ROSEMARY HEIGHTS WEST

NEIGHBOURHOOD CONCEPT PLAN

FINAL REPORT

CITY OF SURREY

PLANNING & DEVELOPMENT DEPARTMENT

SURREY
CITY OF PARKS

July 1997

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ROSEMARY HEIGHTS WEST NEIGHBOURHOOD CONCEPT PLAN

This Neighbourhood Concept plan (NCP) was prepared by IBI Group for the City of Surrey and the property owners of Rosemary Heights.

APPENDIX I

SURREY
CITY OF PARKS

ROSEMARY HEIGHTS WEST NEIGHBOURHOOD

STAGE II NEIGHBOURHOOD CONCEPT PLAN

IBI
GROUP

AMENDMENTS TO ROSEMARY HEIGHTS WEST NEIGHBOURHOOD CONCEPT PLAN (NCP)

CORPORATE REPORT #	FILE #	COUNCIL APPROVAL DATE	APPROVED AMENDMENT
R1692	2350-007/1	11/16/98	Realignment of 34 Ave. to facilitate construction of South Surrey Interchange access ramp

ROSEMARY HEIGHTS WEST NEIGHBOURHOOD

The Rosemary Heights West Neighbourhood is located in southwest Surrey and is comprised of approximately 124 acres. The area is bounded by Highway 99 to the west, the Nicomekl River to the north, proposed 32 Avenue extension on the south and 152 Street on the east; it is bisected by Barbara Creek ravine and it is currently accessed by 152 Street and Croydon Drive.

NEIGHBOURHOOD CONCEPT PLAN

The primary land use will be residential, comprising of adult oriented low and medium density housing. The residential component could comprise a maximum of 433 cluster dwelling units, 132 street oriented townhomes, 322 garden apartments and 210 mid-rise apartment units. Generally, the low density will be located adjacent to Barbara Creek, while the higher density garden apartments and mid-rise apartments will be all adjacent to 152 Street. At full build-out, the neighbourhood is expected to generate approximately 1096 dwelling units and a total population of 2,769 residents. Amenity contributions are estimated to be $575.00 per dwelling. The projected total amenity contributions for the area are approximately $630,200.

In addition, a small commercial area of 0.4 acres is identified on each side of 151 Street between 33 Avenue and 34 Avenue.

Approximately 45% of the land area will be retained as open space.

SERVICES

Roads

Road access to the development will be via a minor collector on 34 Avenue and 150 Street, connecting to 152 Street, where signalization and turn lanes will be provided.

A secondary access will be provided on 33 Avenue, which will intersect 152 Street with a right-in/right-out intersection, restricted because of the close proximity to 32 Avenue. A Development Variance Permit will be required for a cul de sac which exceeds the bylaw maximum length.

Furthermore, the construction of the South Surrey interchange will necessitate the relocation of the south end of Croydon Drive either into 32 Avenue or via 33 or 34 Avenues. The City will be responsible for providing an alternative access for Croydon.

Water Network

The 10 Year Servicing Plan for the City of Surrey identifies a trunk water main on 36 Avenue from 148 Street to 152 Street, 40% of which is to be funded through DCCs.

It is proposed that this water main be located in 150 Street and 34 Avenue, and be a 250mm water main, connecting 148 Street and 152 Street. For the initial phase of development, this water main may be extended from either 148 Street to 36 Avenue and to 150 Street, or from 152 Street to 34 Avenue and 150 Street. It is proposed that this water main be considered as part of the grid system and be added to the 10 Year Water Servicing Plan, thus qualifying for DCC credits.

In a subsequent phase when the mid-rise apartment development proceeds, the water main along 152 Street between 32 Avenue and 28 Avenue will need to be upgraded to 350 mm. It is recommended that this work **be added to the 10 Year Servicing Plan, such that it may** qualify for DCC credits.

Sanitary Services

The 10 Year Servicing Plan identifies a lift station and forcemain to serve most of the Rosemary Heights area. The first phase has been built in conjunction with the Morgan Creek development.

The portion of the neighbourhood east of Barbara Creek will be serviced to this existing lift station by gravity.

The permanent sanitary servicing system for the west portion of the neighbourhood is to be a gravity sewer located along 36 Avenue, from 150 Street, west across Highway 99 to Winter Crescent, through the golf course and to an existing trunk sewer in King George Highway. It is proposed that this system be added to the 10 Year Servicing Plan, thus qualifying for DCC credits.

Because it may be difficult to secure rights-of-way through the private golf course lands and because the costs of the permanent system are significant, an interim siphon system is proposed for a portion of the off-site system, along 36 Avenue and Winter Crescent to King George Highway, with the siphon costs borne by the developer. The extent of the permanent system to be constructed in the first phase will depend on the size of the first phase of development and the DCC's available.

Storm Services

The 10 Year Servicing Plan includes the construction of a storm water detention pond in the vicinity of 150 Street and 34 Avenue and erosion protection along Barbara Creek.

The Master Drainage Plan recently commissioned by the City revised the storm servicing concept to replace the pond with a 1350 mm trunk sewer along 150 Street to service the lands south of Highway 99, discharging to Nicomekl River. This storm trunk will also service the proposed South Surrey interchange, and will be constructed by the City.

Four separate catchment systems are proposed for the area, but none of these exceed 20 hectares and none qualify for DCC rebates. The portion of the 1350 mm trunk sewer within the NCP area would need to be upgraded to 1500 mm to accommodate the proposed development.

Funding

A cash flow analysis of the construction costs and DCC revenues has been prepared and is included in this report. It is noted that the DCC revenues significantly exceed DCC expenditures for all accounts at full development. However, in order to avoid significant overexpenditures in the sanitary account, the first phase of development may proceed on the basis of an interim siphon sanitary service, to be eventually upgraded to the permanent gravity system. The estimated deficiency in the sanitary DCC account is in the first year, approximately $135,000, declining to zero by 2000. The other accounts are surplus

throughout all years, except the water DCC account which is deficient by $60,000 in the year 2000, which amount will need to be borne by the private developers.

TABLE OF CONTENTS

EXHIBITS, TABLES AND APPENDICES

1.0 INTRODUCTION

This Neighbourhood Concept Plan (NCP) report has been prepared by IBI Group on behalf of the Rosemary Heights West Neighbourhood landowners. Direction to the consultant has been given by the Rosemary Heights West Neighbourhood Steering Committee.

As shown in Exhibit 1, the Rosemary Heights West Neighbourhood is located in southeast Surrey, and comprises approximately 124 acres. The area is bounded by Highway 99 to the west, the Nicomekl River to the north, the proposed 32 Avenue diversion to the south and 152 Street to the east. The NCP area is bisected by the Barbara Creek ravine which extends northward into the Nicomekl River. The plan area is accessible via 152 Street and Croydon Drive. The proposed South Surrey Interchange and 32 Avenue diversion will provide access directly from Highway 99. The BC Hydro transmission corridor is included in the plan area, occupying approximately 21 acres.

The NCP for the Rosemary Heights West Neighbourhood has been carried out in two stages: Stage 1 defined land uses, road networks and servicing approaches, and was approved by Surrey Council on December 19, 1995. Stage 2 addresses engineering and servicing cost issues in greater detail. This report briefly summarizes the Stage 1 information and provides the Stage 2 results in a single document, representing the complete NCP for the neighbourhood.

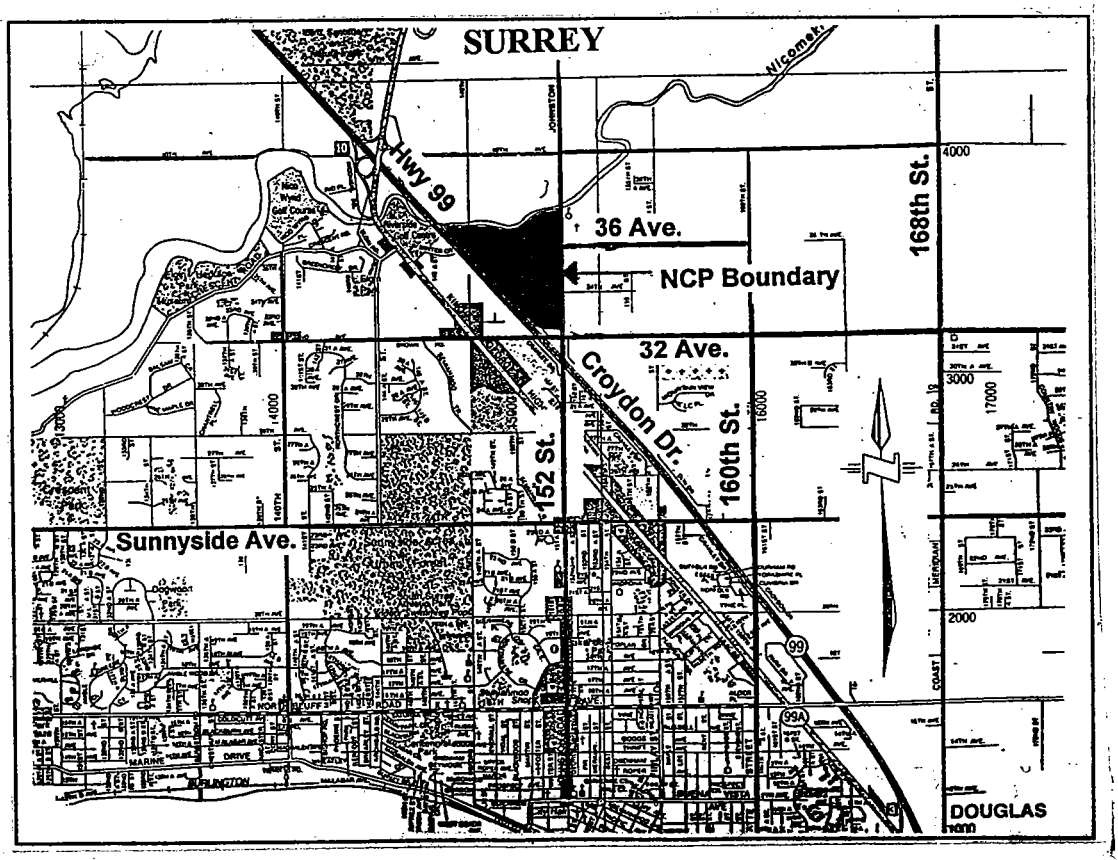
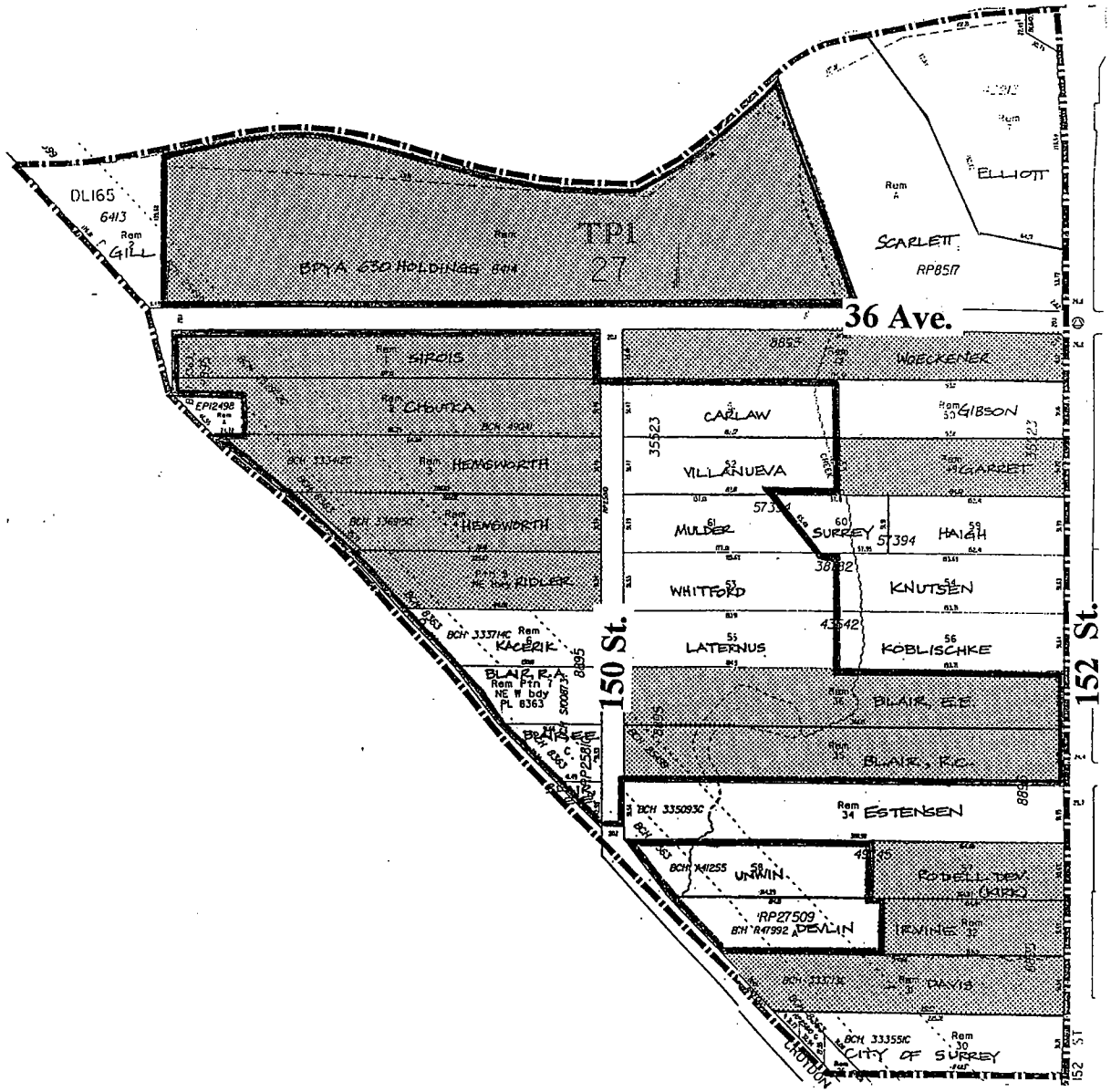


Exhibit 1: Local Setting and Access (not to scale)



LEGEND

Contributing Property Owners

IBI GROUP

Rosemary Heights, West Neighbourhood

Land Ownership

Exhibit 2

SCALE: N.T.S.

