appendices.

The Executive Summary Report is organised into nine sections. Section 2 -- Environmental Review is a summary of the review conducted by Gartner Lee Limited in the spring of 1999. At that time Gartner Lee was retained by New East to identify the environmentally sensitive areas within and around the Campbell Heights area and to prepare environmentally responsible guidelines for land development. Section 5 -- Roads and Transportation is a summary of the study conducted by Ward Consulting Group. Ward Consulting Group was retained by New East to provide transportation planning and modelling for the study area. The remaining sections of this report including storm water management strategies, land use development and demand projection, water supply, sanitary system, non-municipal utility servicing, and overall development costs with DCC recovery are summaries of works prepared by New East.

2.0 ENVIRONMENTAL REVIEW

2.1 Objectives

In the spring of 1999, Gartner Lee Limited conducted an environmental review of the Camp bell Heights area. Their report is provided in full as Appendix B of the Campbell Heights Servicing Study -- Technical Report.

The objectives of the review were to:

- identify the environmental requirements of the area so that they could be incorporated into the early planning stages,
- provide scientifically based guidance towards the land use .plan,
- optimise the biophysical characteristics of the area, and
- provide guidance toward the creation of an environmentally sound storm water management plan.

2.2 Methodology

The review consisted of a desktop study of existing reports, aerial photography, mapping, and environmental databases. This work was augmented with a two day field review by two biologists. The field work examined the physical and biological conditions present in the area and to identified and graded the existing environmentally sensitive areas (ESA). From this information appropriate guidelines for development were devised.

2.3 Findings

2.3.1 *Physical Conditions*

The Campbell Heights area is situated on a plateau at elevations between 40 and 45 metres geodetic. The ground surface is fairly level and rises 20 metres above the surrounding flat clay soils which comprise the Nicomekllowland plain. The western ridge of the plateau, which constitutes the western boundary of the Campbell Heights area, slopes downward to the lowland plain at grades between 10 and 20%.

Geologically the area was formed by a large deltaic deposit of sand and gravel. This formation contains an unconflned aquifer that is recharged,- at least in part, by the infiltration of surface water and precipitation. The aquifer is the same aquifer used by some residents in the City of Surrey and the Township ofLangley as a source of potable water. The aquifer also provides baseflow for the many streams that emanate from the flanks of the plateau including the

Nicomekllowland watercourses. The geological setting of the Campbell Heights area and active groundwater use make them especially sensitive to the receipt of contaminants from surface level activities. To the south, the groundwater provides a source for watercourses leading to the Campbell River.

2.3.2 *Biological Conditions*

The Campbell Heights area supports various vegetative, fish, and wildlife communities and contains species of conservation interest. Four general vegetative communities occur: coniferous forest, deciduous forest, mixed forest, and riparian forest. These are distributed around the study area and provide habitat and nutrients for wildlife and enhance the quality of air and water.

The Campbell Heights area is situated between two regionally important natural areas. The Campbell River Regional Park lies about 1 km to the southeast and the Serpentine Nicomekl River estuary is about 10 km to the northwest. The wooded areas, riparian stream corridors and open fields in Campbell Heights provide migration corridors for wildlife between these two large areas.

The Campbell and Nicomekl Rivers support a variety of salmonid and non-salmonid fish species. Although the Nicomekl is dyked with little riparian cover and heavily sedimented it provides a corridor for fish to reach the extensive network of creeks and ditches throughout the lowlands. Almost all of these creeks are of the highest habitat classification for both spawning and rearing opportunities. The Campbell River, which is more pristine in character offers spawning and rearing habitat. It also has many tributary streams that provide fish habitat.

2.3.3 *Environmentally Sensitive Areas*

For the purposes of this study, environmentally sensitive areas (ESA) were defmed as terrestrial or aquatic features which perform important environmental functions and/or support important biophysical attributes and if modified, could result in significant environmental impact. In this respect thirteen areas, representing three levels of sensitivity (high, moderate, and low) were identified. Figure 2.1 illustrates the locations of the areas as identified by Gartner Lee.

Areas of high sensitivity include the riparian area surrounding Anderson Creek, the groundwater seepage areas feeding the Twin Creeks, Brooklane and Laughlin Creeks, Latimer Pond, and the minor watercourses leading to the Campbell River. Areas identified as moderately sensitive include all of the large wooded areas and a portion of the western ridge slope between 24 and 28 Avenues. The remaining areas were identified as having a low level of environmental sensitivity.

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2.4 Development Guidelines

The development guidelines recommended by Gartner Lee are intended to preserve vegetative and riparian areas for the benefit of fish and wildlife and to enhance the quality of water and air. Specific guidelines for the design of drainage services and the preservation of wildlife corridors were provided and opportunities to enhance wildlife habitat were identified. Figure 2.2 illustrates the location of the potential forested and creek corridors as identified by Gartner Lee.

2.4.1 *Guidelines for Environmentally Sensitive Areas*

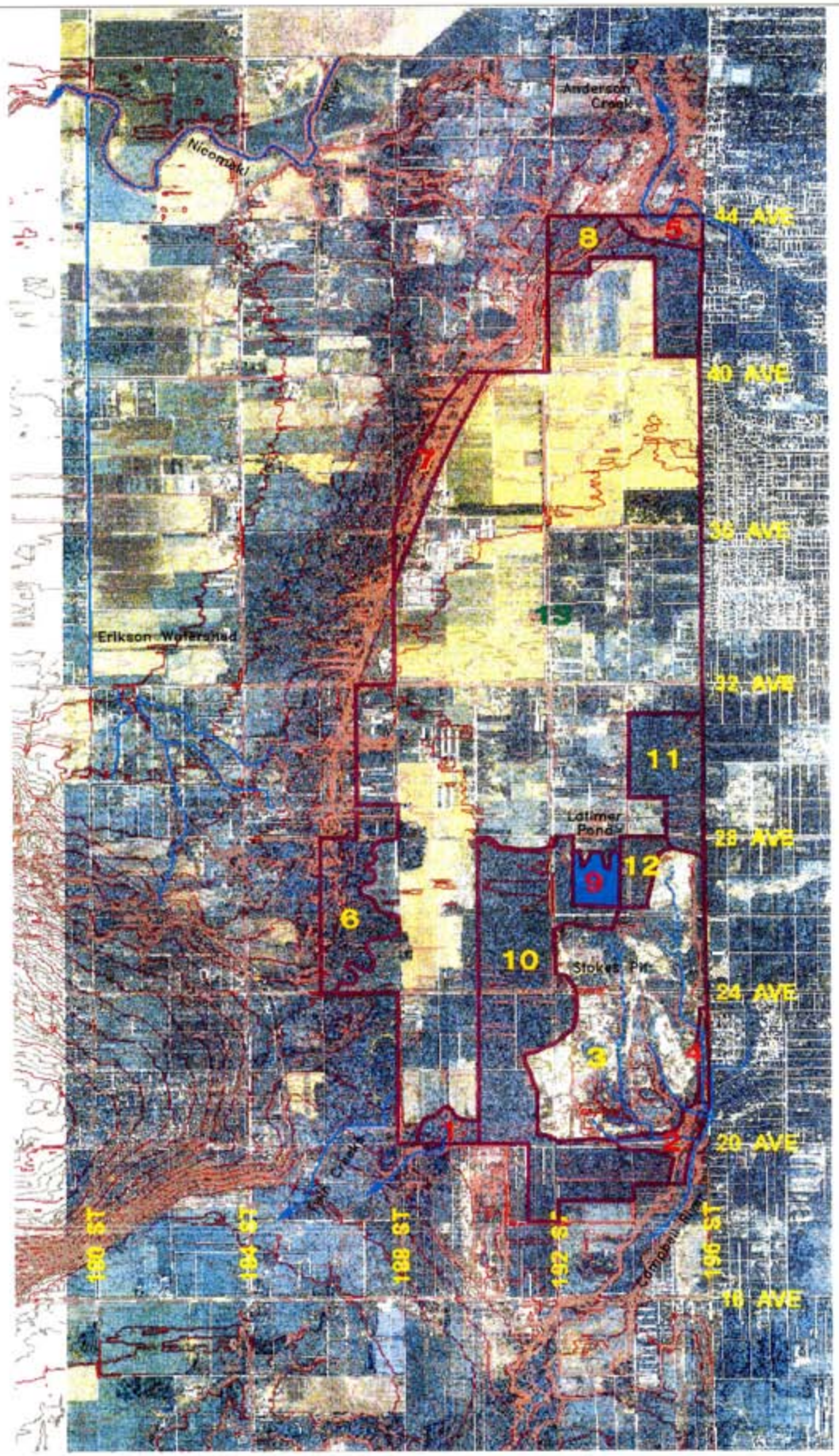
In areas defined as having a high sensitivity it is recommended that development be avoided. In particular riparian areas should be preserved or enhanced especially for fish habitat. In moderately sensitive areas it is important to retain vegetation with particular attention to wildlife corridors. In areas of low sensitivity opportunities to preserve water quality, through the proper management of storm water, and to create wildlife habitat should be undertaken. Throughout the Campbell Heights area efforts should be made to minimise the contamination of storm water runoff from ground level sources and to maximise the quantity of storm water exfiltrated into the ground.

2.4.2 *Guidelines for Drainage Design*

It is recommended that storm water runoff from developed areas, parking lots, and road ways be dealt with using best management practices to minimise contaminants and then exfiltrated into the ground to replenish the aquifer. Surplus flows should be directed towards existing watercourses. Oil, grease, and sediment separators should be used to treat runoff from roadways and parking lots. Wherever possible the conveyance of storm water should be achieved by way of swales and ditches.

2.4.3 *Opportunities for Habitat Enhancement*

A number of opportunities for habitat enhancement are available. These include improvement to the salmonid habitat in Stokes Pit by providing stream complexing for the existing constructed channels, riparian planting, creek realignment, and surface flow preservation. Interconnections between storm water management ponds would provide fish, amphibian, and wildlife corridors. Habitat values could be created in these ponds by providing aquatic and shoreline vegetation.



LEGEND

- Environmentally Sensitive Area Boundary
- 5 Environmentally Sensitive Area Identifier, High
- 9 Environmentally Sensitive Area Identifier, Moderate
- 13 Environmentally Sensitive Area Identifier, Low
- Surface Water (River/Lake), Flow Direction
- Surface Water, Intermittent

Base plan provided by City of Surrey, Planning and Development Department, 1999

Scale 1:20,000 (approximate)
metres
0 500 1000

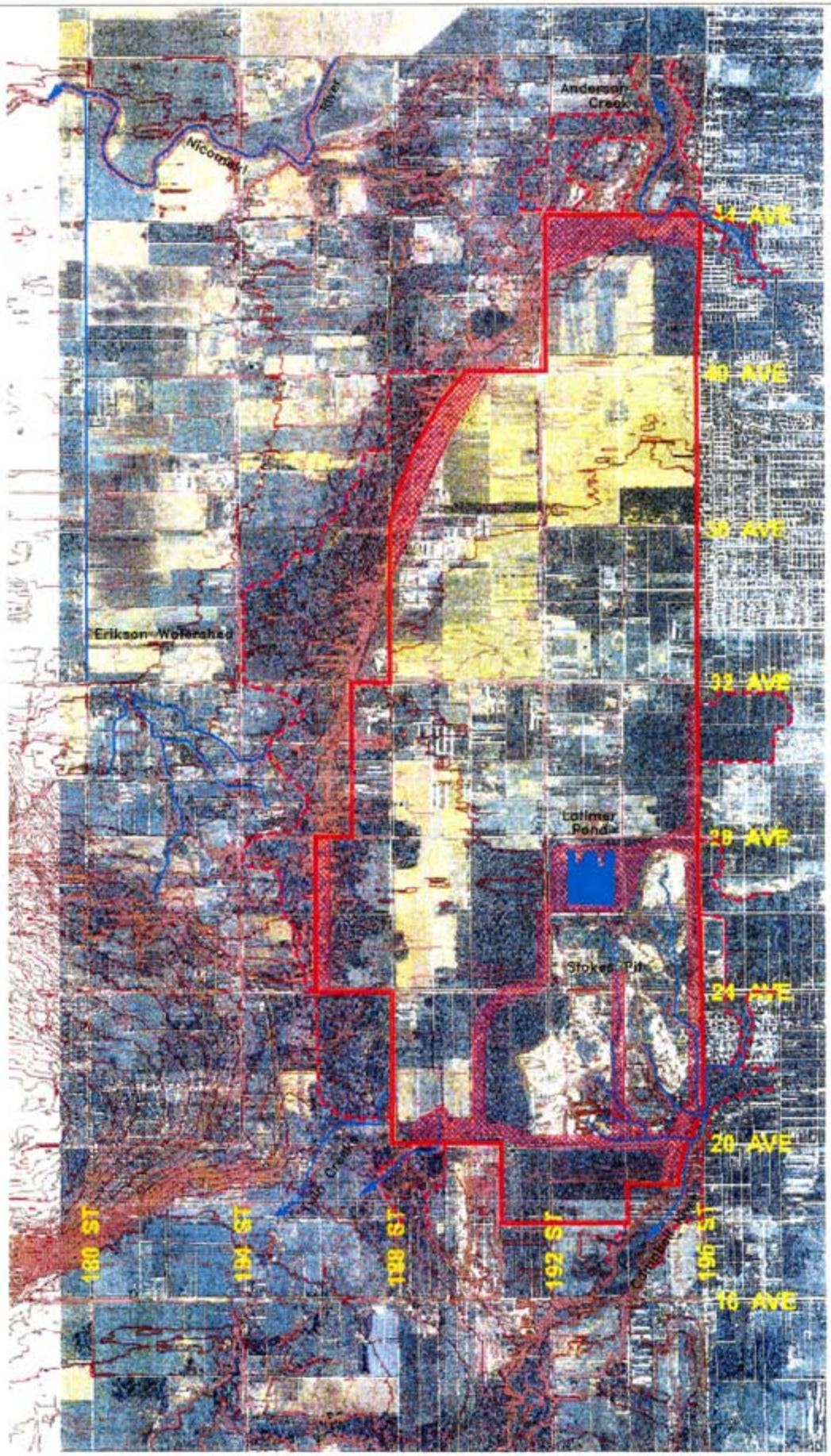
Date Issued: 27 March 2000
Drawn by: BB
GLL Project Number: 99-729
File Name: 99729-01.dwg

Environmentally Sensitive Areas

Campbell Heights Industrial Area Servicing Study
City of Surrey

Gartner Lee

Figure No. 2.1



LEGEND

- Campbell Heights Industrial Area Boundary
- Potential Forest and Creek Corridors within Campbell Heights
- Existing Forest and Creek Corridors Adjacent to Campbell Heights

Base plan provided by City of Surrey Planning and Development Department, 1999

Scale 1:20,000 (approximate)
metres
0 100 500 1000

Date Issued: 27 March 2000
Drawn by: BB
GLL Project Number: 99-729
File Name: 99729-01.dwg

Potential Forested Corridors and Creek Corridors

Campbell Heights Industrial Area Servicing Study
City of Surrey

Gartner Lee

Figure No. 2.2

3.0 STORM WATER MANAGEMENT STRATEGIES

3.1 Introduction

Campbell Heights is unique area in Surrey as the soils are comprised mostly of sands and gravels up to 40 metres in depth. This formation contains an unconfined aquifer that is recharged by the infiltration of surface water and precipitation. The aquifer is the same aquifer used by some residents in the City of Surrey and the Township of Langley as a source of potable water.