DATE: NOV., 1995

2.0 DEVELOPMENT CONTEXT

2.1 EXISTING LAND USES

The NCP area is comprised of a number of large acre lots as shown in Exhibit 2. Most contain single-family residential dwellings. A plant nursery is located on 152 Street, north of 34 Avenue. There is an existing 1.3 acre pond east of 150 Street and a significant environmental feature - the Barbara Creek ravine, which is located in the east central portion of the neighbourhood. The area is served by the existing 150 Street rural road and Croydon Drive.

2.2 LAND OWNERSHIP

Land ownerships as well as contributing land owners are shown in Exhibit 2.

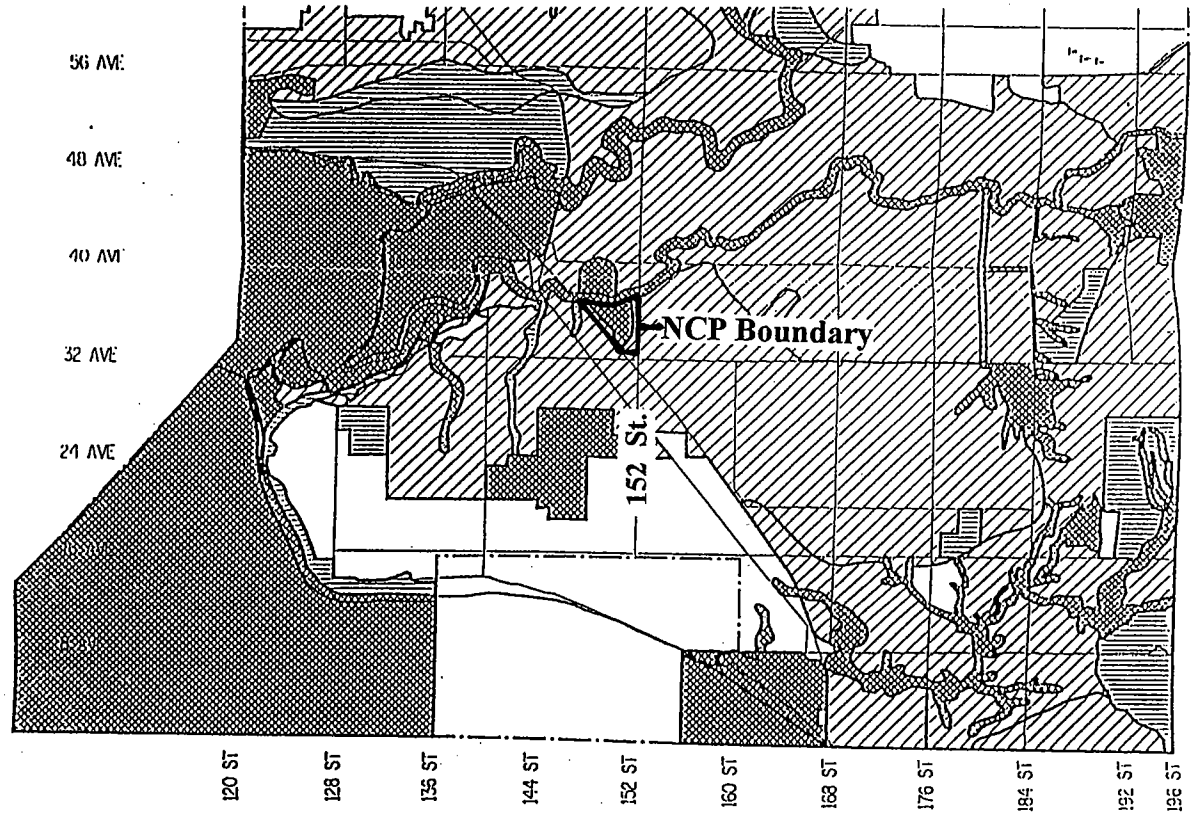
With the exception of the lands north of 36 Avenue, the lots range in size from 1 to 9 acres, with the majority of lots in the 1 to 5 acre range. The NCP procedure requires the endorsement of over 50% of area landowners, holding 70% or more of the land area. It is confirmed that 82% of present landowners, representing 86% of the land area, are participating in the NCP process.

2.3 NATURAL FEATURES

Because the plan area is intersected by Barbara Creek, which flows northward into the Nicomekl River and has significant forest areas, the majority of the land mass in the area has been rated by the City of Surrey as a Highly Sensitive Area (Exhibit 3). A Preliminary Environmental Assessment and inventory of the area's natural features was undertaken by Scott Resources in March, 1995. Findings and recommendations have been reflected in this report. The Preliminary Environmental Assessment, together with correspondence dated September 5, 1996, which confirms that the plan conforms to Federal/Provincial guidelines, are presented in Appendix A.

A Top of Bank Survey was carried out by Soukop Land Surveying during June, 1995. The survey was undertaken to determine the Top of Bank of the Barbara Creek, the ephemeral creek, future 34 Avenue, the pond and the Nicomekl River. Elevations were determined along the Top of Bank lines. The survey also defined the 2.8 metre geodetic or 200 year flood line for the Nicomekl. The top of bank line of the lands north of 36 Avenue and adjacent to the Nicomekl River was reviewed in the field with MOE/DFO staff and the setbacks were confirmed. The results of these surveys are shown on Exhibit 4 and have been used in the preparation of this report.

Supplemental investigations of the area west of the Barbara Creek and north of 36 Avenue were carried out in August 1996 by consultants, in order to confirm the location of a minor drainage ravine to the west of Barbara Creek.



E.S.A. Categories

- High
- Medium
- Low

LEGEND

- Study Area Boundary

ENVIRONMENTALLY SENSITIVE AREAS
District of Surrey, B.C.

This map is not a designation or zoning map. It is a general indicator of relative importance and sensitivity based on an environmental overview of the municipality.

IBI GROUP

Rosemary Heights, West Neighbourhood

Environmentally Sensitive Areas

Exhibit 3

SCALE: N.T.S.

DATE: NOV., 1995

Topographical information based on existing mapping provided by the City of Surrey is also shown in Exhibit 4. This information is preliminary and should be confirmed in the field at time of rezoning and/or subdivision.

Barbara Creek originates within a series of roadside drainage ditches south of Highway 99, flows north through several storm water culverts, and becomes a well-defined ravine north of 34 Avenue, to its confluence with the Nicomekl River.

The lands north of 36 Avenue (approximately 34 gross acres) rise out of the river to a flat, dyked floodplain, up to a steep slope offering views to the north. The deep ravine system of Barbara Creek cuts through the lands and down to the river, approximately 200 metres west of 152 Street.

The lands west of the ravine have a northward sloping topography with a high point in the Hydro Corridor, adjacent to Highway 99. A man-made dam has entrained Barbara Creek into a pond, located just west of the ravine at approximately 34 Avenue. The lands are gently sloping in the vicinity of the pond. Upstream of the pond, the watercourse flows through the B.C. Hydro Corridor to culverts that enclose the creek under Croydon Drive and Highway 99.

The lands east of Barbara Creek also slope down to the north. A small ephemeral tributary is located in this area and joins Barbara Creek approximately 570 metres upstream of its confluence with the Nicomekl River.

The superficial geology of the area is classified as Salish sediment along the Nicomekl River foreshore and Capilano sediment in the upland area. The Preliminary Environmental Assessment provides a detailed analysis of the distinct soil units within the plan area.

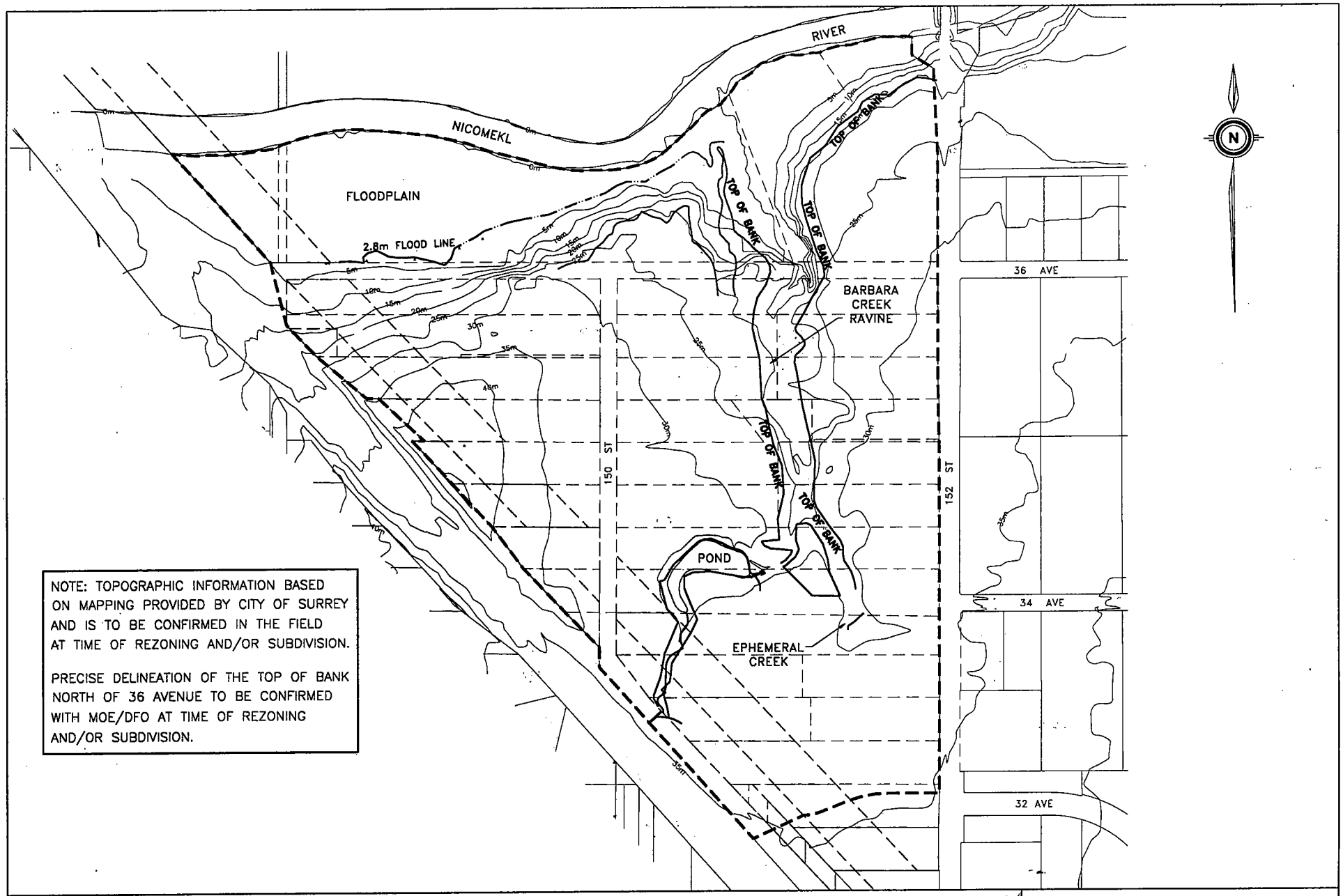
Water features and a variety of vegetation types found in the plan area provide for a range of wildlife habitats including:

- ravine and riparian areas
- mixed coniferous/deciduous woodland pond
- cultivated and seasonally flooded fields.