The aquifer also provides baseflow for the numerous lowland streams which emerge along the length of the flank of the western ridge of the plateau. The lowland watercourses are productive habitat for salmonids. The storm water management plan for the Campbell Heights area must make provision for groundwater recharge to sustain these streams or they could diminish. To the south, the groundwater provides a source for watercourses leading to the Campbell River.

Absent from the plateau area are natural watercourses and gullies. This is an indication of the permeable nature of the soils. Latimer Pond, located near the southwest corner of 192 Street and 28 A venue, is the only waterbody in the area. It was formed as a result of gravel extraction activities within Stokes Pit that intersected with the locally high ground water table. At this location the ground water table is within 3 metres of the ground surface. This condition extends over a large portion of the study area. It reaches its apex near 196 Street, south of 32 Avenue and is thought to extend from there for a radius of 1 kilometre. The ground water table slowly fluctuates in relation to the seasonal variation in precipitation. The localised high ground water table limits the ability to exfiltrate storm water to the ground in these areas.

Rainfall runoff from the Campbell Heights area discharges to three different watercourses. In general, the portion of the study area south of 24 A venue and east of 188 Street drains to the Campbell River system. The remaining portion to the north, which comprises roughly two-thirds of the study area drains to the agricultural lands situated within the Nicomekl River lowlands except for a 20 ha parcel in the northwest corner of the study area which discharges to Anderson Creek. Anderson Creek is a major tributary of the Nicomekl River. The Nicomekllowlands are drained to the Nicomekl River by way of a series of ditches leading to the Erickson Creek pumpstation.

Whenever a rural area, such as the Campbell Heights area, is developed for industrial use, the intensity and volume of storm water runoff increases. The increase is a direct consequence of the increase of impervious areas created by buildings and pavement. If unchecked, the increase in runoff can adversely impact the natural environment by changing the morphology of the receiving waterways and by introducing contaminants such as oil, grease, sediments, etc. Other environmental and social constraints affecting the development of a storm water management strategy for the Campbell Heights area include the preservation of groundwater resources and

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respecting the needs of the agricultural community.

The objectives of this storm water management plan for the Campbell Heights are to: .
minimise the potential impacts to, and enhance, the natural environment, including the ground water resource,
. limit runoff to the Nicomekllowlands to be consistent with or improve upon the design assumptions for the Erickson Pump Station, and
. provide a convenient and safe system to convey the runoff from the minor and major storm events within the Campbell Heights development.

3.2 Analysis and Synthesis

3.2.1 Limitations and Constraints

Significant challenges face the development of a drainage system for the area. These include the flat topography, environmental constraints, and a localised high ground water table..

The flat topography makes the design of a conventional design using piped connections and detention ponds difficult. As depth increases along a piped run, pipes to transport storm water flows quickly become too deep for delivery to a detention pond located on the Campbell Heights plateau. To make such a system function, detention ponds, their outlets, and the receiving water level need to be at increasingly lower (deeper) elevations and storm sewer sizes become increasing large and less efficient.

The increase in impervious surfaces (buildings, roads, parking lots, etc) that accompany development will serve to block the unusually high rate of transmission of precipitation through the permeable soils to the underlying aquifer. If a conventional drainage system is used in the Campbell Heights area the western portion of the aquifer could diminish. This may impact the Nicomekl River lowland streams and resident fish populations that are reliant on ground water seepage as a source of base flow. In addition, if a conventional system is employed then runoff will be directed to surface water routes rather than through the soil to the aquifer as it presently does. This will further exasperate the recharge potential to the aquifer. Therefore, a storm water system that exfiltrated runoff to the ground is appropriate for the Campbell Heights area as it closely mimics the current hydrologic regime.

3.2.2 Methodology

Hydrologic modelling was used to evaluate the runoff regime from the existing (predevelopment) land use conditions and from the anticipated future land use conditions without storm water controls. This comparison was used as the base condition and serves as an aid in determining the

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appropriate size of storm water control devices. For the uncontrolled development condition it was determined that peak storm flows and runoff volumes would increase by 600% and 400% re:;pectively. Therefore one of the principal objectives of the storm water management plan is to control these increases to mimic the predevelopment condition. Table 3.1 summarises the estimated predevelopment and uncontrolled peak development conditions determined by the hydrologic modelling.

Table 3.1 Summary of Peak Flows Rates (m3/s) and Runoff Volume (ha*m)

Area Series	Existing Conditions				Postdevelopment Conditions				% Change			
	2yr 12 br	Syr 12 br	10yr 12 br	lOO yr 12 br	2yr 12 br	Syr 12 br	10yr 12 br	lOO yr 12 br	2yr 12 br.	Syr 12 br	10yr 12 br	lOO yr 12 br
1200 to 1000	0.29	0.47	0.61	1.1	2.0	2.5	2.8	3.8	590	432	359	245
	1.1	1.7	2.1	3.6	4.2	5.1	5.8	7.8	282	*200*	176	117
2200 to 2000	0.68	1.0	1.3	2.4	2.6	3.1	3.5	4.9	282	210	169	104
	2.5	3.6	4.4	7.3	8.2	*10.1*	11.3	15.3	228	181	157	*110*
3000	0.09	0.14	0.18	0.34	0.52	0.64	0.72	1.0	478	357	300	194
	0.22	*0.35*	*0.45*	*0.80*	1.1	1.3	1.5	*2.0*	*400*	271	233	*150*
4000	0.16	0.26	0.33	0.62	0.82	1.0	1.1	1.6	413	285	233	158
	0.53	*0.78*	*0.96*	1.6	1.7	2.1	2.3	3.2	221	169	*140*	*100*
5300 to 5000	0.64	1.0	1.3	2.3	3.9	4.8	5.4	7.6	509	380	315	230
	2.4	3.6	4.4	7.4	8.1	9.9	11.1	15.1	238	175	152	*104*
6000	0.14	0.23	0.3	0.57	1.0	1.3	1.4	2.0	614	465	367	251
	0.49	*0.77*	*0.97*	1.7	2.1	2.6	2.9	*4.0*	329	238	199	135

*NB: Runoff Volumes (ha*m) are in italics*

In recognition of the unique soil conditions in Campbell Heights it is thought that the exfiltration of storm water to the permeable substrata is the most appropriate method to control postdevelopment storm water runoff as it would mimic the natural regime. The benefits of such a system include:

- maintenance of aquifer levels,
- maintenance of baseflows to the Nicomekllowland watercourses,
- reduction of surface runoff, and
- reduction of the need for large, inefficient storm sewers.

An assessment of the exfiltration potential of the Provincial Forestry Nursery Lands was conducted by Golder Associates Ltd. in the Spring of2000. This work was subjected to a peer review by Piteau Associates Ltd. Both of these reports appear as appendices to the Campbell Heights Servicing Study -- Technical Report.

In order to exfiltrate stormwater into the permeable soils the following technologies were examined, exfiltration basins, exfiltration trenches, drainage fields, and exfiltration galleries. Exfiltration basins are "detention pond like" structures designed to retain water so it can be transmitted to the ground over a few hours to a couple of days. Exfiltration trenches are subterranean systems that mayor not contain perforated or non-perorated pipe within a clear granular backfill. In this system storm water is transmitted to the ground through the backfill. Surplus flows can be recovered at the trench outlet and directed downstream or to another drainage facility. Drainage fields are "septic field like" systems in which a series of branches extend from a manifold system to distribute the storm water over a large area. These systems are also located beneath the ground surface. The fourth system, exfiltration galleries, are similar to trenches in concept but are "pit like" systems filled with granular material. Storm water from several areas can be conveyed to a gallery by way of ditches or pipes.

Exfiltration basins and drainage fields were rejected from further investigation as they were deemed to be unsuitable for the Campbell Heights area. In the case of exfiltration basins it was thought that these would suffer from the same limitations imposed by grade as those facing detention ponds and be at risk for clogging. Drainage fields were discounted for their complexity, susceptibility to clogging, and fragility. Exfiltration galleries and trenches were found to be robust, simple to install, and inexpensive. Exfiltration trenches have some advantages over exfiltration galleries in that they form their own pipe network and spread the zone of exfiltration over a wider area. Thus exfiltration trenches were deemed the most suitable form of exfiltration technology for the Campbell Heights area.

The performance of an exfiltration trench is a function of the interaction of a complex set of factors including:

- soil permeability (expressed as the coefficient of permeability, "K"),
- depth from the ground surface to the ground water table,
- trench geometry (width, length, effective water depth), and
- soil saturation conditions at the onset of a precipitation event.

The evaluations of trench performance used for the functional plan simplify this complex set of

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variables in a conservative manner. A more detailed assessment of trench performance is presently being conducted as a task under the preliminary servicing design for the Provincial Forestry Nursery lands.

An economic comparison was preformed between an exfiltration system and a hypothetical conventional, detention pond based drainage system for Campbell Heights. It was demonstrated that exfiltration systems provided a more cost-effective alternative as the need for large pipes and large excavations for detention ponds were eliminated. Therefore it is expected that the reduced costs for drainage infrastructure will be an attraction for potential developers.

As mentioned previously, the ground water table is close to the ground surface near 196 Street south of 32 Avenue. This condition is presently thought to extend for a radius of 1 kilometre through the Campbell Heights area. It is also known that the elevation of the ground water table varies in proportion to seasonal precipitation events. In this area there is not enough separation between the bottom of an exfiltration trench and the anticipated maximum ground water table to create an effective exfiltration zone. Therefore alternative forms of storm water management, such as detention ponds and remotely provided exfiltration zones will be required to service this area. The extent of the high ground water table is presently being assessed as part of the preliminary design work for the Provincial Forestry Nursery lands.

3.3 **Functional Plan**

The style of servicing best suited for a particular area within Campbell Heights is dependent on the location of the maximum anticipated ground water table In recognition of this limitation three styles of servicing have been devised for the Campbell Heights area. These are privately provided exfiltration areas, municipally provided exfiltration areas, and municipally provided detention areas. The functional plan is depicted in Figure 3.1.

The functional plan for exfiltration trenches includes local interconnection to the municipal trench system. Connection points to the municipal trench system will be provided at 200 metre intervals. The benefits of this arrangement are the provision of overflow outlets at appropriate locations and an increase in connectivity throughout the exfiltration system. The increased connectivity will allow water to flow freely and distribute throughout the exfiltration network. This will compensate for unforeseen, micro-localised, soil and high ground water table conditions not discovered during the design phase of the works. The interconnection will also help mitigate and identify partial system failures. Furthermore, the interconnection will allow for additional infiltration during less frequent storm events.

Developers in private exfiltration areas will be required to provide exfiltration facilities to reduce the 1 in 5 year design event postdevelopment peak flow to predevelopment levels. The

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developer provided exfiltration facilities must be connected at their terminal end to an appropriate connection point on the municipal system. This will help distribute water and will provide an overflow outlet at an appropriate location. Table 3.2 provides estimates of the length of exfiltration trench required for private exfiltration areas. The estimated trench lengths are for trenches 1.2 metres wide with a maximum operational water depth of 1.2 metres.

Table 3.2 Summary of Private Exfiltration Areas Trenching Requirements.

Area ID	Area (ha)	Total Estimated Trench Requirements (m)	Total Length of Municipal Trench (m)	Total Length of Developer Provided Trench (m)
A6000	66.2	2,790	400	2390
A5100	66.2	2790	430	2360
A5000 & A5200	114.5	4820	2620	2200
A4000	52.4	2030	915	1115
AllOO & A3000	65.0	2790	1120	1670
AIOOO	64.3	2790	920	1870
AllOOO	22.0	935	640	295

The exfiltration trenches will reduce runoff volumes significantly as they will provide a direct connection to the pervious soil layer thus increasing exfiltration volwnes. This will improve the calculated flood levels and reduce flood duration in the Nicomekllowlands in comparison to those calculated for the design of the Erickson Creek pumpstation. In addition it will reduce erosion and sediment transport in the lowland watercourses thus benefiting the aquatic habitat. Estimates of the calculated runoff volumes for the 1 in 5 year and 1 in 100 year design events are reported in Table 3.3.

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Table 3.3 Comparison of Estimated Runoff Volumes

Area ID	$V_{5\ Pre}$ (m^3)	Conventional $V_{5\ Post}$ (m^3)	Exfiltration $V_{5\ Post}$ (m^3)	$V_{100\ Pre}$ (m^3)	Conventional $V_{100\ Post}$ (m^3)	Exfiltration $V_{100\ Post}$ (m^3)
A6000	7700	26000	270	17000	40000	5700
A5100	7700	26000	270	17000	40000	5700
A5000 & A5200	13300	43000	560	29400	69000	9700
A4000	7800	21000	470	16000	32000	5800
A1100 & A3000	7700	25600	270	17000	40000	5700
A1000	7700	26000	270	17000	40000	5700
A11000	2560	8800	80	5700	13400	1900

In order to convey the runoff as estimated for the 1 in 100 year design event it will be necessary to establish the flood routing by lowering the grade of the roads. The estimated total volume of excavation is 60,000 m^3 In the area of the Provincial Forestry Lands there is no major flow path as the water presently soaks into the ground. In order to mimic the existing conditions and to prevent the major flow from overtopping the escarpment a municipal trench has been provided parallel to the top edge of the slope to capture the 1 in 100 year design flow. The terminal ends of this trench join the roadside municipal trenches along 32 and 40 Avenues. The cost of this trench have been included with the other municipal trench items.

Exfiltration systems are expected to improve water quality. As the majority of runoff will be exfiltrated to the ground the temperature of the water will be cooled to temperatures beneficial to the aquatic environment. The functional plan recommends that all roadways, parking lots, and hazardous materials handling areas be equipped with water quality devices. Modern water quality devices, designed to remove oil, grease, and sediment are also beneficial in removing metals as most of the metals are contained in an undissolved form. Further remediation of runoff will occur in the soil layer between the bottom of the exfiltration trench and the top of the maximum anticipated ground water table. In this zone bacteria naturally resident in the soil will break down oil and grease that may have passed the water quality device. Impacts to municipal water supplies in the areas in the neighbouring Township of Langley are thought to be safe from detrimental impacts as they are up gradient from the proposed exfiltration areas.