These provide suitable habitats to support migratory waterfowl, upland game birds, raptors and a diverse population of passerines. Field investigations focused on raptor/heron activity in the upland areas proposed for development.

There are no fish evident in the ephemeral tributary. The fish habitat value of the tributary, which joins Barbara Creek upstream of its confluence with the Nicomekl River, is in terms of food and nutrient production to Barbara Creek.

Areas within the West Neighbourhood are covered with dense coniferous forest dominated by Douglas fir, western red cedar and western hemlock. Vegetation communities to be impacted by development are limited to the mixed coniferous/deciduous second growth woodlands. There are some mature Sitka spruce present in the plan area, which are utilized by the Nicomekl blue heron colony on the north side of the river. During field investigations, several



NOTE: TOPOGRAPHIC INFORMATION BASED ON MAPPING PROVIDED BY CITY OF SURREY AND IS TO BE CONFIRMED IN THE FIELD AT TIME OF REZONING AND/OR SUBDIVISION.

PRECISE DELINEATION OF THE TOP OF BANK NORTH OF 36 AVENUE TO BE CONFIRMED WITH MOE/DFO AT TIME OF REZONING AND/OR SUBDIVISION.

IBI GROUP

Rosemary Heights, West Neighbourhood

Site Features

Exhibit 4

SCALE: N.T.S.

DATE: APRIL, 1997

cedar and alder snags, including feeder stumps, were identified. Appendix A provides a detailed analysis of the vegetation types within the plan area.

2.4 POLICY CONTEXT

This NCP Report has been prepared in the context of the applicable development policies and objectives governing this area. This hierarchy of plans and policies is identified below.

Official Community Plan (OCP) - The Surrey Official Community Plan Amendment By-law No. 12900 was adopted October 8, 1996 and designates the plan area as URB (Urban) and RM (Multiple Residential), (Exhibit 5).

Local Area Plan (LAP) - The Rosemary Heights Local Area Plan was approved by Council on July 4, 1994 following two years of detailed planning and public consultation . The LAP provides the policy basis to facilitate the submission of specific Neighbourhood Concept Plans (NCP's). The approved Local Area Plan concept is shown in Exhibit 6.

Stage 1 NCP - The Rosemary Heights West Neighbourhood Stage 1 NCP was approved by Surrey Council on December 19, 1995. The plans and conditions of the Stage 1 approval are reflected in this document,

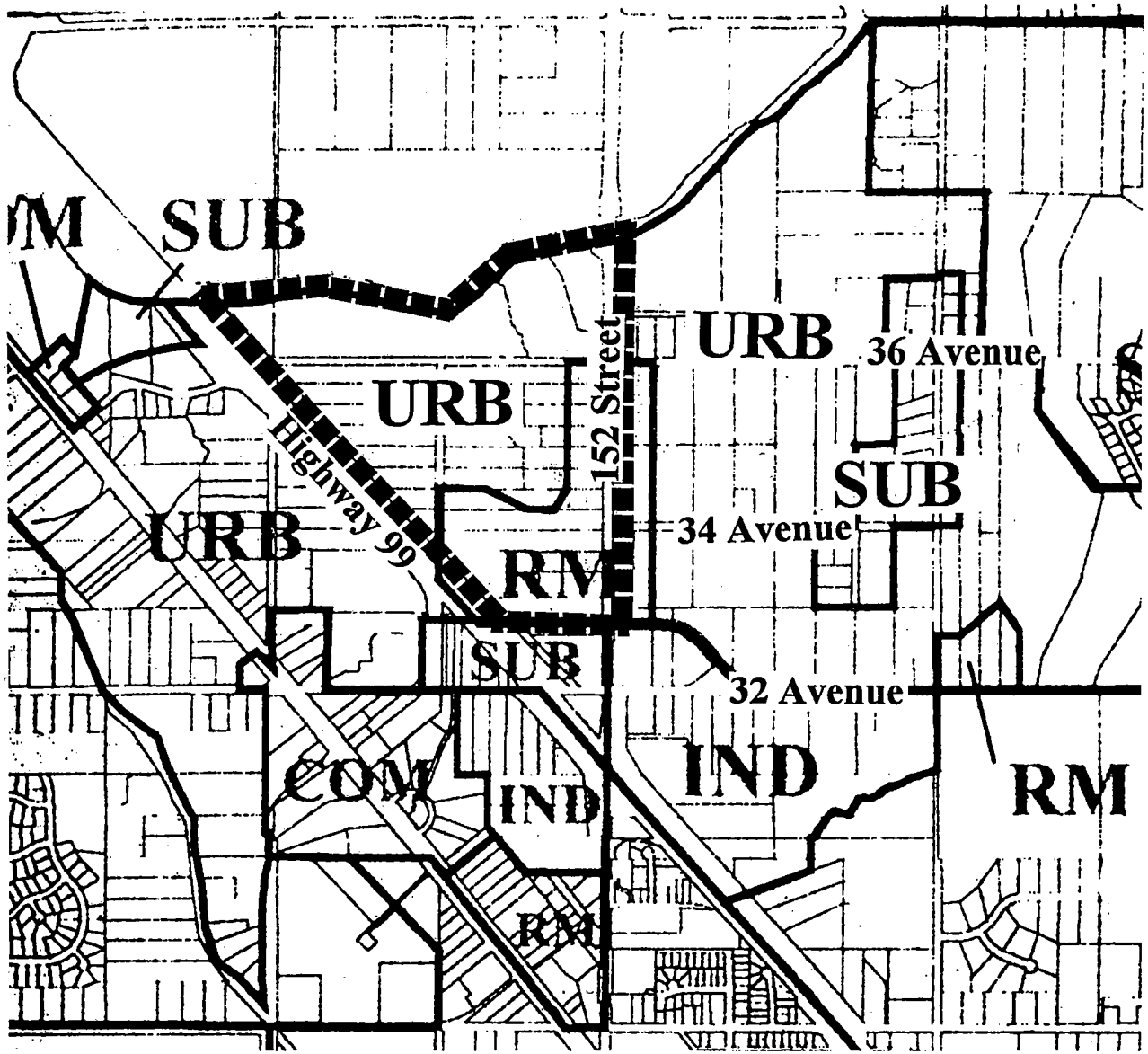
Surrey Zoning By-law No. 12000 - The By-law currently designates the majority of lands within the plan area as "RS" and "RA" which permit single-family development on one acre lots; and "A-1" and "A-3" which are agricultural zones (Exhibit 7). The plan area will have require rezoning in order for development to proceed.

Other Surrey Policies - Other Surrey policies which will be followed and implemented include: *The Subdivision By-law, The Tree Replacement and Removal By-law; The Affordable Housing Strategy; The Environmentally Sensitive Areas Study* and; *The Engineering Terms of Reference, Rosemary Heights/South Surrey Servicing Plan Report.*

Federal/Provincial Acts and Guidelines - Federal and Provincial laws and guidelines which will apply to this NCP include: *The Fisheries Act; The Wildlife Act and Guidelines and; The Land Development Guidelines for the Protection of Aquatic Habitat.*

2.5 PUBLIC PARTICIPATION

The formulation of this Plan included extensive consultation with the property owners, the City of Surrey, outside agencies and the public in accordance with the General Terms of Reference. The public was consulted through three open houses held at the White Rock Christian Fellowship Academy on May 2, 1995 (6:30 - 9:00 p.m.), November 30, 1995 (6:00 - 9:00 p.m.), and October 24, 1996 (6:30 - 8:30 p.m.).



LEGEND

URB	Urban Designation
SUB	Suburban Designation
IND	Industrial Designation
COM	Commercial Designation
■■■	West Rosemary Heights Boundary

IBI GROUP

Rosemary Heights, West Neighbourhood

Official Community Plan

Exhibit 5

SCALE: NTS

DATE: FEBRUARY, 1997

May 1995 Open House

All property owners in the NCP area, members of Council and the Semiahmoo Residents' Association were directly notified by mail. A postal service mail drop covering approximately 2,500 residences in the surrounding area was also undertaken.

Approximately 80 people attended. In addition to a sign-in sheet, exit questionnaires were provided to obtain comments on issues to be addressed through the NCP process. IBI made a short presentation at 7:30 p.m. which was followed by a question and answer period.

The presentation and display materials reviewed the LAP policies and highlighted the NCP's main issues. The overall public reaction was positive. Specific issues identified include:

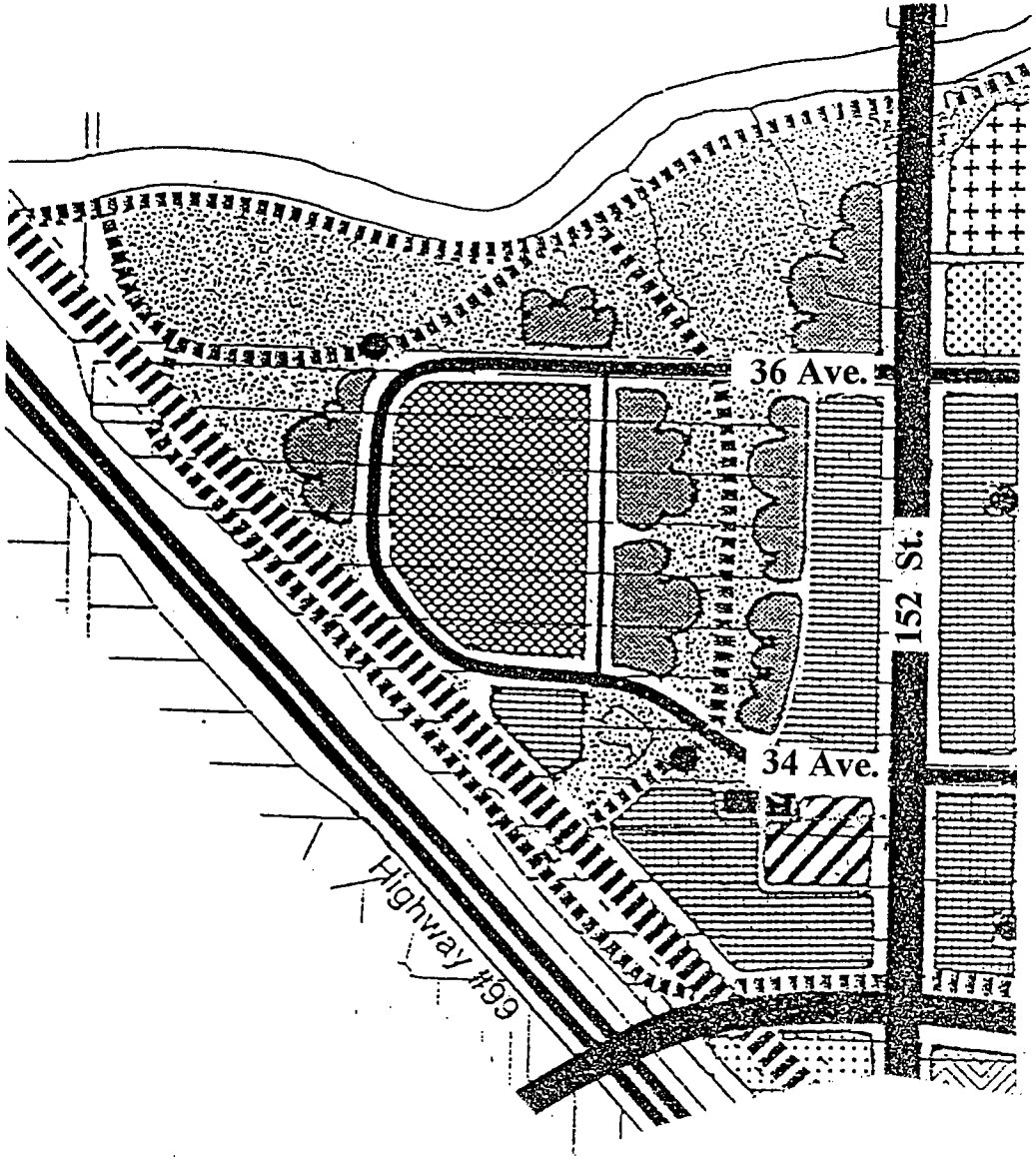
- Reservations with respect to the LAP designations for the mid-rise apartment area and the garden apartments.
- Support for a revised road concept that did not include a 36 Avenue bridge/ravine crossing and maintaining 150 Street as the main north/south corridor.
- Concern for the timing of the proposed 32 Avenue/Highway 99 interchange and the impact on the timing of development in the West Neighbourhood.
- Suggestions were made that the NCP incorporate bicycle/walking paths along the Nicomekl River.
- Concerns were expressed over increases in run-off and storm drainage, particularly with respect to siltration of Barbara Creek and the Nicomekl River.
- Suggestions were made that a sanitary servicing option for the West Neighbourhood would be to cross Barbara Creek at the proposed 36 Avenue servicing bridge.
- Attendees suggested that development should be set back from the creek/ravine and the Nicomekl River/floodplain. It was also suggested that development should respect existing significant trees, natural features and wildlife habitat corridors.

November 1995 Open House

The second public Open House was held on November 30, 1995. All property owners in the NCP area and those within 100 metres of the West Neighbourhood were notified by mail. Advertisements were also placed in two local papers.

Approximately 50 people attended. A sign-in sheet and exit questionnaires were provided. IBI conducted a presentation explaining the NCP Stage I and Stage II processes, the proposed concept plan and the supporting planning rationale.

The public reaction to the plan was very positive. The main issues identified by the participants were:



LEGEND

- Clustering at Single Family Density
- Street-Oriented Townhouses
- Townhouses
- Garden Apartments (3 storeys)
- Apartment (8-12 storeys)
- Neighbourhood Commercial
- Open Space
- Special Feature
- Pedestrian / Bike Path

IBI GROUP

Rosemary Heights, West Neighbourhood

Local Area Plan

Exhibit 6

SCALE: N.T.S.

DATE: NOV., 1995

- Frustration over the amount of time that the planning process was taking; and
- Concern over the timing of the construction of the 32 Avenue interchange and the implications on the development schedule for the West Neighbourhood. Specifically, the residents were very concerned that development in the neighbourhood will not be given authorization to proceed until the interchange is constructed.

October 1996 Open House

This Open House was held on October 24, 1996. All property owners were directly notified by mail. A postal service drop covered approximately 1,200 residents, and an ad was placed in a local paper. Council and City Staff were notified through the City's internal delivery system.

Approximately 35 people attended. In addition to a handout and display materials, IBI made a brief presentation.

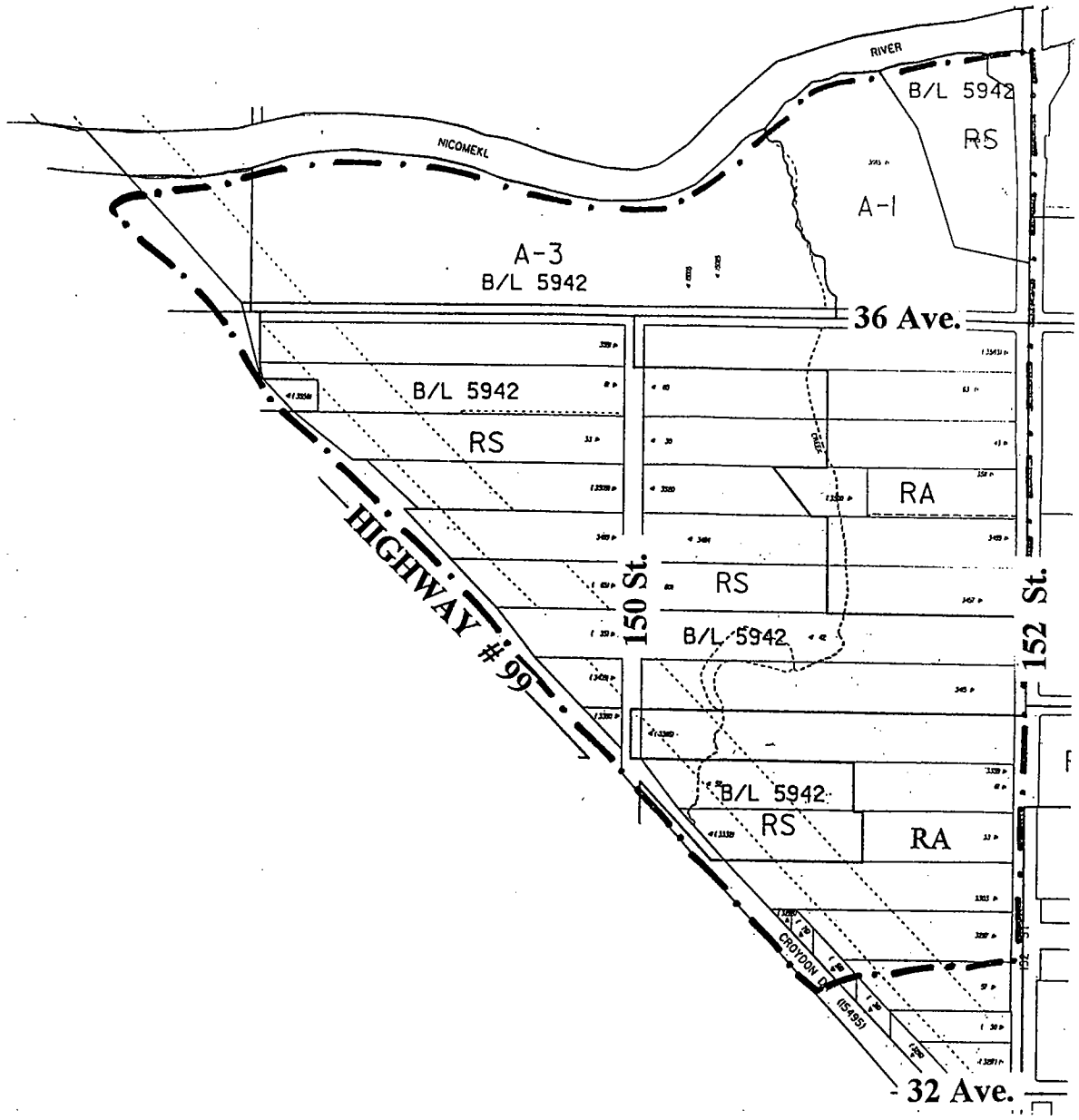
Specific issues identified were:

- Frustration regarding the lengthy planning process.
- Road dedication, the timing of infrastructure and their effect on the development approvals process.

Suggestions made at these meetings and through written comments obtained from the exit questionnaires have been acknowledged in the final land use plan.

2.6 OWNERS' CONCERNS

A number of landowners' individual written comments received during the course of the preparation of this plan are included in Appendix B. All comments and/or concerns have been discussed at different times in Steering Committee meetings and where possible, changes have been made to the NCP. In many cases however, it has not been possible to amend or change the NCP, particularly in regards to concerns and/or reservations about the location and/or manner of compensation for rights-of-way for roads or servicing corridors within individual properties. Letters are being reproduced as these existing owners have wished to go on record about their concerns such that there is no misunderstanding of their position respecting their individual properties in the future.



IBI GROUP

Rosemary Heights, West Neighbourhood

Existing Zoning

Exhibit 7

SCALE: N.T.S.

DATE: NOV., 1995

3.0 NEIGHBOURHOOD CONCEPT PLAN

3.1 DEVELOPMENT OBJECTIVES

This NCP has been prepared to achieve the following development objectives:

- To outline the land use and densities for the development of a complete neighbourhood.
- To define mechanisms and strategies that will preserve and protect the environmentally sensitive areas and significant existing vegetation.
- To design an efficient circulation system which accommodates required traffic volumes yet protects the integrity of the neighbourhood.
- To determine the property owners' contributions, to address the neighbourhood amenity needs and to determine service requirements that will form its subsequent development.

3.2 DEVELOPMENT CONCEPT

The primary land use will be residential, comprising of adult-oriented low and medium density housing. The residential component of the plan will occupy approximately 58 net acres and produce a maximum of 1,096 units. A small commercial area (.4 acres) is also identified on either side of the proposed road connecting 33 Avenue and 34 Avenue. Approximately 45% of the total land area will remain as open space.

The residential, commercial and natural features of the plan area will be linked by walkways and trails. A north/south open space link providing pedestrian and cyclist access is proposed in the Bicycle Blueprint (City of Surrey, November 1993), and will be located within the Hydro Corridor.

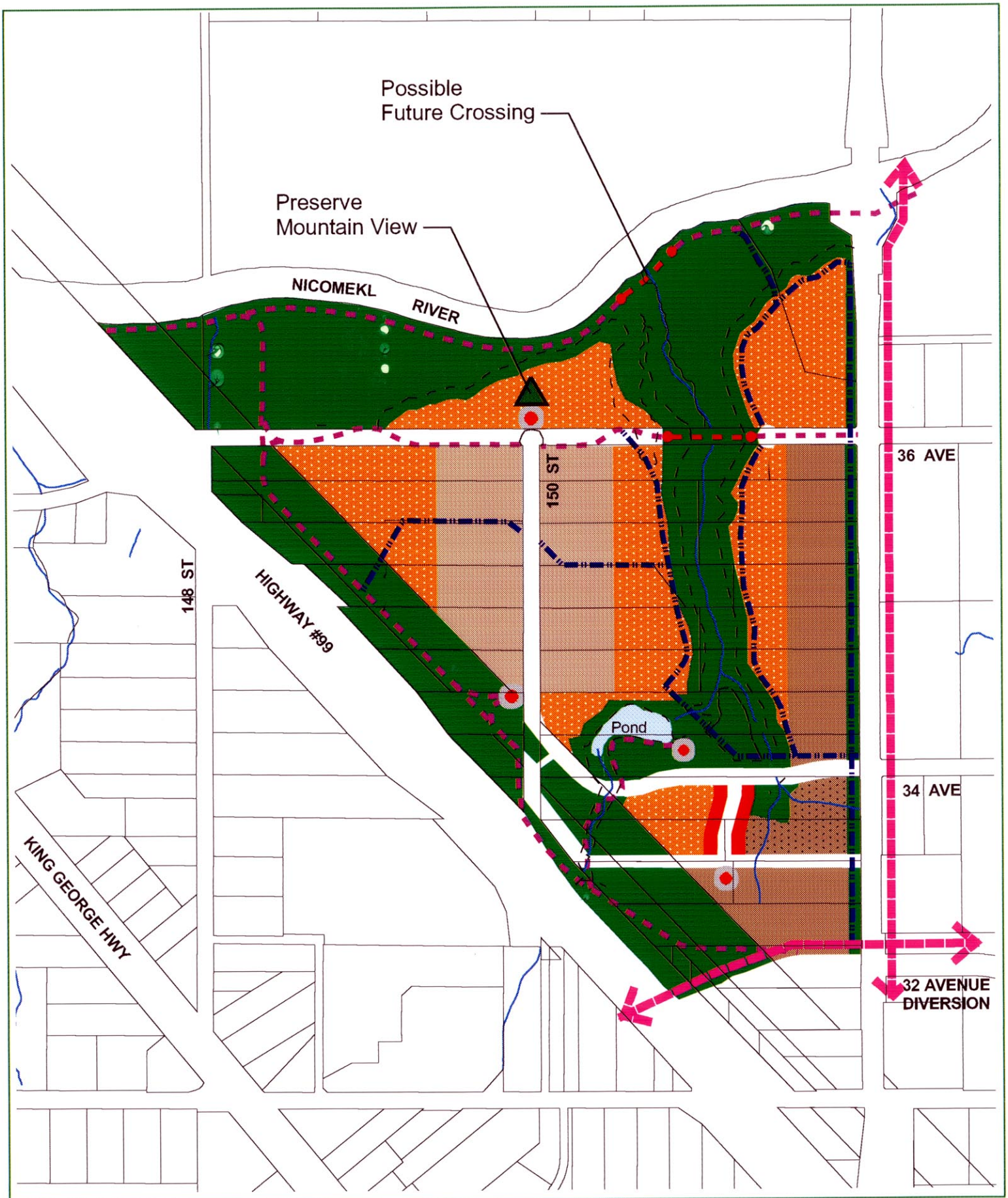
The concept incorporates the proposed 32 Avenue Diversion and Highway 99 Interchange which will provide direct access to Highway 99. The main entrance to the plan area from 152 Street will be at 34 Avenue, consistent with the LAP proposal. Emergency right-of-ways are provided on both sides of the ravine and the areas west of 150 Street.

The NCP land use plan is presented in Exhibit 8. Table 3 contains a statistical comparison of the Local Area Plan, the Stage 1 NCP and this Stage 2 NCP.