3.4 Order of Costs Estimate

The order of cost estimate is based on a quantities estimate obtained from schematic sketches of a functional layout. The quantities were then multiplied by unit prices obtained from previously tendered works for past construction projects and budget prices provided by local suppliers.

Based on the above methodology the order of costs were originally estimated to be $10.7-million dollars. However, based on the present uncertainties surrounding the design of exfiltration trenches and allowing for unforseen items a multiplier of 1.2 has been applied. Therefore the estimated order of costs for the drainage system detailed in this functional plan is $ 12.9-million. This figure compares favourably to the estimated $20.7-million for a conventional system. These estimates do not include land and right-of-way acquisition costs.

3.5 Design Guidelines for Developers

The control of silt generated during the construction of site works and buildings must be strictly enforced and monitored in order to protect the integrity of the exfiltration systems. Landscaping should be done in consideration of the location of exfiltration systems to prevent the intrusion of plant roots into the exfiltration network.

Minor Desip Storm Events (up to 1 in 5 vear return period)

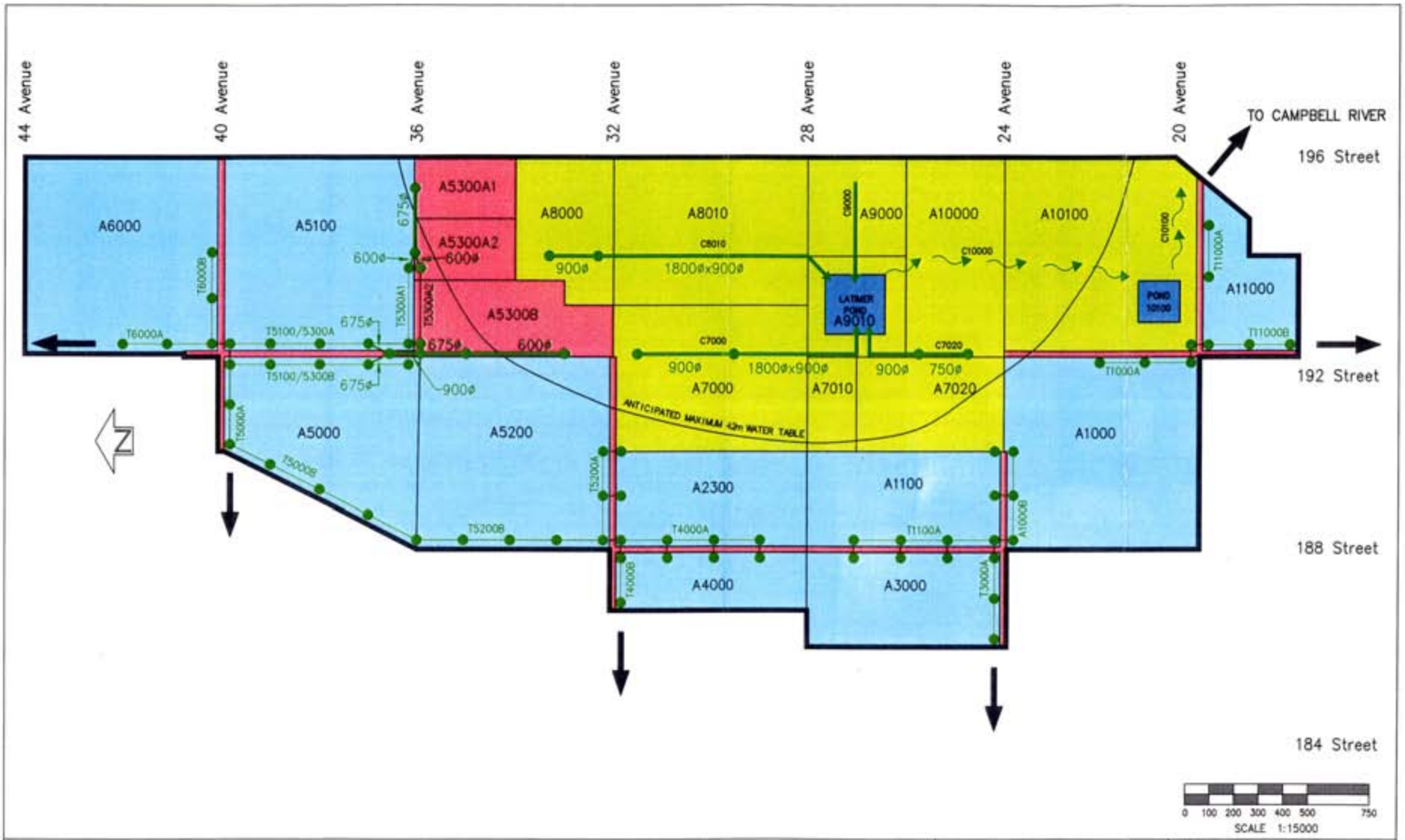
Consider the provision of roof top detention storage by limiting the size and placement of roof drains within the limits of the British Columbia Building Code.

Provide water quality devices for drainage originating from roadways, parking lots, and hazardous goods handling areas to intercept potential contaminants (oil/grease/sedimentJetc) prior to entering the exfiltration system.

In locations deemed, "Private Exfiltration Areas" site specific storm water management must be devised by the private developer such that runoff originating from buildings, road ways, parking lots, and open areas are exfiltrated to the soil such that the postdevelopment peak flow at the terminal end of the exfiltration trench is reduced to predevelopment levels. The terminal end of private exfiltration trenches is to be connected to the closest access point on the municipal exfiltration trench system.

Major Storm Flow

Lot grading to direct major flow to roadways. Internal roadways must be capable of containing the major flow. .



LEGEND:

- MAJOR FLOW ROUTES
- EXFILTRATION TRENCH
- STORM SEWER
- EXFILTRATION BY OWNER – NO CITY DRAINAGE SERVICING < 5 Yr.
- CONVENTIONAL DRAINAGE SERVICING BY CITY
- EXFILTRATION SERVICES BY CITY

CITY OF SURREY
14245-56 Avenue
Surrey, B.C., Canada V3X 3A2
TEL (604) 591-4011, FAX 591-4257

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TEL (604) 591-1315, FAX 591-9903

PROJECT: **Campbell Heights Final Report**

TITLE: **FIGURE 3.1 FUNCTIONAL PLAN**

4.0 LAND USE, DEVELOPMENT, AND DEMAND PROJECTIONS

4.1 Land Use Plan

Prompted by the interest of a semi-conductor manufacturer seeking a large parcel of land the City decided to establish a servicing plan for the Campbell Heights Industrial Area. The initial concept was to include two semi-conductor plants, each generally occupying one half-mile square block (64 hectares), with the remaining lands assumed to be used for industrial and business purposes.

A Proposed Land Use Concept Plan, Figure 4.1, was prepared by the Planning Department to reflect this concept. This plan provides for the necessary open space to cover the environmentally sensitive areas, both in terms of continuity and buffer strips. It also gives more detailed definition of the allowable industrial and business land uses.

4.2 Development Sequence

Past experience from development of a similar scale indicates that it usually takes several decades for an area of this size to reach completion and that the types of development would change following the ever-changing demand and trend. For the planning of municipal infrastructure services, it will be essential to consider both the ultimate requirements as well as the staged interim requirements. The ultimate requirements must ensure the sustainability of the development potential and are influenced by external and regional services to be examined herein. The staging of implementation has been devised to enable the demand for the immediately foreseeable future to be met while allowing for adjustments as demands and trends change over time.

To allow for a reasonable pace of development, a development sequence consisting of the following is suggested:

- 50% of the first semi-conductor plant to be immediately constructed and commissioned in two years, with the second half operational two years later,
- A lapse of two years between the completion of the first and the commencement of construction of the second semi-conductor plant, which will also be constructed in two stages and become fully operational over four years.
- Two industrial/business zoned land blocks to be started every six years, and requiring 14 years to complete at a linear rate of growth. The first two IB blocks commence in the year 2002.

The above development sequence will result in full development over 40 years. For the purpose

of this study and with the assumption that the semi-conductor plant on the Forestry Nursery land will lead the development, the remaining development is assumed to start generally from the north end of the study area and progress towards the south.

Figure 4.2 show the boundaries of the three phases for the Campbell Heights area development with the initial phase to be generally north of 3200 Avenue. Phase 2 of the development encompasses the area south of Phase 1 to 24 A venue excluding Stokes Pit. Phase 3 includes the remammg area.

4.3 Developable Area

The area of 64 hectares represents the gross area available within each half-mile square block. In establishing the net developable areas, the following non-developable components have been deducted:

. Road right-of-ways - by allowing for all designated road right-of-ways and appropriate mid block roads. No allowance for mid-block roads has been made for the semi-conductor plants.
.. Environmentally sensitive areas - as identified on the Land Use Concept Plan. . Storm water detention pond requirements - as initially identified under Section 3 of this report with such detention ponds to be considered as part of the open space requirements. • Open spaces and parks of 5% of the net block area. . Other institutional use such as utilities installations, transportation and servicing, security, medical, and day-care facilities at 5% of net block area.

Applying these components to the individual blocks, the net developable areas were established on block by block basis as given in Table 4.1. The average net developable area for the industriallbusiness zone is around 60% and those for the semi-conductor sites are 80%. These net developable areas are applied as the basis for the establishment of the necessary servicing.

4.4 Demand Projection Parameters

Based on the City of Surrey Design Criteria Manual, the specific demand projection parameters applied to this study were as follows:

Fire Flow

The fire flow requirement of250 1/s (21,600 m3/day) is applicable to the entire industrial area at the outset of the development (assumed to be year 2002).

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IndustriallBusiness Areas

. For the purpose of overall demand projection, the average value of 60% or 38.4 hectares for each 64-hectare block was assumed as the net developable area.
. 90 equivalent population per hectare of net developable area. This gives an equivalent population of 3,456 persons per block.
. Average water demand of 500 litres per equivalent population per day with no seasonal peaking expected for industrial demand.
. Average dry-day sanitary flow was assumed to be 500 litres per equivalent population per day. Together with an infiltration rate of 11,200 litres per net developable hectare per day. . 75% floor area ratio being the maximum allowable for IB zoning in the Surrey Zoning Bylaw No. 12000.
. For purpose of traffic generation projection and estimate of2,133 employees per block was assumed.

Semi-Conductor Plant Areas

The following assumptions and parameters are given by Jacobs Engineering Group, the functional design specialist for such plants, in their report prepared for the British Columbia Trade and Investment Ministry, revised version dated December 15, 1999:
. 24,000 m3/day water demand for each plant occupying a block
. An average sanitary flow of 20,400 m3/day per plant
. 75% floor area ratio to be applied to the net developable area
. 4,800 employees per semi-conductor plant. This gives 1,600 employees per shift with three shifts per day

4.5 **Demand Projection**

Using the assumptions and parameters described in this section, projections for water demand, sanitary flow, floor area, and employment are generated as per Table 4.2.

Wherever practicable, implementation of services should be carried out in phases. This will allow the timing and capacity of the latter phases requirements to be evaluated based on the usage and progress of the initial phase of development.

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TABLE 4.1 CAMPBELL HEIGHTS SERVICING STUDY

ESTIMATION OF DEVELOPABLE LAND -- June 9, 2000

BLOCK IOCATION	GROSS AREA	PERIMETER ROADS	INTERNAL ROADS	ENVIRO SENSITIVE	DETENTION POND	NET. AVAILABLE	OPEN SPACE 5%	INSTITU-TIONAL 5%	DEVEIOP-ABLE AREA	AS % OF GROSS
AA	31	1.68	2.40	3.92		23.30	1.16	1.16	20.97	67.0%
BB	64	3.04	4.80	18.43	3.50	34.24		1.71	32.52	50.8%
CC	64	3.92	3.20	16.50	7.00	33.38		1.67	31.71	49.5%
FF	64	3.92	3.20	25.55	6.25	25.08		1.25	23.83	37.2%
GG	24	1.37	0.80	4.20	1.40	16.23		0.81	15.42	64.2%
HH	64	4.14	4.80	3.20		51.86	2.59	2.59	46.67	12.9%
JJ	64	3.92	4.80	8.80		46.48	2.32	2.32	41.83	65.4%
LL	64	3.57	4.80	3.20		52.43	2.62	2.62	47.19	73.7%
MM	52	1.62	3.20	15.15	6.90	25.13		1.26	23.87	45.9%
NN	64	3.04	4.80	4.00		52.16	2.61	2.61	46.94	73.4%
pp	64	2.16	4.80	23.40	2.50	31.14		1.56	29.58	46.2%
TOTAL (liB)	619.3	32.4	41.6	126.345	27.55	391.423	11.31	19.57	360.54	58.2%
		5.2%	6.7%	20.4%	4.4%	63.2%	1.8%	3.2%		
DD (CHIP 2)	32	0.60		6.26	1.08	24.07		1.20	22.86	71.4%
EE (CHIP 2)	64	3.04		2.40		58.56		2.93	55.63	86.9%
KK (CHIP 1)	64	2.16		6.80	1.92	53.12		2.66	50.46	78.9%
TOTAL (CHIP)	160.00	5.80	0.00	15.46	3.00	135.75	0.00	6.79	128.96	80.6%
		3.6%	0.0%	9.7%	1.9%	84.8%	0.0%	4.2%		

No allowance for open space will be made for blocks with large environmentally sensitive areas

TABLE 4.2 CAMPBELL HEIGHTS SERVICING STUDY

DEMAND PROJECTION

WATER, SANITARY AND EMPLOYMENT

								Water	per block		Sanitary	per block		Employee	per block			
								I/B	1,728	cu.m./day	I/B	2,158	cu.m./day	I/B	2,133	persons		
								Semi-Cond.	24,000	cu.m./day	Semi-Cond.	20,400	cu.m./day	Semi-Cond.	1,600	persons		
								Fire Flow	21,600	cu.m./day								