3.2.1 Residential Development

The residential development concept encourages adult-oriented low and medium density sites, and acknowledges the natural features of the plan area. The four types of housing proposed are:

- Cluster Housing



SURREY
CITY OF PARKS

- Commercial
- Garden Apartment
- Townhouse
- Apartments 8-12 Storey
- Cluster Housing
- Preservation Area/ Open Space
- Pond
- Major Linear Open Space Corridor (Multi-Use)
- Top of Bank
- Neighbourhood Pedestrian & Bicycle Routes
- Commuter Bike Routes
- Potential For Pedestrian & Bike Bridge
- Landmarks

ROSEMARY HEIGHTS WEST
NEIGHBOURHOOD CONCEPT PLAN

City of Surrey Planning & Development

Jan. 26, 1999

SCALE: 0 50 100 150 Meters

N

- Townhomes
- Garden Apartments
- Mid-Rise Apartments

Unless otherwise noted, the designated densities for the various land uses refer to the gross lot areas. The gross area used for calculation includes all developable lands, the Barbara Creek ravine, Nicomekl floodplain, and the Hydro Corridor, north of the proposed 33 Avenue.

Cluster Housing Areas

The clustering of dwelling units at 6 units per gross acre is to be developed in the areas on both sides of the Barbara Creek Ravine, the area north of 36 Avenue, the area south of 36 Avenue and adjacent to the Hydro Corridor, and the areas on both sides of the pond. These areas total 72.12 gross acres and, based on the 6.0 units per acre gross density, would yield a maximum of 433 units. These cluster housing sites will involve the preservation of significant natural features, such as the Barbara Creek Ravine, with the transfer of density to developable areas. Therefore, comprehensive development (CD) zoning is proposed. This zoning will establish regulations specific to the site, ensuring an environmentally sensitive built form and where appropriate, integration with adjacent townhouse areas. Maximum density based on net area shall not exceed 15 units per acre.

Townhouses Area

Townhouses are proposed for the areas on both sides of the existing 150 Street. Based on a density of 10 units per gross acre, the maximum yield would be a total of 132 units. Private internal access will be provided, the details of which will be determined at the development stage. The number of direct accesses off 150 Street will be limited. With the exception of density provisions, a CD zoning based on RM-10 requirements is recommended such that these areas can be integrated with the neighbouring cluster housing areas. Maximum density based on net area shall not exceed 15 units per acre.

Garden Apartment Area

Garden Apartments are proposed for the area west of 152 Street between 34 Avenue and 36 Avenue, and the areas west of 152 Street between the proposed 33 Avenue and the re-aligned 32 Avenue. These areas total 12.87 acres and at a density of 25 units per gross acre, yield 322 units.

The garden apartment area bordering on the west side of 152 Street comprises approximately 8.2 gross acres, and will provide for higher density development along the 152 Street edge, in order to provide an appropriate interface with the Central Neighbourhood development on the other side of the street. These buildings will be 3 to 4 stories in height.

The area to the south of the proposed 33 Avenue comprises approximately 4.7 acres, excluding the Hydro right-of-way, and will relate to and complement the mid-rise area, designated for the corner of 34 Avenue and 152 Streets.

The RM-30 zone is recommended for the garden apartment area south of 33 Avenue. A CD zone based on RM-30 requirements is recommended for the garden apartment area north of

34 Avenue so that this development becomes integrated with the adjacent cluster housing areas.

Mid-Rise Apartment Area

A 3 acre area south of 34 Avenue and west of 152 Street is proposed for mid to higher rise apartment buildings. Access can be achieved off of 34 Avenue or 33 Avenue. The maximum density is 70 units per gross acre, for a maximum yield of 210 units. A RM-70 zone is recommended for this site.

3.2.2 Commercial Development

A 0.4 acre commercial node has been designated along either side of the proposed road connecting 33 Avenue and 34 Avenue. This commercial area is intended to accommodate a small scale shopping area serving the needs of the area residents. The use, density, height and site coverage will be based on the C-5 zoning designation.

Table 1: Land Use Statistics

Land Use	Approx. Land Area (acres)	% of Total Land Area	Approx. Number of Dwelling Units*	% Total No. of Units	Projected Population at Saturation**
Apartments (8-12 storey)	3.00	2.95%	210	19.15%	368
Street-Oriented Townhomes	13.20	12.99%	132	12.04%	330
Garden Apartments	12.87	12.67%	322	29.34%	644
Clustering s.f. Density - Gross Area	72.12	70.99%	433	39.46%	1428
Commercial	0.40	0.39%	N/A	N/A	N/A
Total	**101.59**	**100.00%**	**1096**	**100.00%**	**2769**

* Based on the following LAP Densities:

Apartments	Maximum of 210 units
Townhomes	10 units per gross acre
Garden Apartments	25 units per gross acre
Cluster Housing	6 units per gross acre

**Projected Population at Saturation based on:

	Persons per unit
Apartments	1.75
Townhomes	2.5
Garden Apartments	2
Cluster Housing	3.3

3.2.3 Parks and Open Space

The significant natural features of the West Neighbourhood are:

- Barbara Creek Ravine;
- Nicomekl River floodplain;
- Hydro Corridor which runs the full length of the plan area on the western boundary;
- ephemeral creek.

These features, together with the recommended no disturbance setback zones, comprise approximately 56 acres, or 45% of the total land area (Table 2).

The City has confirmed that some form of formal protection to the Barbara Creek Ravine and the Nicomekl River floodplain areas will be required. These areas are not intended to become public parkland. When a particular parcel of land is developed, portions which are ravine will be dedicated to the City in conjunction with rezoning and/or subdivision.

The pond area will be dedicated to the City when the parcels of land which contain the pond and/or the approximate 0.8 acres between the Barbara and ephemeral creeks north of proposed 34 Avenue are developed at time of rezoning and/or subdivision; this will form part of the parkland dedication. The form and extent of enhancement of the pond area will be determined by the City in conjunction with other agencies.

Pedestrian and bicycle pathways are shown conceptually in Exhibit 11. These will link the natural features within this NCP area and through coordination with the Central Neighbourhood, provide future linkages between these features and adjacent areas. The precise location of these pathways will be confirmed in coordination with appropriate agencies.

The Hydro Corridor provides an opportunity to develop additional forms of recreational activities. These include a continuous walking and cycling trail connecting the north and south sections of the plan area, view outlet park space, tennis courts, recreational vehicle parking and possible detention pond.

Table 2: OPEN SPACE ELEMENTS

Open Space Element	Area (acres)
Hydro Corridor	21.00
Barbara Creek Ravine/Nicomekl River Floodplain	32.50
Pond and Greenspace	2.30
TOTAL	**55.80**
NCP Area	124.40
% of Total NCP Area	**45%**

3.2.4 Affordable Housing

In addition to the amenity contributions identified in Section 5.3, the City has an affordable housing strategy. This strategy applies to all rezoning projects, regardless of size. To address the issue of affordable housing, the strategy specifies that the developer provide either a minimum of 20% of the units or lots within the project to be set aside as affordable housing, or in lieu of actually providing the units, a contribution to the City's Affordable Housing Fund in the amount of $750.00 per unit.

This NCP area is identified as an area for non-family housing, and therefore it is not feasible to recommend any site for a family-oriented, affordable housing project. It may however, be feasible to locate a senior's housing project within this neighbourhood.

3.3 RELATIONSHIP WITH LOCAL AREA PLAN

This NCP report provides a physical plan which generally conforms with the land use policies contained in the Rosemary Heights Local Area Plan (Exhibit 6). The land uses, road pattern, densities, and servicing issues represent a refinement of the overall design. A statistical comparison of this NCP and the LAP is located in Table 3. The minor deviations, as detailed below, are a result of the public planning and technical review processes.

- The location of the small commercial area has been adjusted slightly to allow for a second access road to the apartment sites and to respect the existing ephemeral creek.

- The open space area around the pond has been reconfigured. This open space and pond will serve as a local park for the neighbourhood. In addition, an area north of the proposed 34 Avenue has also been identified as an open space feature.

- The figures contained in the Local Area Plan for the Cluster Housing were not calculated on a gross density basis and, as such, the projected number of units was less than that determined through this NCP process.

- The LAP proposed a major crossing of the Barbara Creek Ravine. However, the construction of a road crossing at this location would have serious environmental and financial implications. The revised road network, which eliminates the crossing has been accepted by City of Surrey staff as a viable road network alternative. The boundaries of the specific land use areas have been modified slightly to reflect the changes in the road network.

- As illustrated in the following table, the land area allocated to Garden Apartments has dropped 7.13 acres. The gross land area allocated to Cluster Housing has risen 10.12 acres; this increase includes the 7.13 acres transferred from the Garden Apartments and 2.99 acres of the Hydro Corridor adjacent to the pond area. The addition of this 2.99 acre area to the gross density calculation was necessary to keep the number of units and density consistent with the approved Local Area Plan. Hence, the total land area used for

density calculation has risen from 98.6 acres in the Stage I Report, to the current 101.59, a difference of 2.99 acres (Table 3). The LAP proposes Garden Apartments for the areas surrounding the pond.

- In order to better comply with the Ministry of Environment recommendations, the residential areas on either side of the pond have changed from Garden Apartments at a density of 25 units per gross acre presented in the Stage 1 Report, to Cluster Housing at 6 units per gross acre.

Comparison of LAP, NCP Stage 1 and NCP Stage 2

Land Use	Land Area (acres)			Number of Units *			Projected Population **		
	Local Area Plan	NCP Stage 1 (Dec 95)	NCP Stage 2 (May 96)	Local Area Plan	NCP Stage 1 (Dec 95)	NCP Stage 2 (May 96)	Local Area Plan	NCP Stage 1 (Dec 95)	NCP Stage 2 (May 96)
Apartments (8 - 12 storey)	3	3	3	210	210	210	368	368	368
Street-Oriented Townhomes	12.76	13.2	13.2	128	132	132	330	330	330
Garden Apartments	20	20	12.87	500	500	322	1000	1000	644
Clustering S.F. Density - Gross Area	35.68	62	72.12	214	372	433	706	1228	1428
Commercial	0.4	0.4	0.4	N/A	N/A	N/A	N/A	N/A	N/A
Park Area									
TOTAL	71.84	98.6	101.59	1052	1214	1096	2404	2926	2769

* Based on the following LAP Densities:

Apartments	70 units per gross acre
Townhomes	10 units per gross acre
Garden Apartments	25 units per gross acre
Clustering Single Family	6 units per gross acre, including adjacent land within Hydro Corridor or adjacent land within floodplain.

** Projected Population at Saturation based on:

	Persons per unit
Apartments	1.75
Townhomes	2.5
Garden Apartments	2
Clustering Single Family	3.3

4.0 SERVICING

In order to implement the Neighbourhood Concept Plan, significant improvements to the existing circulation, water, sanitary and storm services are required. These improvements are described in this section. The costs of these improvements are presented in Section 5.5 and in Appendix G.

The proposed servicing indicated within this document is purely conceptual and deemed to be the best fit at the time that this study was prepared. Changes will occur from time to time and the City may want to make changes to the proposals within this report. Each development applicant will, however, be required to meet the design criteria, construction standards and other relevant regulations and bylaw requirements current at the time. Nothing contained herein shall bind the City to follow the conceptual layouts or sizes as depicted within this report.

4.1 CIRCULATION

The circulation system includes roads, lanes, utilities, rights of way, as well as pedestrian, bicycle and transit systems.

4.1.1 ROADS

This section outlines the existing road network, the proposed road network, the relevant transportation studies, and the estimated costs.