Year	I/B Block 1st Group 2 Blocks	I/B Block 2nd Group 2 Blocks	I/B Block 3rd Group 2 Blocks	I/B Block 4th Group 2 Blocks	I/B Block 5th Group 2 Blocks	Total I/B Blocks No.	Semi-Cond Plant No.	Water I/B cu.m./day	Water Semi-Cond. cu.m./day	FireFlow cu.m./day	I/B + Semi-Cond cu.m./day	I/B + Semi + FireFlow cu.m./day	Sanitary I/B cu.m./day	Sanitary Semi-Cond cu.m./day	Sanitary I/B + Semi cu.m./day	Employee I/B Persons	Employee Semi-Cond Persons	Employee I/B + Semi Persons
2000						0	0.00	-	-	21,600	-	21,600	-	-	-	-	-	-
2002	Start					0	0.50	-	12,000	21,600	12,000	33,600	-	10,200	10,200	-	800	800
2004	0.29					0.29	1.00	494	24,000	21,600	24,494	46,094	617	20,400	21,017	609	1,600	2,209
2006	0.57					0.57	1.00	987	24,000	21,600	24,987	46,587	1,233	20,400	21,633	1,219	1,600	2,819
2008	0.86	Start				0.86	1.50	1,481	36,000	21,600	37,481	59,081	1,850	30,600	32,450	1,828	2,400	4,228
2010	1.14	0.29				1.43	2.00	2,469	48,000	21,600	50,469	72,069	3,083	40,800	43,883	3,047	3,200	6,247
2012	1.43	0.57				2.00	2.00	3,456	48,000	21,600	51,456	73,056	4,316	40,800	45,116	4,266	3,200	7,466
2014	1.71	0.86	Start			2.57	2.00	4,443	48,000	21,600	52,443	74,043	5,549	40,800	46,349	5,485	3,200	8,685
2016	2.00	1.14	0.29			3.43	2.00	5,925	48,000	21,600	53,925	75,525	7,399	40,800	48,199	7,313	3,200	10,513
2018	2.00	1.43	0.57			4.00	2.00	6,912	48,000	21,600	54,912	76,512	8,632	40,800	49,432	8,532	3,200	11,732
2020	2.00	1.71	0.86	Start		4.57	2.00	7,899	48,000	21,600	55,899	77,499	9,865	40,800	50,665	9,751	3,200	12,951
2022	2.00	2.00	1.14	0.29		5.43	2.00	9,381	48,000	21,600	57,381	78,981	11,715	40,800	52,515	11,579	3,200	14,779
2024	2.00	2.00	1.43	0.57		6.00	2.00	10,368	48,000	21,600	58,368	79,968	12,948	40,800	53,748	12,798	3,200	15,998
2026	2.00	2.00	1.71	0.86	Start	6.57	2.00	11,355	48,000	21,600	59,355	80,955	14,181	40,800	54,981	14,017	3,200	17,217
2028	2.00	2.00	2.00	1.14	0.29	7.43	2.00	12,837	48,000	21,600	60,837	82,437	16,031	40,800	56,831	15,845	3,200	19,045
2030	2.00	2.00	2.00	1.43	0.57	8.00	2.00	13,824	48,000	21,600	61,824	83,424	17,264	40,800	58,064	17,084	3,200	20,284
2032	2.00	2.00	2.00	1.71	0.86	8.57	2.00	14,811	48,000	21,600	62,811	84,411	18,497	40,800	59,297	18,283	3,200	21,483
2034	2.00	2.00	2.00	2.00	1.14	9.14	2.00	15,799	48,000	21,600	63,799	85,399	19,730	40,800	60,530	19,502	3,200	22,702
2036	2.00	2.00	2.00	2.00	1.43	9.43	2.00	16,293	48,000	21,600	64,293	85,893	20,347	40,800	61,147	20,111	3,200	23,311
2038	2.00	2.00	2.00	2.00	1.71	9.71	2.00	16,788	48,000	21,600	64,788	86,388	20,963	40,800	61,763	20,721	3,200	23,921
2040	2.00	2.00	2.00	2.00	2.00	10.00	2.00	17,280	48,000	21,600	65,280	86,880	21,580	40,800	62,380	21,330	3,200	24,530

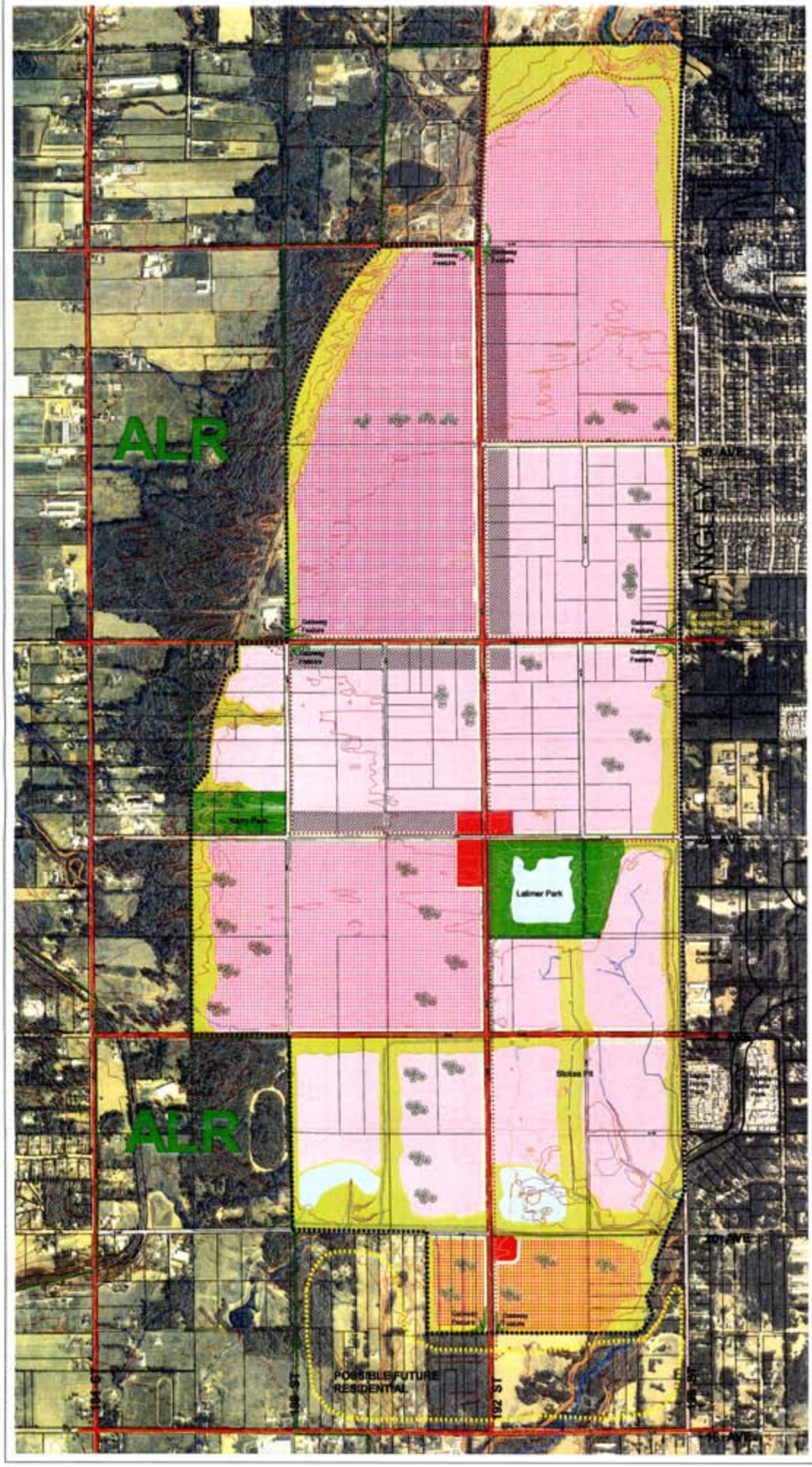
ALR
ALR
LANGLEY
32 AVE
30 AVE
28 AVE
Latimer Park
Stokes Pit
30A AVE
POSSIBLE FUTURE RESIDENTIAL
16 AVE
CAMPBELL HEIGHTS
LAND USE
CONCEPT PLAN
City of Surrey
Planning & Development Department
Campbell Heights Local Area Plan Review Boundary
Technology Park
Business Park
Technology Park or Business Park
Business Park (Office)
Commercial
Business Park or Live / Work in Cluster Housing Form
City Parks
Open Space Corridors / Buffers
Landscaping Strips
Stormwater Management Facilities
Multi-Use Trail (Walking, Cycling and Horseback Riding)
Walking and Cycling Pathways
Tree Preservation Opportunities
Arterial Roads
ALR Boundary
Creeks and Rivers
Contours 1m
Contours 5m
N
W
E
S
SURREY

FIGURE 4.1

TENTATIVE PHASING OF DEVELOPMENT

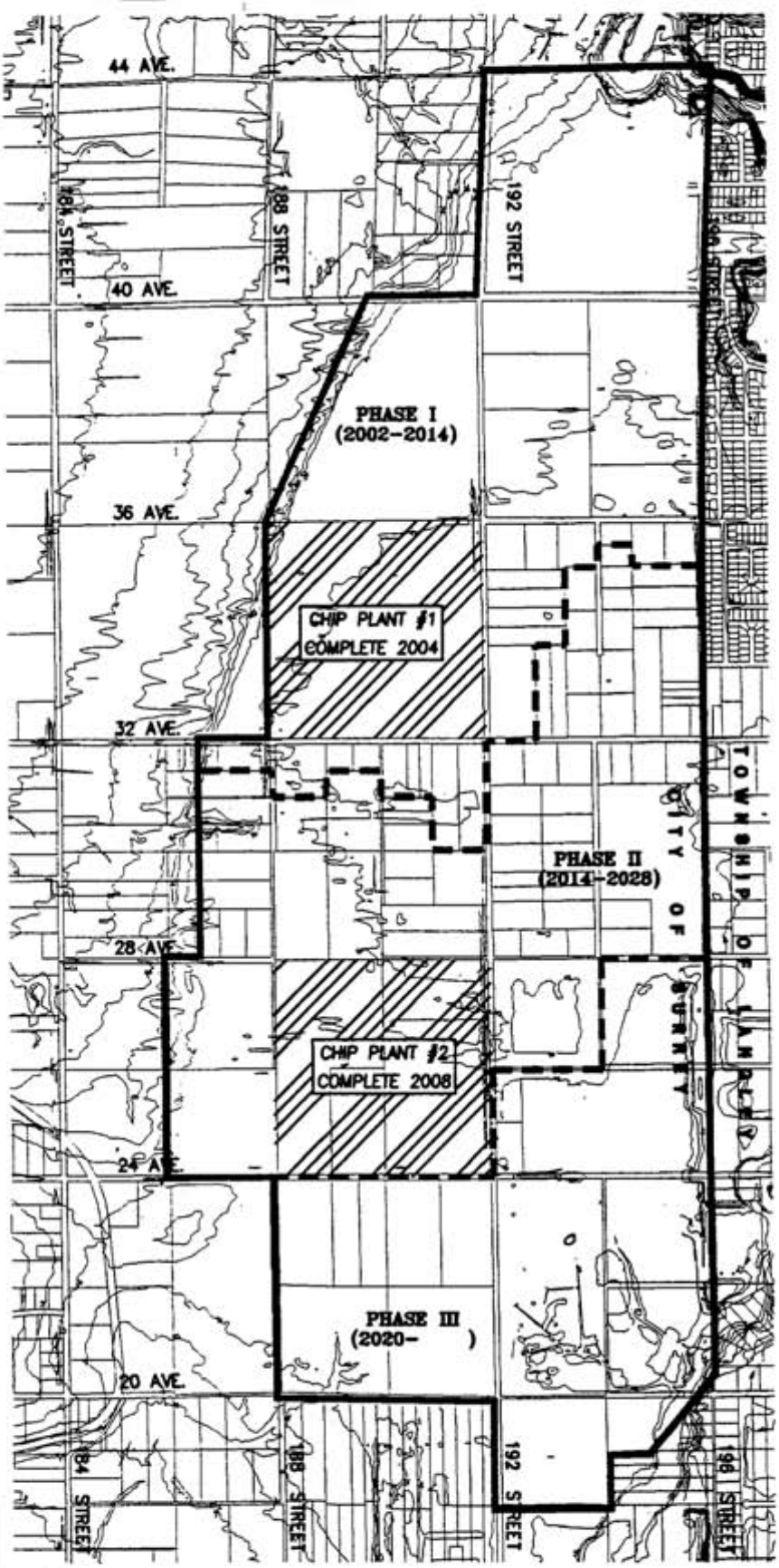

FIGURE 4.2

NEW EAST CONSULTING SERVICES LTD.
#288, 12899 - 76th AVENUE
Surrey, B.C., Canada V3W 1E6
TEL (604) 591-1915, FAX 591-9923
Email: neces@direct.ca

5.0 ROADS AND TRANSPORTATION

This component of the study was carried out to determine the lane requirements of all arterial and collector roads serving the Campbell Heights area. The transportation modelling was done by Ward Consulting Group Inc. Their complete report describing the analysis of the road network improvements, results, and recommendations is included as Appendix E of the Campbell Heights Servicing Study -- Technical Report.

5.1 Existing System Assessment

Campbell Heights presently has a network of two-lane rural cross-section roads designated as arterials and collectors. There are no signalized intersections. Three intersections have all-way stop control. The key regional roads that serve for trips to and from Campbell Heights include Highway 10/56 Avenue, Highway 15/176 Street, and Highway 99.

Within the study area the existing arterial roads are at less than one-half capacity for the present afternoon peak hour period. This estimate is based on a capacity of 800 vehicles per hour per lane. The primary deficiency in the existing road network is the lack of continuity of 40 Avenue between Highway 15 and 200 Street in Langley.

5.2 Future Traffic Background Conditions

Forecasts for future traffic demand were prepared using the current (February, 1999) version of Translink's regional transportation model. The base network for this study's model is identical to the GVRD's Transportation 2021 network. Included in this base network are a number of regional transportation improvements that have been proposed including a new crossing of the Fraser River between Langley and Maple Ridge, and extended rapid transit service from Surrey City Centre to Newton and Guildford. It was assumed that Highway 10 between King George Highway and 176 Street would remain as two lanes, and would be four lanes east of 176 Street.

The traffic projections for the Lower Mainland are largely based on the land use assumptions under the current version of the GVRD Growth Management Strategy. The overall employment and population totals for Surrey used for the traffic projections herein are consistent with the GVRD strategy.

Even without the proposed development of the Campbell Heights area there would still be improvements to the road network in the broader area that are required by 2021. Since these are required regardless of the proposed Campbell Heights development they should not be attributed

to the proposed development. These improvements were assumed to be in place when considering what additional improvements are required as a result of the development of the Campbell Heights area.

5.3 Future Traffic Projections

The road network in the study area was redefined to include all of the planned arterial roads to which some collector roads were added in the middle of the area. Some of the traffic projections include a toll road connector between Highways 1 and 99. The City indicated that this toll road connector would skirt the study area and end at 192 Street near Colebrook Road.

Full build out of the Campbell Heights area is expected to occur by the year 2040. At that time it is estimated that employment in the area will reach 24,000 jobs. For other areas in Surrey and the rest of the GVRD, there are no land use projections available for 2040. Similarly there is no plan for the 2040 road network. Thus, the 2040 traffic volume forecasts are based on the surrounding area 2021 network with only the Campbell Heights area using the 2040 conditions. As such, the results do not represent the true 2040 conditions, but give some indication as to traffic volumes that are likely to be encountered in the vicinity of the study area.

Future traffic projections were made for the following alternatives:

- Year 2021 a.m. peak hour without toll roads,
- Year 2040 a.m. peak hour without toll roads,
- Year 2040 a.m. with an east-west toll road, and
- Year 2040 a.m. with east-west and north-south toll roads.

5.3.1 *2021 Projected Volumes -No Toll Roads*

The model was run for the 2021 a.m. peak hour to determine the number of required lanes on each of the links and also to determine where signals would likely be required. Four lanes will be required on the following arterial roads under these conditions:

- 192 Street north of 24 Avenue to Highway 10,
- 184 Street north of 32 Avenue to Highway 10,
- 40 Avenue from Highway 15 to 184 Street,
- 32 Avenue from 200 Street to 184 Street,
- 24 Avenue from 200 Street to Highway 15, and
- 16 Avenue from 200 Street to Highway 15.

Signals will be required at the intersection of all arterial roads in the vicinity of the development. These intersections include:

. Colebrook Road at 192 Street,
. 40 Avenue at 184 Street, 192 Street, 200 Street, and Highway 15, .
32 Avenue at 184 Street, 192 Street, and 200 Street,
. 24 Avenue at 184 Street, 192 Street, and 200 Street, and
. 16 Avenue at 192 Street, and 200 Street.

5.3.2 *2040 Projected Volumes*

The Campbell Heights area is expected to be built out by the year 2040. At present there is no official regional model that projects traffic volumes to the year 2040. In order to gain some understanding of the final build out conditions the traffic model used in this study was run assuming year 2021 background conditions but year 2040 development conditions in Campbell Heights. The results of this modelling should be considered speculative at best.

The year 2040 projected traffic volumes were estimated considering the effect of providing toll roads outside the Campbell Heights area. The first modelling run considered no external toll roads. Under these conditions it was estimated that six lane would be required on 192 Street from 40 Avenue to Highway 10.

The second modelling run considered and east-west toll road connecting Highway 1 to Highway 99. Under these conditions it was estimated that eight lanes would be required on 192 Street north of 40 Avenue. In addition the intersection of 192 Street and 40 Avenue would require upgrades featuring double left turn lanes. Other improvements include the provision of six lanes for 192 Street between 32 and 40 Avenues and for 184 Street between 40 Avenue and Highway 10.

The third modelling run considered the provision of two toll roads. The routes for the toll roads were assumed to be parallel to Highway 10 generally along Colebrook Road and diagonal from the intersection of the two toll roads at 192 Street, diagonally to 168 Street and 8 Avenue. Under these conditions six lanes will be required for 192 Street north of 40 Avenue and four lanes will be required for 184 Street north of 40 Avenue.

5.4 Recommended Road Network

Based on the projections of future traffic generated by the development of the Campbell Heights

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industrial area, it is recommended that:

- 184 Street be constructed as a four lane road between 32 Avenue and Highway 10,
- 192 Street be constructed as a four lane road between 24 Avenue and Highway 10 with a right-of-way allowance for the possible future widening of 192 Street to a six lane facility at some time in the future, and
- In the east-west direction, 16 Avenue, 24 Avenue, 32 Avenue, and 40 Avenue should all be constructed as four lane roads through to the border with Langley at 196 Street.

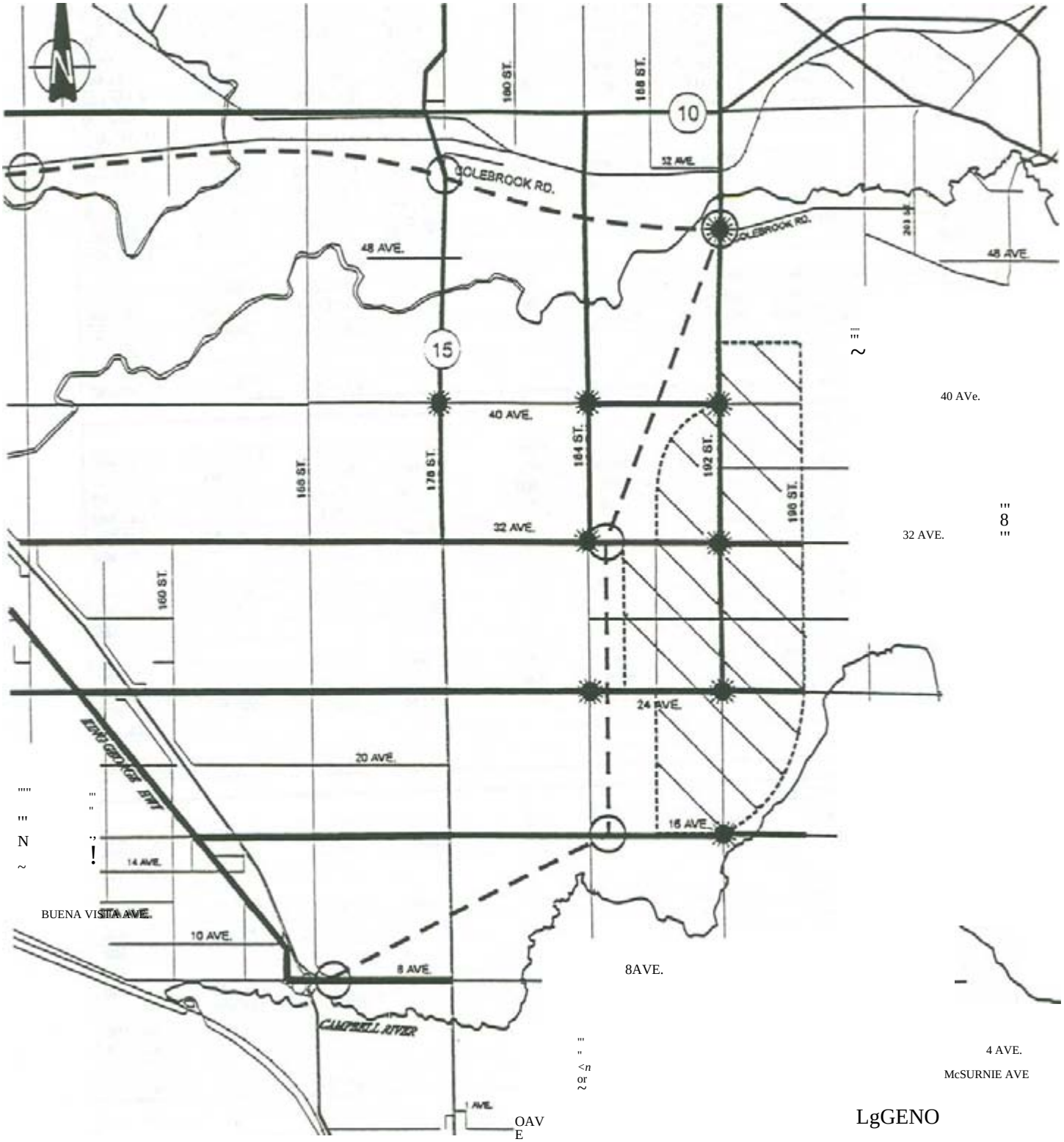
Figure 5.1 shows the recommended road network improvements resulting from the development of Campbell Heights, together with the base network improvements required for the broader area beyond Campbell Heights.

Servicing costs for the recommended road network improvements have been generated using current construction estimates. The costs have been grouped according to phase of development, road classification (arterial/collector), and location (whether within or outside the Campbell Heights area). These costs are presented in Table 5.1. The costs are provided by phase consistent with the assumptions detailed in Section 4 of this report.

Table 5.1 – Road Servicing Costs by Development Phase

ROAD SEGMENT	ROAD CLASS	LOCATION (Within/outside Campbell Heights)	ROAD WIDTH	LENGTH (m)	UNIT PRICE $/m	BASIC AMOUNT $	CONTING., O/H, Eng., GST = 40%	ITEM COST $
PHASE 1 : 2002 - 2014								
184 : 40 - 52	Arterial	Outside CH	4/5 lanes	2400	1,512	3,628,800	1,451,520	5,080,320
192 : 40 - 56	Arterial	Outside CH	4/5 lanes	3200	1,512	4,838,400	1,935,360	6,773,760
184 : 52 - 56	Arterial	Outside CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
32 : 184 - 188	Arterial	Outside CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
40 : 192 - 184	Arterial	Outside CH	4/5 lanes	1600	1,512	2,419,200	967,680	3,386,880
Traffic signals	Arterial	Outside CH		3	100,000	300,000	120,000	420,000
Subtotal								**19,047,840**
192 : 40 - 36	Arterial	Within CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
192 : 36 - 32	Arterial	Within CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
32 : 192 - 188	Arterial	Within CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
Traffic signals	Arterial	Within CH		2	100,000	200,000	80,000	280,000
Subtotal								**5,360,320**
40 : 192 - 19000	Major Collector	Within CH	2 lanes	400	840	336,000	134,400	470,400
36 : 196 - 192	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
40 : 19000 - 184	Major Collector	Within CH	2 lanes	1250	840	1,050,000	420,000	1,470,000
Subtotal								**2,881,200**
TOTAL PHASE 1						19,492,400	7,796,960	**27,289,360**
PHASE 2 : 2014 - 2028								
24 : 176 - 196	Arterial	Outside CH	4/5 lanes	4000	1,512	6,048,000	2,419,200	8,467,200
32 : 192 - 196	Arterial	Outside CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
184 : 32 - 40	Arterial	Outside CH	4/5 lanes	1600	1,512	2,419,200	967,680	3,386,880
192 : 28 - 24	Arterial	Outside CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
Traffic signal	Arterial	Outside CH		1	100,000	100,000	40,000	140,000
Subtotal								**15,380,960**
192 : 32 - 28	Arterial	Within CH	4/5 lanes	800	1,512	1,209,600	483,840	1,693,440
Traffic signals	Arterial	Within CH		1	100,000	100,000	40,000	140,000
Subtotal								**1,833,440**
188 : 32 - 28	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
28 : 196 - 192	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
28 : 192 - 188	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
Subtotal								**2,822,400**
TOTAL PHASE 2						14,312,000	5,724,800	**20,036,800**
PHASE 3 : 2020 - Completion								
16 : 176 - 196	Arterial	Outside CH	4/5 lanes	4000	1,512	6,048,000	2,419,200	8,467,200
Traffic signal	Arterial	Outside CH		1	100,000	100,000	40,000	140,000
Subtotal								**8,607,200**
192 : 24 - 20	Arterial	Within CH	2 lanes	800	840	672,000	268,800	940,800
Traffic signals	Arterial	Within CH		1	100,000	100,000	40,000	140,000
Subtotal								**1,080,800**
188 : 28 - 24	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
20 : 196 - 192	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
20 : 192 - 188	Major Collector	Within CH	2 lanes	800	840	672,000	268,800	940,800
Subtotal								**2,822,400**
TOTAL PHASE 3						8,936,000	3,574,400	**12,510,400**
TOTALS BY CATEGORY								
	Arterial	Outside CH						**43,036,000**
	Arterial	Within CH						**8,274,560**
	Major Collector	Within CH						**8,526,000**
GRAND TOTAL								**59,836,560**

FIGURE **5.1**
RECOMMENDED LANE AND SIGNAL REQUIREMENTS



LgGENO

SIGNALIZED INTERSECTION

4 LANE ROAD

TOll. ROADS - ROUTE TO BE DETERMINED BY~

0 INTERCHANGE ~

6.0 WATER SUPPLY

6.1 Overview on Availability of Water Supply from Source

The City of Surrey relies on the Greater Vancouver Water District (GVWD) for its municipal water supply. Using the Nicomekl River as a convenient geographical demarcation, areas of Surrey to its south are provided with water from the GVWD via two trunk mains crossing the Nicomekl River at around 144 Street and at 192 Street. The latter trunk main also supplies the Township of Langley from a branch at 36 Avenue.

The 1989 Surrey/GVWD Water Agreement outlines the responsibilities of both parties in the delivery of water to the south Surrey area including Campbell Heights. Under this agreement the GVWD provides 13.5 Mgd (61,400 m3/day) via the 144 Street main and 11.1 Mgd (50,500 m3/day) via the 192 Street main with the former being at maximum delivery capacity under current operating pressure.

The present (1999) peak day demand of South Surrey is 16.4 Mgd (74,600 m3/day). Therefore the currently available capacity is 8.2 Mgd (37,300 m3/day). Allowing for the planned demand growth in South Surrey, the remaining available capacity is enough for one full semi-conductor plant plus other likely initial industrial development. Under this scenario, increase to supply capacity from GVWD would be required between 2005 and 2010. A second semi-conductor plant would immediately trigger the need for additional supply. The GVWD estimates that an in-line booster pump station at a cost of$6 to $7-million would increase the supply by 7.5 Mgd (34,000 m3/day).

6.2 Local Major Installation

Under the agreement for supply from GVWD, water is available with no guarantee of pressure. In practice a certain level of pressure is available within the GVWD trunk system and often, particularly during winters, the available pressure is sufficient to maintain a direct supply to the local distribution system of the Campbell Heights area without pumping. However, in planning of the local water distribution system, it is essential that appropriate provisions be made to cover periods of low pressure from the GVWD sources.

For a development of this magnitude and particularly with semi-conductor manufacturing processes totally dependent on an uninterrupted supply of water, it is essential at the planning stage to fully establish the availability and the security of the water supply from source. A local reservoir and pump station would provide a predetermined level of supply security.

The projection of water demand for full development is at best a guideline based upon considerable assumptions and approximations. It would therefore be prudent to implement the installations in phases. In this respect, the reservoir and pump station should initially be built to 50% of ultimate requirements with provision for extension to full capacity. The initial phase of work will be sufficient to meet the full industrial demand and the fire flow to around 2007 or 2008. The pace of the initial phase of development will determine the timing for providing the remaining capacity.

6.3 Reservoir and Pump Station Capacities

To provide a reliable water supply at the extremity of the regional system, we recommend that a local storage reservoir with a capacity equal to the greater of 6 hours of fire flow or 6 hours of industrial demand, but not for both cumulatively. This recommendation is based on consideration of the required lead time for discovery, communication, and remedy of problems through source switching as well as the insufficiency of the existing supply trunk capacity to meet fire flow. It also provides some emergency storage at this extremity of the regional trunk water system.

It is recommended that the reliable capacity of the pump station be 200% of the industriallbusiness average draw off plus 100% of the semi-conductor plant draw off. The pump station capacity must also be at least equal to the required fire flow.