4.1.1.1 Existing Road System

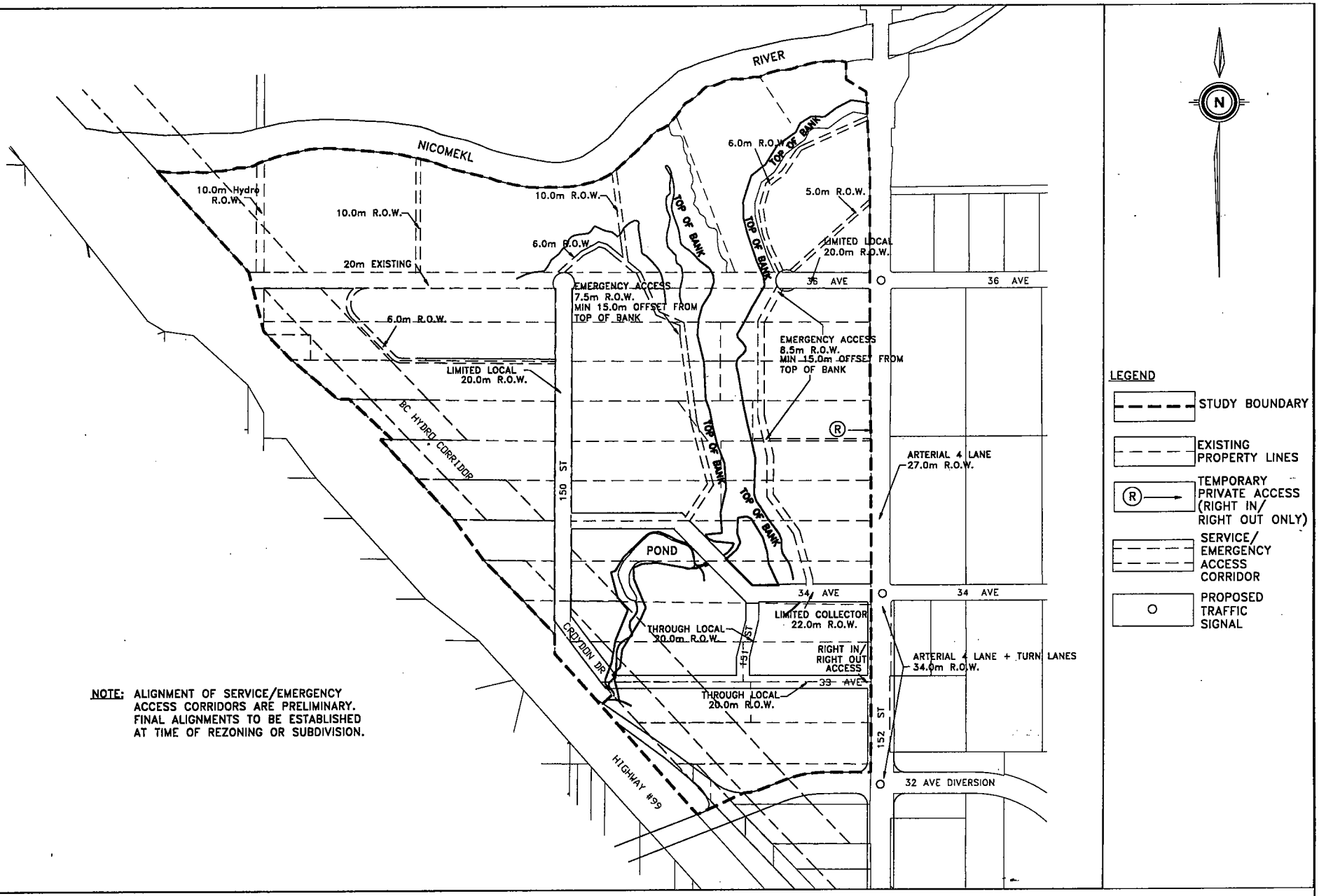
The existing road system comprises three roadways:

- 152 Street, a 2-lane, arterial roadway with gravel shoulders and ditches, providing access from the neighbourhood to the rest of the arterial and highway system in South Surrey.
- Croydon Drive and 150 Street, a 2-lane, rural local road with gravel shoulders and ditches, providing internal connection from the neighbourhood to the arterial system, and internal access to the neighbourhood.

4.1.1.2 Proposed Road Network

The Rosemary Heights Local Area Plan proposed a road network comprising a loop collector road system with east/west accesses at 34 Avenue and at 36 Avenue crossing Barbara Creek, and two internal north/south roads on either side of existing 150 Street.

Upon examination and review of the LAP proposals and through a series of meetings and discussions with the Engineering Department, a revised road network for the West Neighbourhood has been designed (Exhibit 9), and approved as part of the Stage 1 NCP. The revised road network provides for a single, limited collector roadway on 34 Avenue and 150 Street, accessing the areas internal to the western portion of the neighbourhood. In order to ensure security of access for emergencies, a second access is proposed at 33 Avenue, connecting with 150 Street. 33 Avenue will intersect 152 Street mid-way between 32 Avenue



NOTE: ALIGNMENT OF SERVICE/EMERGENCY ACCESS CORRIDORS ARE PRELIMINARY. FINAL ALIGNMENTS TO BE ESTABLISHED AT TIME OF REZONING OR SUBDIVISION.

IBI GROUP

Rosemary Heights, West Neighbourhood

Roads and Service/Emergency Access Corridors

Exhibit 9

SCALE: N.T.S.

DATE: APRIL, 1997

and 34 Avenue, allowing only right-in/right-out turns at 152 Street, to minimize traffic conflicts on 152 Street.

A short, through local roadway, 151 Street, is proposed to provide access for the lands south of 34 Avenue. The lands on 152 Street would have access to 36 Avenue in the north and 33 Avenue and 34 Avenue in the south, thus avoiding direct property access to 152 Street. The proposed road network eliminates the 36 Avenue bridge crossing, which was estimated to be prohibitively expensive and have significant environmental impacts. The proposed road network also allows for relocation of Croydon Drive to facilitate construction of the new interchange at 32 Avenue and Highway 99.

While the 33/34 Avenue loop provides two accesses to the neighbourhood from 152 Street, the cul-de-sac length from 150 Street will still exceed the maximum allowable length of 110 meters. Therefore, a Development Variance Permit application will be required to extend the length to 300 meters, allowing 150 Street to connect 34 Avenue with development as far north as 36 Avenue. This concept is supported by the City Planning Department and the City Engineering Department. Additional safety features, such as sprinkler systems, will be required to offset the increase in cul-de-sac length. It should be noted that the fire station is located in close proximity to the neighbourhood at 32 Avenue, east of 152 Street.

An interim, mid-block, right-in/right-out access is proposed to serve the Garden Apartment area between 34 Avenue and 36 Avenue. This is proposed as an interim measure should development of the midblock parcels proceed ahead of those with frontages on either 34 or 36 Avenue, with the understanding that it will be removed upon completion of development of adjacent parcels. It is strongly recommended that these properties consolidate prior to development. An encumbrance will be registered against the properties along the west side of 152 Street between 34 and 36 Avenues to ensure future reciprocal access agreements.

As part of the circulation network a system of emergency accesses/utility corridors in statutory rights-of-way are proposed, as follows:

- A 7.5 metre right-of-way emergency access is proposed for the west side of the ravine connecting 36 Avenue and 34 Avenue to complete the loop road concept for the neighbourhood, to provide the secondary access required by the Fire Department, and to accommodate underground services as discussed later in this section.

- A second 8.5 metre right-of-way is proposed on the east side of the ravine to accommodate underground services and vehicle access to the area. If alternative access is provided internally and a ravine corridor is still required adjacent to the ravine, the width may be reduced to 6 metres. If alternative access is provided internally and services are incorporated into this internal road, then the corridor on the east side of the ravine need not be provided. Registered reciprocal access agreements will be required for all parcels to allow for the public/private lane.

- A third right-of-way is proposed through the Townhouse/Cluster Housing areas on the west side of 150 Street. This is a 6 metre right-of-way that extends west from 150 Street and loops north to join the 36 Avenue existing road right-of-way, intended to provide access to the services in 36 Avenue, west of 150 Street.

These statutory rights-of-way will require construction of a hard surface roadway or walkway to carry maintenance vehicles, restricting maximum grades to approximately 12%, and providing corner cuts to accommodate 12 metre centreline radius emergency vehicles. These rights-of-way will be provided as development proceeds on a lot by lot basis.

The landscape treatment of 152 Street and 34 Avenue will be complementary to the landscaping provided on these same roads, as specified in the final NCP for Rosemary Heights Central Neighbourhood.

4.1.1.3 Rosemary Heights Major Road Network Study

The City of Surrey has retained a consulting firm to study the major road network requirements for the larger Rosemary Heights Neighbourhood. This analysis was based upon the full development of the neighbourhood, which will accommodate approximately 8,600 new residents at full development, estimated to occur in approximately 10 years time.

The study determined that in order for the development of Rosemary Heights to proceed, a number of arterial network improvements would be required:

- road widening
- traffic signals
- turning bays at all major intersections
- the South Surrey interchange

A total of approximately $11.6 million of arterial road improvements (including Surrey's estimated share of the interchange cost) will be required to service the development.

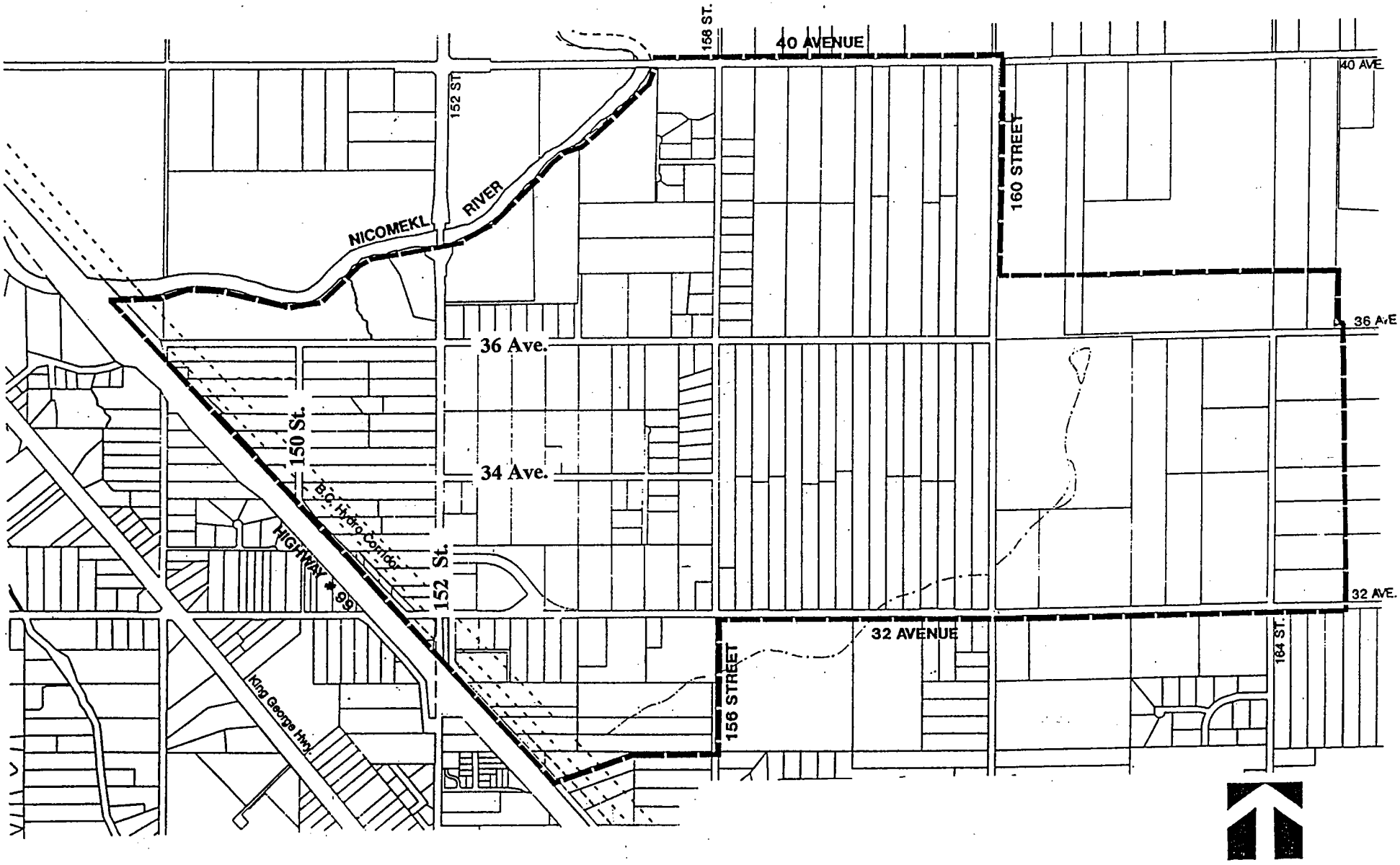
The study concluded that that Phase I of the South Surrey Interchange should be completed by the time there were a total of 850 housing units in Morgan Creek/Rosemary Heights if the level of service is to remain at level "C".

In a July 1996 Information Report to Council relating to this study, the Engineering Department indicated that if the limit of 850 units is exceeded, then average delays per vehicle would increase. Council adopted the staff recommendation that MoTH be encouraged to expedite the construction of the Phase I South Surrey Interchange.

The City of Surrey, Ministry of Transportation and Highways (MoTH) and the B.C. Transportation Financing Authority (BCTFA) are discussing staging approaches for the South Surrey interchange.