Based on the above strategy, the following interim and ultimate capacities corresponding to the projected demand are recommended for the proposed reservoir and pump station:

	Reservoir Capacity, lIB + Semi-Cond.	Pump Station Capacity, lIB + Semi-Cond.	Fire Flow	Suggested Configuration
Reservoir				
Ultimate	16,320 m.J		5,400 m.J	47m x 70m x 5m
Interim	8,160 m.J		5,400 m'	47m x 35m x 5m
Pump Station				
Ultimate		82,560 m.J/day	250 1/s	4 x 240 1/s + 1 SIB
Interim	-	41,280 m.J/day	250 1/s	2 x 240 1/s + 1 SIB

6.4 Major Installation, Land Requirements, and Layout

A reservoir and pump station of the ultimate recommended configuration will probably occupy a site of 80 metres by 100 metres. To avoid land acquisition costs it is suggested that this reservoir

and pump station facility be sited adjacent to the north-west corner of 192 Street and 32 Avenue within the Forestry Nursery land. Since this block has been assumed as the site for a semi-conductor plant, most of the reservoir structure could be underground leaving the roof available for landscaping or recreational uses.

6.5 Operations Strategy

Various modes of operation have been developed. The normal modes of operation should target at maintaining the required pressure in the distribution system with gravity supply from the GVWD systems. In the event of inadequate supply from or the unavailability of either GVWD sources, water will be drawn from the local reservoir via pumping to meet the deficit. It will also be necessary to operate a pump to draw a nominal quantity from the reservoir into the distribution system to ensure adequate turn over of the reservoir storage to prevent stagnation.

With the provision of two separate trunk feeds for electrical power and water supply for the semi-conductor plants, it could be concluded that the provision of standby generator is not necessary for the pump station. However, provision of standby generator should be considered for maintaining the requisite fire flow and reservoir/pump station/valves operation during power and water supply failure.

6.6 Grid Distribution System

In consideration of the particular demand pattern for the industrial zones, a design flow equal to the peak hour demand is appropriate. A network of distribution system will be implemented to provide alternative feed in the event of local problems. In addition, the proposed network should be able to provide fire flows at extremity locations so that a fire in one area would not adversely diminish the water available for industrial processes in other portions of the Campbell Heights area. The minimum size pipes for the network as modelled are shown in Figure 6.1.

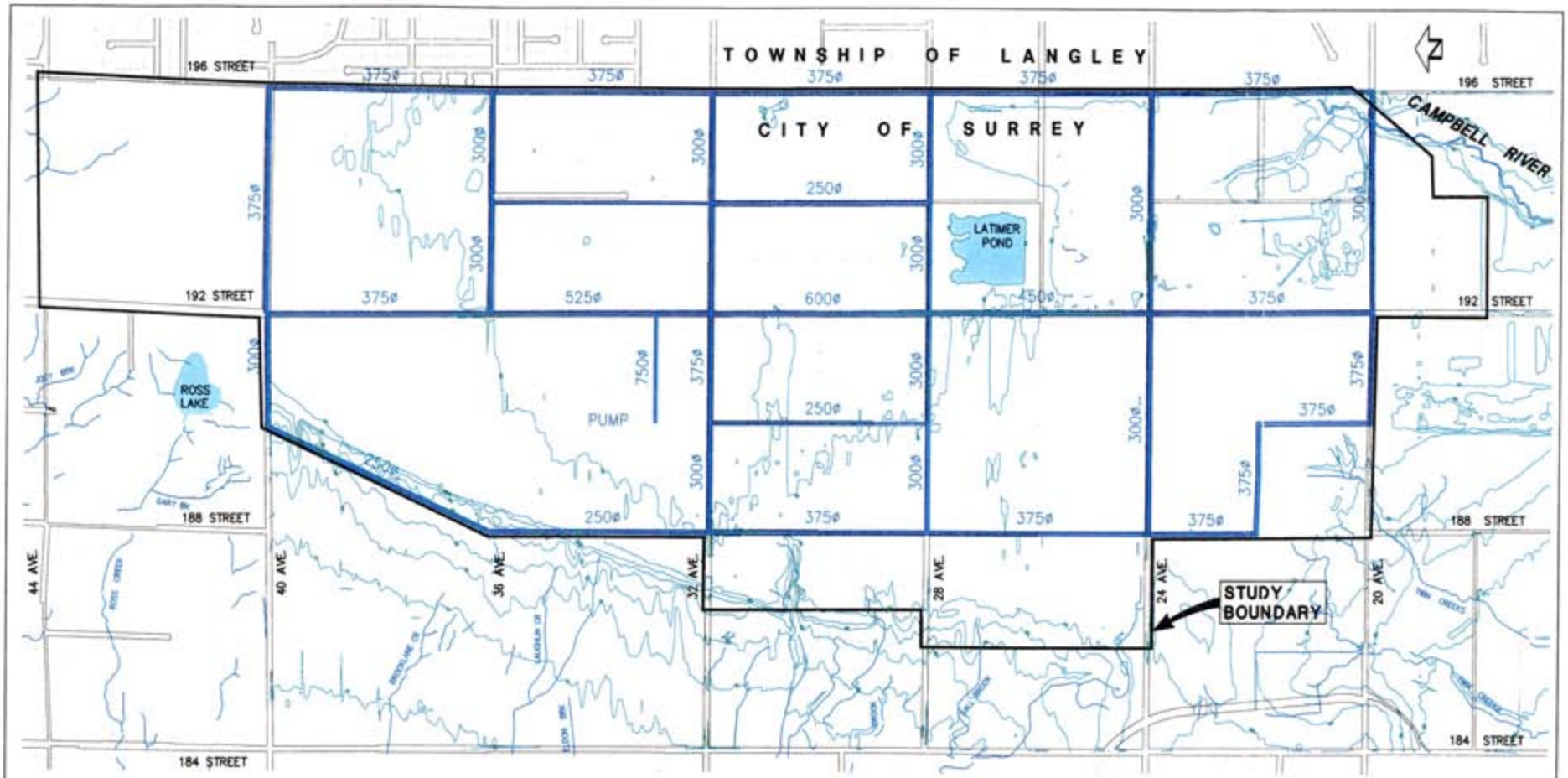
6.7 Order of Costs Estimates

The order of cost estimate for the grid water distribution system for the entire Campbell Heights area is $8.36 million at year 2000 price levels. The component costing details together with the phasing for implementation of the grid system are given in Table 6.1.

TABLE 6.1
WATER SERVICING COSTS BY DEVELOPMENT PHASE

GRID WATER DISTRIBUTION SYSTEM

LOCATION BY NODES	LOCATION BY ROADS	LENGTH	WATER	UNIT PRICE	BASIC AMOUNT	CONTING., O/H, Eng., GST	TOTAL ITEM COST
						40%	
PHASE 1 : 2002 - 2014							
16 - 15	192 : 40 - 36	800	375	277	221.600	88.640	310.240
15 - 14	192:36-32	800	525/675	500	400,000	160,000	560,000
9-7	196 : 40 - 36	800	375	277	221,600	88,640	310,240
7-5	196 : 36 - 32	800	375	277	221,600	88,640	310,240
17 - 8	190/188: 40 - 36	900	250	239	215,100	86,040	301,140
8-6	188 : 36 - 32	800	250	239	191,200	76,480	267,680
9 -16	40: 196 - 192	800	375	277	221,600	88,640	310,240
16 - 17	40 : 192 - 19000	400	300	266	106,400	42,560	148,960
7 -15	36: 196 - 192	800	300	266	212,800	85,120	297,920
5 -14	32: 196 - 192	800	300/375	272	217,600	87,040	304,640
14 - 6	32: 192 - 188	800	375/300	272	217,600	87,040	304,640
17 - B	40 : 19000 - 184	1250	-		-	-	-
	Total Phase 1						3,425,940
PHASE 2 : 2014 - 2028							
14 - 13	192: 32 - 28	800	600	527	421,600	168.640	590,240
5-3	196 : 32 - 28	800	375	277	221,600	88,640	310,240
6-4	188 : 32 - 28	800	375	277	221,600	88,640	310,240
3 -13	28: 196 - 192	800	300	266	212,800	85,120	297,920
13 -4	28 : 192 - 188	800	300	266	212,800	85,120	297,920
13 - 12	192 : 28 - 24	800	450	330	264,000	105,600	369,600
1 -12	24: 196 - 192	800	300	266	212,800	85,120	297,920
12 - 2	24 : 192 - 188	800	300	266	212,800	85,120	297,920
	Total Phase 2						2,772,000
PHASE 3 : 2020 - completion							
12 - 11	192 : 24 - 20	800	375	277	221,600	88,640	310,240
3 - 1	196 : 28 - 24	800	375	277	221,600	88,640	310,240
1 - 10	196 : 24 - 20	800	375	277	221,600	88,640	310,240
4-2	188 : 28 - 24	800	375	277	221,600	88,640	310,240
2 -20	188 : 24 - 20	800	375	277	221,600	88,640	310,240
10 - 11	20: 196 - 192	800	300	266	212,800	85,120	297,920
11 - 20	20: 192 - 188	800	375	277	221,600	88,640	310,240
	Total Phase 3						2,159,360
TOTAL ALL 3 PHASES							8,357,300



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CITY OF SURREY
14245-56 Avenue
Surrey, B.C., Canada V3X 3A2
TEL (604) 591-4011, FAX 591-4257

NEW EAST CONSULTING SERVICES LTD.
#286, 10899 - 76th AVENUE
Surrey, B.C., Canada V3W 1E6
TEL (604) 591-1915, FAX 591-9933
Email: neces@direct.ca

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FIGURE 6.1
WATERMAIN SCHEMATIC

7.0 SANITARY SEWER SYSTEM

7.1 System Overview

The Campbell Heights area is situated on a plateau standing above the lowlands to its west. The plateau continues into the Township of Langley. The area is generally flat with the ground sloping gently from east to west. In the north-south direction, the highest point is along the 192 Street spine is near 32 Avenue from which the ground slopes gently towards north and south. In general the grade of the ground is between 0.13% and 0.25% with the areas towards the perimeters slightly steeper.

The developed areas within the City of Surrey discharge their sewage into the Greater Vancouver Sewage and Drainage District (GVSDD) trunk systems which convey the sewage to the Annacis Island Treatment Works for treatment. Two options are available for conveying the sewage from the study area to the GVSDD trunk system:

Option 1 Discharge northward to the gravity section of the GVSDD Langley/ C10verdale trunk system along 52 Avenue near 184 Street. The trunk sewer could be quite deep if all flows were directed north by gravity.

Option 2 Discharge westward to Rosemary Heights and the future Grandview trunk. This route would require a new trunk with the attendant costs of obtaining right-of-ways and mitigation of disruptions on private properties. There is no planned timing for constructing this trunk.

GVRD advised that the projected discharge could only be accommodated through:

- advancing the future upgrading of trunk systems by up to 20 years with additional costs for one or two semi-conductor plants equivalent to $20 to $25 million net present value at 5% discounted rate, or
- holding discharge from the semi-conductor plants during storm events with 2 to 5 years return period or greater to account for the much increased base flows through infiltration over the GVSDD trunk catchments during such severe storm conditions. This will require local holding storage.

At this early preliminary stage, the requirement to provide on-site storage is a significant issue. In light of the apparently high preliminary demand estimate, there should be a significant incentive for industrial users to explore means for reducing the water demand and thus the waste water quantity. Options available for consideration include recycling, treatment of waste water to improve quality to meet criteria for occasional discharge into streams, or a cash contribution towards off-site storage.

7.2 Design Criteria for Trunk and Sub-Trunk Systems

Inconsideration of the City's design criteria and the specific demand pattern of the industries in the area, it is concluded that a peak flow of 1,000 litres/equivalent population/day would be appropriate for the design of the sanitary trunk and sub-trunk system. Pump station for sewage will also designed to cope with the peak flow.

7.3 Methods of Conveyance

Because of the large area of flat terrain to be serviced, the following alternatives methods for conveyancing the sewage flow were considered:

- Shallow gravity sewer with conventional construction,
- Shallow pressure sewer, or force main with pump station, and
- Deep gravity sewer involving trenchless technology.

To provide an initial overview, four alternative gravity routes for the trunk system to reach the GVSDD system were developed as shown on Figure 7.1. All four of these alternative routes assume that the area south of 20 A venue, because of the lower elevation, would be pumped to the trunk system. The flat terrain and the distance of conveyance require deep sewers for all four alternatives.

In common for these four alternative routes is a pr~ssure pipe to convey the sewage flow from the industrial area to the GVSDD gravity trunk sewer at 52 Avenue. For security and operational flexibility, a twin pipe system will be provided at shallow depth along 184 Street.

A hydraulic analysis was conducted for these to establish the sizes and grades of the component sewers. Based on this analysis order of cost estimates for the different routes were developed and summarised hereunder.

	Route #1	Route #2	Route #3A	Route #3B	Route #4
Trunks	$9.04M	$10.22M	$14.1IM	$13.44M	$7.67M
Sub-trunks	$3.32M	$3.11M	$3.32M	$3.32M	$4.15M
Pump station	$1.IOM	$1.10M	$1.lOM	$1.IOM	$1.lOM
Total	$13 .46M	$14.33M	$18.53M	$17.86M	$12.92M

With Route # 1 and Route #4 selected as the more favourable gravity sewer alternatives, the options of pumping the upstream parts of the catchment are further examined with a view of

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reducing the overall costs by avoiding the use of deep trenchless sewers.

7.4 Economic Comparison and Order of Costs

In order to fully compare the merits of routes #1 and #4, with or without pumping for the upstream catchments and each carrying its own schedule for the implementation, an economic comparison was made using the Discounted Cash Flow method. The principle of the discounted cash flow method is to establish the amount of money to be available at the beginning the project (the Present Value) which will allow the project expenditure to be applied as scheduled with the remaining money together with interest accrued to cover the remaining capital and operating expenditure of the project. The alternative which gives the least present value is the most economically viable project.

Applying a discount factor of3% per annum, the results of the economic comparison in terms of their present values are given below:

	Route #1 All Gravity	Route #1 with Pumping	Route #4 All Gravity	Route #4 with Pumping
	Deep sewer	Shallow sewer	Deep sewer	Shallow sewer
Relative Capital Cost	$6.17 M	$6.91 M	$6.23 M	$5.86 M
Capital Cost Present Value	$5.25 M	$5.70 M	$5.30 M	$4.76 M
Capitalised opeFating cost	$0.01 M	$0.44 M	$0.01 M	$0.03 M
Total Present Value	$5.26 M	$6.14 M	$5.31 M	$4.79 M
Economic Viability ranking	2	4	3	1

Other subjective factors to be considered include:

- Certainty on successful implementation,
- Sensitivity to costs variation,
- Flexibility in investment to reflect development momentum, and
- Operating and maintenance costs.

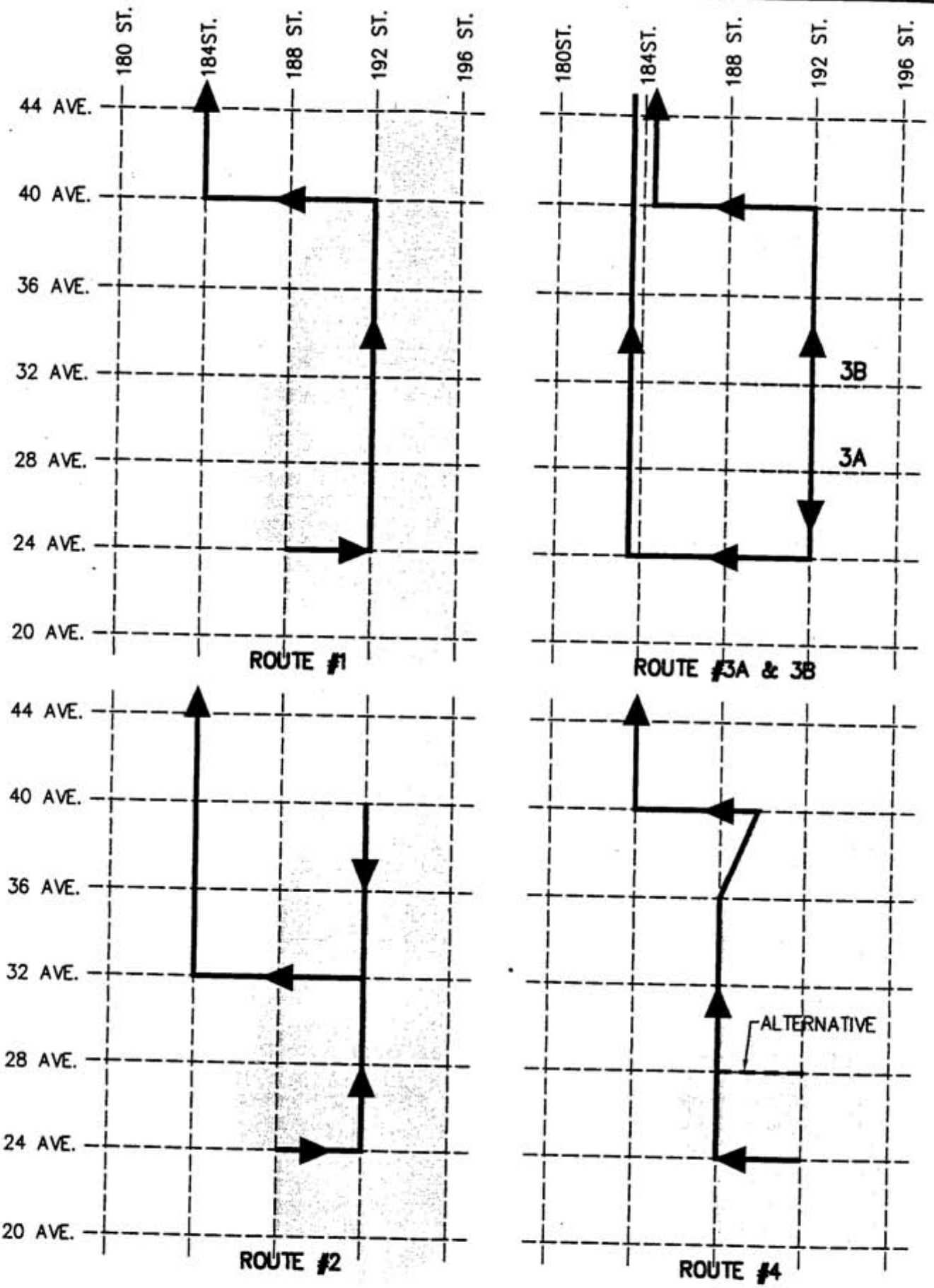
Taking into account of the economic viability and other subjective factors, it is concluded that Route #4 at shallow depth generally following the 188 Street alignment, together with pumping for catchments south of 28 Avenue (except for semi-conductor plant #2) would be the most viable option. Figure 7.2 gives the pipe sizes and grades for this alternative.

The order of cost estimate for the trunk and sub-trunk sanitary services for the entire Campbell Heights area is $13.2-million at year 2000 price levels. The component costing details together with the phasing for implementation of the sanitary sewer system are given in Table 7.1.

CAMPBELL HEIGHTS SANITARY SEWER SERVICES
ORDER OF COST ESTIMATE - ROUTE #4 WITH PUMPING

TABLE 7.1

Year	Component Locations by Street	Component Locations by Nodes	Length	Size/ Capacity	Unit	Unit Price	Basic (2002) Cost	Contingencies, Overheads, Engineering, GST = 40%	Total Item Cost
2002	Along escarpment : 32 Av - 36 Av	6 - 8, Shallow trunk	800	900	Metre	650	520,000	208,000	728,000
	Along escarpment : 36 Av - 40 Av	8 - 17, Shallow trunk	900	1,050	Metre	690	621,000	248,400	869,400
	32 Av : 19600 - 192 St.	5 - 14, Shallow Sub-trunk	800	375	Metre	350	280,000	112,000	392,000
	32 Av : 192 St - 188 St	14 - 6, Shallow Sub-trunk	800	450	Metre	436	348,800	139,520	488,320
	36 Av : 19600 - 192 St.	7 - 15, Shallow sub-trunk	800	375	Metre	350	280,000	112,000	392,000
	40 Av : 19050 - 184 St	17 - B, shallow twin pressure trunk	1,250	675 + 525	Metre	810	1,012,600	405,040	1,417,640
	184 St : 40 Av - 52 Av	B - C, shallow twin pressure trunk	2,400	675 + 525	Metre	812	1,949,100	779,640	2,728,740
	36 Av : 192 St - 18800	15 - 16, Shallow sub-trunk	800	450	Metre	436	348,800	139,520	488,320
		(in advance of requirement)							
2008	40 Av : 19600 - 192 St.	9 - 16, Shallow sub-trunk	800	375	Metre	350	280,000	112,000	392,000
	40 Av : 192 St - 19050	16 - 17, Shallow sub-trunk	400	525	Metre	458	183,200	73,280	256,480
2008	188 St : 28 Av - 32 Av	4 - 6, Shallow trunk	800	750	Metre	608	486,400	194,560	680,960
	28 Av ROW : 192 St - 188 St	13 - 4, Shallow trunk	800	600	Metre	500	400,000	160,000	560,000
	24 Av : 18800 - 192 St	2 - 12, Shallow sub-trunk	800	300	Metre	300	240,000	96,000	336,000
	192 St : 24 Av - 28 Av	12 - 13, Force main	800	450	Metre	436	348,800	139,520	488,320
		(in advance of requirement)							
2014	28 Av : 19600 - 192 St	3 - 13, Shallow sub-trunk	800	300	Metre	300	240,000	96,000	336,000
2020	192 St : 20 Av - 24 Av	11 - 12, Force main	800	450	Metre	436	348,800	139,520	488,320
	192 St : 24 Av - 20 Av	12 - 11, Shallow Sub-trunk	800	450	Metre	436	348,800	139,520	488,320
	24 Av ROW : 19600 - 192 St	1 - 12, Shallow sub-trunk	800	300	Metre	300	240,000	96,000	336,000
	20 Av/192 St pump station	PS-11A, Structure 50%	1.0	74	litre/sec	131,760	131,760	52,704	184,464
	20 Av/192 St pump station	PS-11A, Wet well 50%	1.0	270	cu.m.	158,460	158,460	63,384	221,844
	20 Av/192 St pump station	PS-11A, Mechanical 50%	1.0	74	litre/sec	193,720	193,720	77,488	271,208
	20 Av/192 St pump station	PS-11A, Electrical 50%	1.0	74	litre/sec	102,480	102,480	40,992	143,472
2026									
	20 Av/192 St pump station	PS-11A, Structure 50%	1.0	72	litre/sec	65,880	65,880	26,352	92,232
	20 Av/192 St pump station	PS-11A, Wet well 50%	1.0	260	cu.m.	158,460	158,460	63,384	221,844
	20 Av/192 St pump station	PS-11A, Mechanical 50%	1.0	72	litre/sec	96,860	96,860	38,744	135,604
	20 Av/192 St pump station	PS-11A, Electrical 50%	1.0	72	litre/sec	51,240	51,240	20,496	71,736
		TOTAL COSTS					9,435,160		13,209,224



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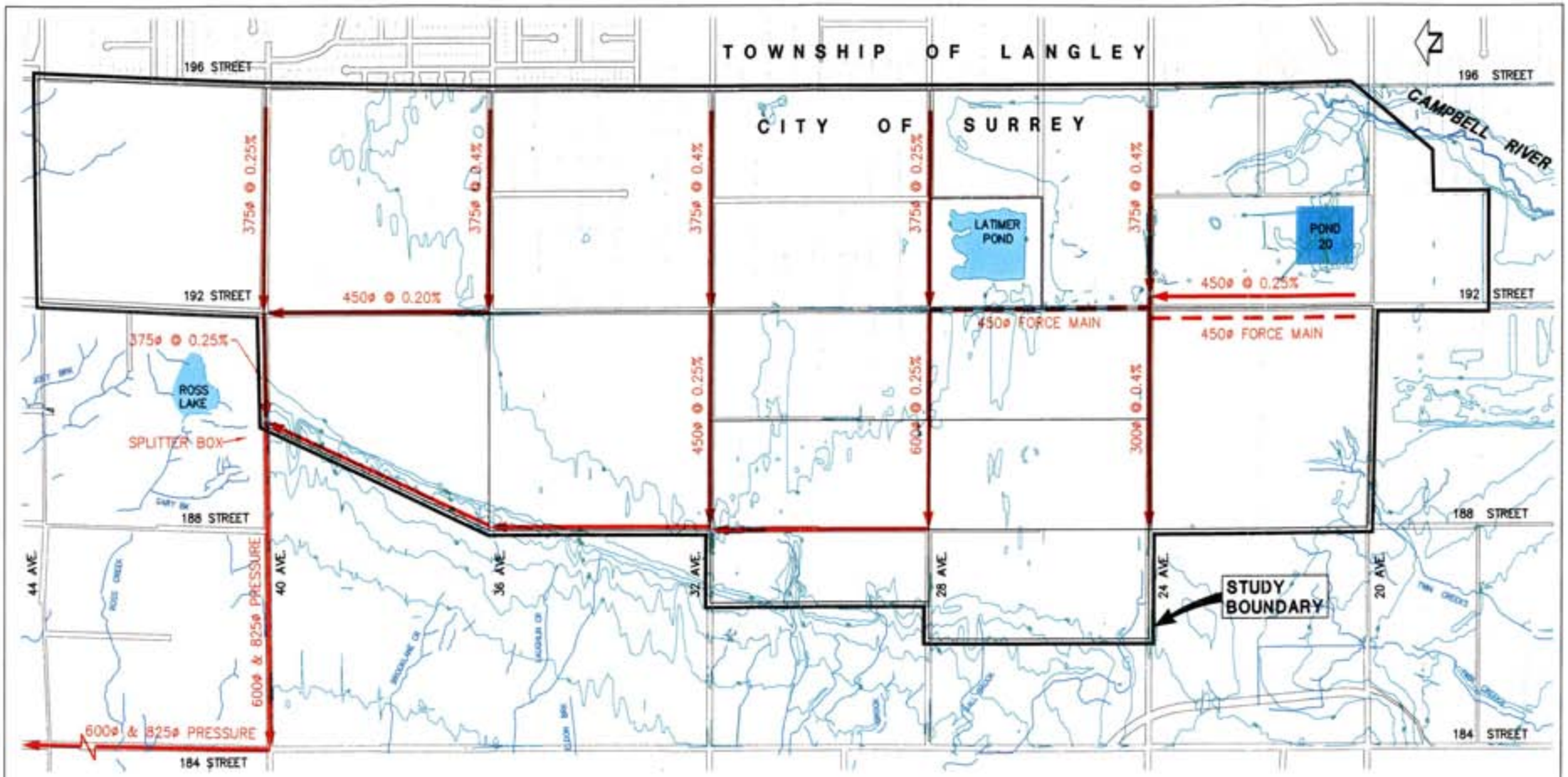

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CITY OF SURREY
14245-56 Avenue
Surrey, B.C., Canada V3X 3A2
TEL (604) 591-4011, FAX 591-4257

NEW EAST CONSULTING SERVICES LTD.
#206, 13899 - 76th AVENUE
Surrey, B.C., Canada V3W 1E6
TEL (604) 591-1915, FAX 591-9923
Email: nacs@direct.ca

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FIGURE 7.2
RECOMMENDED SYSTEM

8.0 NON-MUNICIPAL UTILITY SERVICES

The non-municipal utility services included in this study are electrical power, gas, telecommunication, data communication, and public transit. The capacity of the existing services and provision of new services for individual utilities are addressed in this section.

8.1 Electrical Power

Power Demand

The electrical supply criteria for a single semiconductor plant (full four F AB development) is 90 MW of non-interruptible power as described in the report *Semiconductor Site Assessment*, by Jacobs Engineering Group, December 15, 1999. The power demand for Business Park (IB) zoned areas, can be conservatively estimated as 75 kW per acre for industrial land use At the full development stage (Year 2040), the power demand for two semi-conductor plants and the remaining 365 hectares of industrial development would be 180 MW and 70 MW respectively. Therefore a total demand of approximately 250 MW will be required.

Power Transmission

The semi-conductor facilities require non-interruptible electrical power and therefore two transmission lines must be provided. The preferred transmission routes for the circuits are from McLellan Station then along 184 Street and 192 Street.

Two options for providing transmission power voltage were investigated: 69 kV pole lines located within the road right-of-way, or 230 kV transmission lines located in a dedicated right-of-way. The economic break point for using the more expensive 230kV lines is for demands of approximately 200 MW, provided that the demand is certain and required immediately. The 69 kV lines are the preferred choice for Campbell Heights because they cost less and provide more flexibility for development. A single 69 kV circuit can supply about 100 MW, and additional circuits can be added to the 69 kV lines to increase the capacity of the pole run to 300 MW.

BC Hydro has determined that two substations solely dedicated for the semi-conductor plant sites within the Campbell Heights area are required with a third substation for the remaining industrial properties. Each substations will require a land area footprint of approximately 0.5 ha. Land should be reserved for these substations.

Although the transmission lines will be overhead, the local distribution system will be underground and installation of cable ducting should be co-ordinated with BC Hydro for placement under all newly constructed road works.