4.1.1.4 Croydon Drive Relocation

The construction of the South Surrey interchange will necessitate the relocation of the south end of Croydon Drive either directly into 32 Avenue or via 33 or 34 Avenues.



IBI GROUP

Rosemary Heights, West Neighbourhood

Major Road Network Study (MRNS) Boundaries

Exhibit 10

SCALE: N.T.S.

DATE: NOV., 1995

The City of Surrey Engineering Department retained IBI Group to examine alternative long-term and short-term alignments for both 33 Avenue and 34 Avenue. This study determined the following:

- The preferred alignment for 34 Avenue is from existing 152 Street/34 Avenue intersection, across the east branch and central branch of Barbara Creek, passing north of the pond and connecting to 150 Street. This is the preferred alignment from a cost and environmental point of view, the latter as confirmed by the environmental consultant.

- The preferred alignment for 33 Avenue is the approximate mid point between 32 Avenue and 34 Avenue at 152 Street, and then west to connect to Croydon Drive.

The City of Surrey will be responsible for ensuring that an alternate access for Croydon Drive is provided when the Croydon at 32nd Avenue interchange is constructed.

For the initial stage of development west of Barbara Creek, it is proposed that access be provided by construction of either 33 Avenue or 34 Avenue, and maintaining existing Croydon Drive until the interchange construction is commenced. When the interchange is constructed, it is proposed that an emergency access connection (with "knock down" bollards) to Croydon Drive from 32 Avenue be provided, until the second permanent access is constructed. Until the second permanent access is constructed, development will be restricted to the proposed maximum cul de sac length of 300 meters, subject to the Development Variance Permit approval discussed earlier.

4.1.1.5 Surrey Capital Works - 10 Year Servicing Plan

The 10 year servicing plan developed by the Engineering Department, City of Surrey, includes the following roadways in the larger Rosemary Heights area.

Table 4: Surrey 10 Year Road Plan

Ref. No.	Location	Description	Est. Cost	Start Date
752	152 Street: King George Hwy - 34 Avenue	arterial widening (6 lanes)	$2.4 million	1997
3089	152 Street at Nicomekl River	Bridge	$2.4 million	2002
2948	152 Street: 34 Avenue - 40 Avenue	arterial widening (19 m)	$2.4 million	2002
4556	32 Avenue at 152 Street	signal replacement	$80,000	2002
4004	Highway 99 / 152 Street interchange	Surrey's share	$1.5 million	2002

As outlined above, the Major Road Network Study generally confirmed the 10 year plan, with the following exceptions:

- widening of 152 Street from King George Highway to 34 Avenue need only be four lanes, plus turning lanes at intersections, requiring 34 metre right-of-way width.

- the first phase of the South Surrey interchange is required by 1998, rather than 2002.

- additional signals are required, on 152nd Street at 34 Avenue and 36 Avenue, as outlined in the Major Road Network Study.

4.1.1.6 Road Classification

The elements of the road network have been classified by function and right-of-way width, as shown in Exhibit 9. Following is a discussion of each.

34 Avenue and 150 Street

34 Avenue and 150 Street are proposed as the main spine roads for the plan area and are classified as limited collector and limited local, respectively. It is proposed that the right-of-way widths be 22.0 m and 20.0M, sufficient to provide the necessary services. 34 Avenue will accommodate one lane in each direction, wide enough to provide for a bicycle lane (4.3 m lane width), parking on one side and turn lanes at intersections. In addition, sidewalks and street lights are proposed for both sides.

33 Avenue

33 Avenue from 152 Street to 151 Street is classified as a through local, requiring 20 m of right-of-way. This road will accommodate parking on one side and 4.3 m lanes to accommodate bicycles. Streetlights and sidewalks will be provided on both sides due to the high density in the area.

151 Street

151 Street would also be classified as a through local road in 20 m right-of-way. The pavement width will provide for parking on both sides. Bicycle lanes will not be required due to the short length of the street. Street lights and sidewalks will be provided on both sides due to the high density.

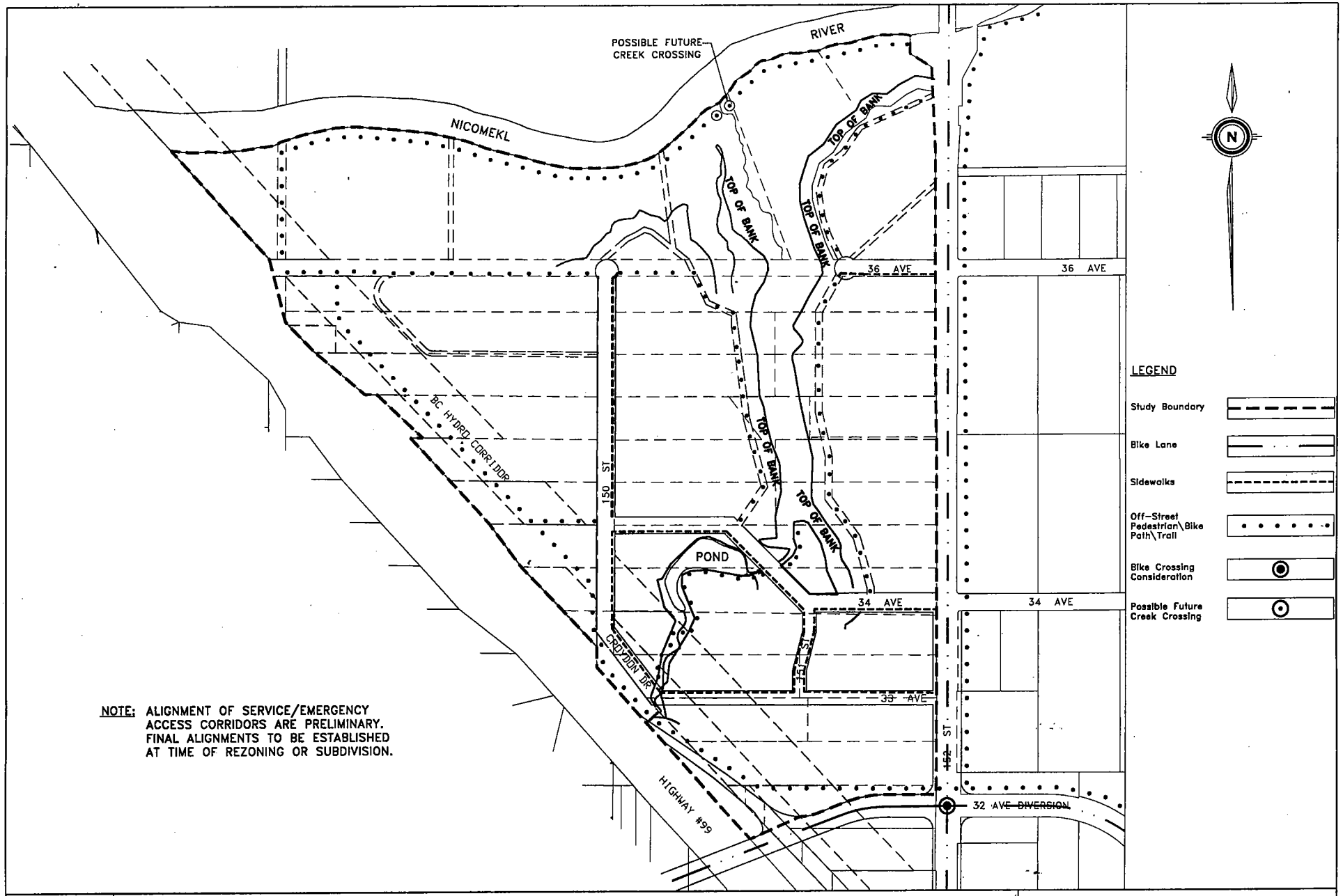
Emergency Accesses / Utility Corridors

In addition to the roadways, a system of emergency accesses/utility corridors in statutory rights-of-way are proposed to provide emergency access as well as accommodate and provide access to servicing utilities. These individual rights-of-way were described in Section 4.1.1.2.

4.1.2 PEDESTRIAN AND BIKE ROUTES

The pedestrian and bicycle routes network provides a comprehensive circulation system within the plan area. These paths will connect the residential areas to the pond, ravine, Nicomekl River, Village Centre and Central Neighbourhood. Exhibit 11 illustrates the pedestrian and bicycle network for the plan area. Specifically, the elements of this system include:

- sidewalks along 152 Street and the major internal roads.



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IBI GROUP

Rosemary Heights, West Neighbourhood

Bicycle & Pedestrian Network

Exhibit 11

SCALE: NTS

DATE: APRIL, 1997

- an off-street bike/pedestrian path which connects the Hydro corridor, pond, ravine, and floodplain features of the neighbourhood. Portions of this system will be incorporated within the statutory rights-of-ways proposed for the neighbourhood which will be acquired at the development stage.

A pedestrian crossing of Barbara Creek is not proposed at this time because the bridge which carries the force main across Barbara Creek, installed by the Morgan Creek developers, will not accommodate a pedestrian walkway. However, public passage will be allowed along the creek within the right-of-way, acquired at the development stage.

It should be noted that the trails proposed should respect the required no disturbance setback zones from the natural features. As such, current alignments are conceptual and precise locations will be determined in conjunction with appropriate agencies. The City of Surrey Bicycle Blueprint should be referred to when determining the ultimate design of the bike paths.

The jointly drafted BCE/DFO document "A Guide to Access Management Near Aquatic Areas" offers several suggestions regarding the construction of trail networks and should be referred to when planning the construction of a trail system adjacent to a watercourse.

4.1.3 Public Transit

Public transit service will be provided along 152 Street. Bus stops will be provided on the far side of each of the major intersections.

More than 75% of the area would lie within an acceptable walking distance of 400 m, based upon the proposed roadway and walkway network. The portion west of 150 Street and north of 34 Avenue would be up to 700 m walking distance, unless a pedestrian bridge is provided across 36 Avenue, in which case the walking distance would be reduced to 400 m.

4.2 WATER SERVICING

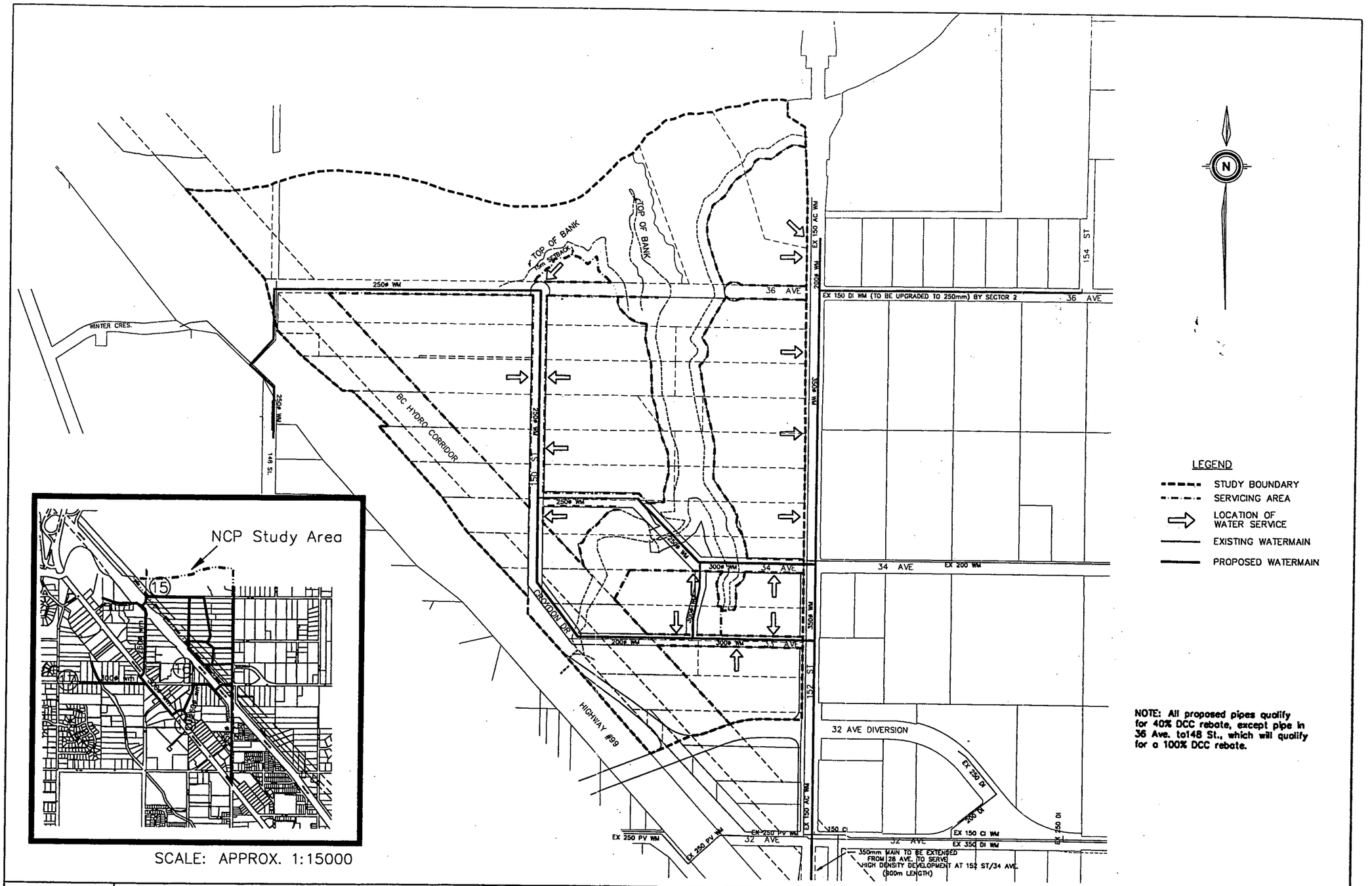
4.2.1 Existing Services

This NCP area lies within the Crescent Pressure Zone, for which the HGL is set at 80 m Geodetic.