Staein~ and Capital Costs

The conceptual plan to power the area will be staged according to the three proposed phases of development. The distribution feeder system will follow main roads to service the potential 'IB' lots. This feeder system would not include individual lot service.
The staged works and budgetary capital cost (accuracy of :%:30%) are described below.

Phase 1 (2002-2014):

230/60 kV facilities at McLellan Substation	$9.7M
Double circuit 69/25 kV transmission lines (184 St. and 192 St.)	$2.9M
69/25kV substation #1	$6.4M
Distribution feeder system @ $1.8M/IB	$7.2M
TOTAL	$26.2M

Phase 2 (2014-2028):

230/60 kV facilities at McLellan Substation.	$10M
Double circuit 69/25 kV transmission lines (184 St. and 192 St.)	$1.1M
69/25 kV substation #2 (for Chip plant #2)	$6.4M
BC Hydro 69/25 kV substation #3	$9.0M
Distribution feeder system @ $1.8M/IB	$6.3M
TOTAL $32.8M	

.*Thisfigure has a high degree of uncertainty resulting from the potential for other developments which may occur within the time frame.*

Phase 3 (2020-completion) would only require a distribution line system within the IB areas south of 28 Avenue. The budgetary capital cost is estimated to be:

Distribution feeder system @ $1.8M/IB	$4.5M
TOTAL $4.5M.	

Cost Sharin~

The above budgetary costs are not currently part of BC Hydro's capital infrastructure program and therefore would be passed on to the City/Developer. There are however, cost sharing opportunities which the City may pursue such as potential revenue allowances, negotiated concessions, or the *Power for Jobs,* special funding program.

8.2 Natural Gas Services

BC Gas was contacted regarding existing and planned future gas lines in the area. Since the natural gas requirements are highly dependent on the individual customer demands and the type of industry, BC Gas representatives were reluctant to speculate on the sizes and routing of pipes. Some of the existing gas services feeding the residential areas in Campbell Heights would require upgrading to 8 inch diameter to accommodate the increased demand. It is expected that no additional costs for gas services would be required from the Owner/Developer as BC Gas recovers installation costs from user rates.

8.3 Telecommunications

Currently, there are partial telephone services available from a Remote Servicing Unit (RSU) located in Langley at 200 Street and 24 Avenue. Future telephone communications servicing
will require additional fibre optic and copper lines from distribution centres both north and south of the Campbell Heights area. The nearest existing distribution centre, (referred to as Central Offices) in the north is located at Highway 10 and 176 Street. To the south of Campbell Heights development the White Rock Central Office is located at 16 A ve and 184 Street. The nearest fibre optic contact point is at the White Rock Central Office.
Telus planners have suggested that a total number of four Remote Servicing Units (RSU) may be required for the full development scenario. It is proposed the sites will be centred in the development area and all be located along the 192 Street corridor. The northern most sites would be installed for Phase 1 of the development and are located on 192 Street at 40 A ve and 36 Ave. Telus will recover their servicing costs through user rates.

The Phase 1 development will be serviced from two northern RSU's from the Cloverdale central office at Highway 10 and 176 Street. The lines will be positioned along Highway 10 for approximately 2.4 km to 192 Street thence south for 4 km along 192 Street. For the further phases of development (Year 2008 and beyond), the remaining 2 RSUs will be installed on 192 Street at 28 Avenue and 24 Avenue and connected from the White Rock central office in the south.

The underground ducting necessary for conveying the telecommunication lines will be 6 way ducting for all routes. Cable ducts will be clustered beneath the newly constructed pavement along all major streets within the area. Local lot services should also be underground. The civil installation costs for the main ducting infrastructure are typically borne by the developer or the City. Costs for a 6-way conduit cluster is estimated to be approximately $48/metre. The overall length for delivery from the central offices and distribution within the Campbell Heights area is 21 km and is estimated to cost $1-million.

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Total estimated costs within each phase are summarised below.

Phase	Civil-Ducting
Phase 1	$460,000
Phase 2	$310,000
Phase 3	$230,000
TOTAL	**$1,000,000**

8.4 **Data Communication**

A Rogers Cable TV representative was contacted for information on the requirement for cable servicing. For most newly developed areas, Rogers installs its cables within the same conduit clusters as Telus.

Rogers fibre optic lines are currently positioned near but not within the development area. Rogers future plans may include extending their fibre optic system within this area however this would be dependent on demand from potential customers. Co-axial cable will likely be placed to service the new facilities.

The existing Rogers cable system is a hybrid fibre optics and coaxial network. Four lines currently service the Campbell Heights area. The two way service lines are capable of digital boxes, and internet connection.

No additional capital outlay costs would be required from the City since the installation of civil ducting has already been accounted for and discussed in Section 8.3. There may be an opportunity for cost recovery of the civil ducting installation by leasing space within the 6-way conduit cluster (within the road right-of-way) to Rogers or other cable companies.

8.5 **Public Transit**

Currently no transit service operates in the south-east part of Surrey. The nearest transit service to the Campbell Heights area is the #320 bus service that operates between Langley City Centre and Surrey Central Sky Train via Highway 10, Highway 15, and Fraser Highway.

Translink considers the potential transit market to be low for the proposed industrial development in the Campbell Heights area. The low priority status is attributed to the anticipated high employee wages, dispersed residential locations of employees, and readily available low cost parking. These assumptions should be further established once the more

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detailed land use plan is available. Translink is currently preparing a five-year Strategic Transportation Plan and an Area Transit Service Plan for the south Fraser Valley. It is not anticipated that the plan will include new routes for the Campbell Heights area, however this will be confinned when these plans which become available in mid July 2000.

9.0 OVERALL DEVELOPMENT COSTS AND DCC RECOVERY

9.1 Overall Development Costs

The order of costs estimates for the provision of the major servicing components for the Campbell Heights Industrial area are presented in Table 9.1.

It should be noted that these order of costs estimates are generated through application of traditional prices over unit measures of the components without the support of preliminary design. Nevertheless, these estimates should be representative of the overall magnitude of investment and the likely apportionment of investment required to service the area over three approximately equal time phases. It also allows a general comparison with the likely Development Cost Charges that can be generated under the existing rates.

9.2 Non-Municipal Utilities

The proposed land use plan contemplates the development of two semi-conductor manufacturing plants. These facilities require a substantial amount of electric power. To meet the demand, the BC Hydro McLellan Substation must be upgraded and 69 kV transmission lines must be installed to deliver the required power to the Campbell Heights area. In addition, some system redundancy must be provided to minimise the potential for power interruption. The estimated cost to the developer of such an installation is $25-million.

When substation upgrades and transmission line extensions are not included in BC Hydro's planned capital works program, or when land development requires advancing planned capital works, the developer must provide a revenue guarantee in a form acceptable to BC Hydro or front the capital cost. These revenue guarantees are estimated to range between $2 to$1 7 - million and are dependant upon BC Hydro's planned upgrades at the time of the location of the two semi-conductor manufacturing plants. An assumed revenue guarantee of$17-million is included in the above mentioned $25-million installation cost.

In addition to the substation upgrade and transmission line extension a distribution system is required to service the IB blocks surrounding two semi-conductor manufacturing plants. The estimated upfront cost for the distribution system is $18-million which is borne by the developer. BC Hydro will calculate the associated net revenue as infill customers connect and will provide the developer with a rebate after 5 years. Therefore the initial installation cost can potentially be fully recovered if sufficient customer infill occurs within 5 years.

BC Gas will extend the gas services at its own cost to generate user revenue. For telecommunications utilities the developer must install a utility duct. The telecommunications

companies will supply their own facilities (cables, transformers, amplifiers, cross-connect boxes, switching, etc.) at their own cost. These will be recovered through user rate charges.

9.3 Development Cost Charges Recovery

The likely amount of recovery of servicing costs through Development Cost Charges collection is given in Table 9.2. These figures are provided as the overall amount for each phase and as the amount per hectare of developable land.

The amounts and percentages of recovery for individual components are extremely low except for storm water management. For most areas using exfiltration technology for storm water control, the property owners are expected to provide their own exfiltration system within their properties. It should be noted that private exfiltration systems would cost less than conventional private drainage system.

The overall cost of servicing is high because of the general lack of suitable servicing in or adjacent to the area and the high demand for water and waste water discharge from the semi-conductor manufacturing facilities. Such high servicing costs would probably be partly offset by the relatively lower land prices for unserviced land.

Since the situation for this development is unique, consideration should be given to the early development of a District Improvement Levy to equitably recover the servicing costs. This will also provide some economic basis for interested developers and assist with establishing equitable land pricing.

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Table 9.1 Campbell Heights Servicing Costs
On/Off Site Trunk Servicing - By Development Phases

PHASING	ART ROADS INCL STORM OUTSIDE C H	ART ROADS WITHIN C H	MAJOR COLLECTORS WITHIN C H	SANI SEWER WITHIN C H	SANI PRES-SURE PIPES OUTSIDE C H	WATER MAIN	RESERVOIR & PUMPSTATION	STORMWATER MANAGEMENT	SUB TOTAL BY PHASE (DCC SERVICES)	UTILITIES CIVIL	POWER SUPPLY* & DISTRIBUTION**	GRAND TOTAL BY PHASE
PHASE 1 : 2002 - 2014	21,816,000	5,360,000	2,881,000	4,007,000	4,146,000	3,426,000	6,500,000	5,383,000	53,519,000 -	899,000	11,000,000 * 7,200,000 **	72,618,000
PHASE 2 : 2014 - 2028	18,889,000	1,833,000	2,822,000	2,401,000		2,772,000		6,317,000	35,034,000 -	1,697,000	14,000,000 * 6,300,000 **	57,031,000
PHASE 3 : 2020 - completion	10,584,000	1,081,000	2,822,000	2,655,000		2,159,000		1,163,000	20,464,000 -	798,000	4,500,000 **	25,762,000
TOTAL BY CATEGORY	51,289,000	8,274,000	8,525,000	9,063,000	4,146,000	8,357,000	6,500,000	12,863,000	109,017,000	3,394,000	25,000,000 * 18,000,000 **	155,411,000

ALL ABOVE ESTIMATES DO NOT INCLUDE LAND AND RIGHT-OF-WAY ACQUISTION COSTS.
STORM MANAGEMENT ESTIMATES ARE APPLICABLE FOR AN EXFILTRATION BASED SYSTEM. A CONVENTIONAL SYSTEM IS ESTIMATED TO BE APPROXIMATELY $20.4 MILLION
* POWER SUPPLY COSTS INCLUDE REVENUE GUARANTEES OF $7M IN PHASE 1 AND $10M IN PHASE 2 AS EXPLAINED IN SECTION 8.
**DISTRIBUTION COSTS OF $18M ARE INCLUDED, HOWEVER MAY BE FULLY RECOVERED SHOULD SUFFICIENT INFILL DEVELOPMENT OCCUR.

Table 9.2 Campbell Heights DCC Collection

BLOCK LOCATION	DEVELOPABLE AREA (hectares)	ARTERIAL ROAD	COLLECTOR ROAD	STORM WATER MGT	SANITARY SEWER	WATER	TOTAL DCC COLLECTIBLE	SERVICING COSTS (DCC SERVICES)	SURPLUS (+) SHORTFALL (-) BY PHASE
Unit rate (Industrial) Per hectare		33,700	8,200	50,400	6,700	7,175	106,175		
PHASE 1 : 2002 - 2014	240.44	8,102,744	1,971,588	12,118,050	1,610,931	1,725,139	25,528,452	53,519,000	(27,990,548)
PHASE 2 : 2014 - 2028	98.82	3,330,234	810,324	4,980,528	662,094	709,034	10,492,214	35,370,000	(24,877,787)
PHASE 3 : 2020 - completion	139.85	4,712,777	1,146,729	7,048,188	936,962	1,003,388	14,848,043	20,128,000	(5,279,957)
TOTAL BY CATEGORY	479.10	16,145,754	3,928,641	24,146,766	3,209,987	3,437,560	50,868,708	109,017,000	(58,148,292)
SERVICING COSTS % RECOVERY		59,563,000 27%	8,525,000 46%	12,863,000 188%	13,209,000 24%	14,857,000 23%	109,017,000 47%		
SURPLUS (+) SHORTFALL (-) BY CATEGORY		(43,417,246)	(4,596,360)	11,283,766	(9,999,013)	(11,419,440)		(58,148,292)	

4. Council-in-Committee - December 11, 2000

It was

Moved *by* Councillor Watts Seconded *by* Councillor Higginbotham That the following motions from

Council-in-Committee be ratified.

RES.ROO-2959

Carried

Item No. COl7 Campbell Heights Industrial Area - Servicing Plan File: 2350-011

The General Manager, Engineering submitted a report to provide an overview *of* the engineering servicing and financial strategies for Campbell Heights.

The General Manager, Engineering was recommending approval *of* the recommendations outlined in his report.

It was

Moved *by* Councillor Hunt
Seconded by Councillor Watts
That Council approve the engineering, servicing plan and financial strategies as specified in the Campbell Heights Industrial Area - Servicing Plan Report as the means *of* managing engineering services for this Industrial Area.

RES.ROO-2960

Carried with Councillor Bose against.

Item No. COl8 Campbell Heights - Local Area Plan Review File: 2350-011

The General Manager, Planning and Development submitted a report:

1. To provide an overview *of* the CampbelI Heights Local Area Plan Review process, including a summary *of* the planning and public consultation process, and highlights *of* the Economic and Market Analysis;

2. To present the proposed Land Use Concept Plan and policies; and

3. To seek Council's approval *of* the proposed Campbell Heights Local Area Plan and implementation measures.

The General Manager, Planning and Development was recommending approval *of* the recommendations outlined in his report.

It was

Moved by Councillor Hunt
Seconded by Councillor Watts
That Council:

1. Approve the Local Area Plan for Campbel1 Heights, induding the Land Use Concept Plan, related policies and design guidelines as presented in

Appendix I as a means of managing development and the general provision of services, amenities and facilities in the area;

2. Amend the South-East Surrey Local Area Plan by replacing the part related to Campbell Heights with the Land Use Concept Plan and Policies contained in Appendix I;

3. Authorize staff to draft an amendment to Zoning By-law, 1993, No. 12000, as amended, to include an amenity contribution provision for the Camp bell Heights Plan Area;

4. Authorize staff to draft a new Technology Park Zone and bring forward for By-law Introduction the necessary amendments to the Zoning By-law and other City By-laws in conjunction with the rezoning of the Provincial or other lands to the new zone; and

5. Authorize staff of the Economic Development Office to follow up on the recommendations of the CampbelI Heights Economic and Market Analysis, and bring forward a report on the development and launching of a marketing program for Campbell Heights.

RES.ROO-2961

Carried with Councillor Bose against.