The south portion of the neighbourhood is served by an existing 150 mm watermain located on 152 Street, which is inadequate for long term development and requires upgrading. This watermain connects to a 250 mm watermain on 152 Street at 32 Avenue, which is fed by a 300 mm watermain on 32 Avenue at King George Highway. The 250 mm watermain is also connected to a 350 mm main on 32 Avenue east of 152 Street, but this main has no feed from the east at this time.

The main feeds to the area are as follows:

- From the 700 mm diameter GVRD main at 144 Street at 32 Avenue through a PRV. This feeds a 300 mm main on 32 Avenue running east to King George Highway where it turns



IBI GROUP

Rosemary Heights, West Neighbourhood
Water Servicing Concept

Exhibit 12

SCALE: NTS

DATE: APRIL, 1997

south before connecting to a 250 mm watermain. This in turn runs northeast until it reaches 32 Avenue, continuing on to 152 Street.

- From the 400 mm feeder main on King George Highway at 152 Street. From this point a watermain starting as 300 mm runs north on 152 Street, reducing to 250 mm and 150 mm up to 32 Avenue.

In addition, there are existing 150 mm mains throughout the area which are not adequate and do not conform with the current city standards and need to be replaced. There is also an old, existing 100 mm steel main that connects under Highway 99 to Winter Crescent and serves the lots on 150 Street. This main is inadequate to service further development in the area and requires upgrading.

4.2.2 10-Year Servicing Plan (1993)

The 10-year servicing plan for the City of Surrey identifies and provides for growth-related improvements to the regional supply system, as shown on the schedule for the City water supply projects. The following table summarizes the works relevant to the NCP Area.

TABLE 5: City of Surrey 10 Year Water Servicing Plan

Reference	Location	Description	Estimated Cost	Start
2444	152 St. - 32 Ave to 36 Ave	300 mm watermain	$240,000	2002
2441	36 Ave - 148 St. to 152 St.	300 mm (40% share)	$144,000 *	2002
2443	148 St. - 32 Ave to 36 Ave	300 mm (40% share)	$ 96,000 **	2002

Notes: * 50% of length - now necessary
**** 75% complete - upsizing cost**

4.2.3 Proposed Water Servicing

The NCP development will impose an additional water demand upon the existing City water supply system. The additional demands were calculated based on NCP population projections and the City Engineering Department's Design Criteria Manual. The water demands are as follows:

A. **Domestic**

Average Daily Demand	15.68 litres/sec
Maximum Peak Day Demand	31.35 litres/sec
Peak Hour Demand	62.71 litres/sec

B. **Fire Flow**

Multiple Family Townhouse	120 litres/sec
Multiple Family Townhouse/Low Density Apartment	120 litres/sec
Mid-rise Apartment	200 litres/sec

The proposed water network is shown in Exhibit 12. This system was developed based on analyzing a number of different scenarios for staging of development. This analysis indicated the following:

- For the first stage of development, the minimum required water network will be construction of a 250 mm water main, either from 152 Street along 34 Avenue to 150 Street, or from 148 Street, extended across Highway 99 along 36 Avenue to 150 Street. This system would initially be a one-way feed until further development completes the connection either to 152 Street and 148 Street. It is proposed that this water main be added to the grid main system and be included in the 10-year servicing plan, qualifying for DCC credits.

- For the complete development of the neighbourhood, excluding the mid-rise apartment site at 34 Avenue/152 Street, the minimum off-site water service required (in addition to the first phase) is the provision of a second feed comprising a 350 mm watermain on 152 Street, from 32 Avenue to 34 Avenue, and extended to 36 Avenue to serve the lands fronting on 152 Street. This watermain **should be added to the 10 Year Servicing Plan, thus qualifying** for DCC credits.

- The ultimate development of the neighbourhood, including the mid-rise apartment site, will require the improvements outlined above, as well as construction of a 350 mm watermain on 152 Street from 28 Avenue to 32 Avenue. It is proposed that this watermain be added to the **10 Year Servicing Plan, thus qualifying for** DCC credits.

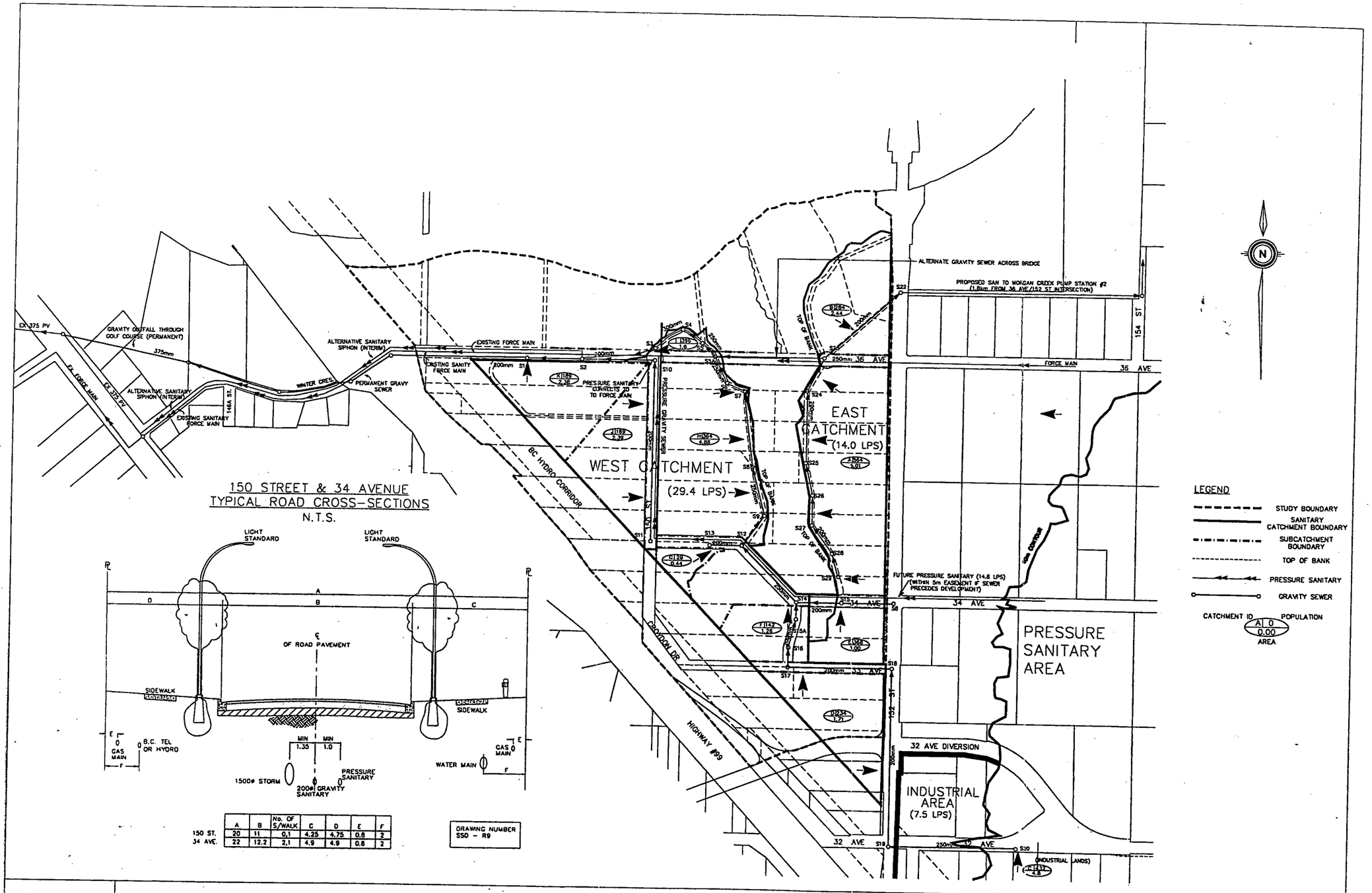
The DCC revenues and costs associated with the development of the water network are presented in Section 5.5.

The detailed water network analysis is described in Appendix E. This analysis is based upon phasing outlined above. As each development phase is submitted for approval, the developers will need to prove the adequacy of the water network by subdivision.

4.3 SANITARY SERVICING SYSTEM

4.3.1 Existing Sanitary Servicing System

There are currently no sanitary sewer services in the plan area. Property owners currently use septic tanks and tile beds.



150 STREET & 34 AVENUE
TYPICAL ROAD CROSS-SECTIONS
N.T.S.

	A	B	No. OF S/WALK	C	D	E	F
150 ST.	20	11	0,1	4.25	4.75	0.8	2
34 AVE.	22	12.2	2,1	4.9	4.9	0.8	2

DRAWING NUMBER
SSO - R9

IBI GROUP

Rosemary Heights, West Neighbourhood
Sanitary Servicing Concept

Exhibit 13
SCALE: NTS
DATE: APRIL, 1997

Crossing through the plan area along the 36 Avenue right-of-way is a recently constructed sanitary forcemain, which carries flows from the Morgan Creek development to a GVSDD trunk sewer located west of the plan area. A pipe bridge was constructed on 36 Avenue across the Barbara Creek ravine by the developer to carry the force main across the creek. This forcemain is to service lands east of Barbara Creek.

4.3.2 Sanitary Catchment Areas

Two sanitary catchment areas have been defined within this sector:

- The east catchment comprises the lands between Barbara Creek and 152 Street, from 34 Avenue north to the development limit north of 36 Avenue. This area will generate sanitary flows of 14.0 lps.

- The west catchment area includes all the lands in the plan area west of Barbara Creek as well as south of 34 Avenue, and will generate sanitary flows of 29.4 lps.

In addition to the east and west sanitary catchment areas in the NCP Sector 1, there are two areas in Sector 2 that may be serviced through Sector 1. There is an industrial area of approximately 14 hectares located south of 32 Avenue and east of 152 Street, as well as a residential area north of 32 Avenue, west of approximately 153 Street and south of 34 Avenue which also will be serviced through Sector 1.

This latter area is located above 41 meters and is to be serviced by a pressure sewer through Sector 1, connecting to the forcemain on 36 Avenue at 150 Street.

Approximately 4.8 ha of the industrial area is within the Sector 1 catchment area, and is estimated to generate 7.5 lps sanitary flows. The gravity sewer system in Sector 1 will be sized to accommodate these industrial flows, increasing the total flows from the west catchment to 36 lps.

4.3.3 Proposed Sanitary Servicing System

Off-site Service

In the Stage 1 analysis, alternative outfalls were examined for servicing the area. The Stage 1 Report determined a preliminary option in which the west part of the plan area could be serviced by a lift station located in the northwest part of the area, pumping into the existing force main on 36 Avenue. The east part of the plan area would outfall to the Morgan Creek pump station or to the pump station in the northwest by way of a gravity sewer across Barbara Creek.

Since Stage 1, another alternative outfall has been identified. This involves the construction of a gravity sewer across Highway 99, through Winter Crescent, to an existing 375 mm diameter sanitary trunk on King George Highway, a distance of approximately 650 m. A 375 mm diameter pipe is required to accommodate the sanitary flows, estimated to cost approximately $855,000, including the Highway 99 crossing, but excluding land/right-of-way costs through the golf course. Construction of this gravity sewer is less costly for both capital and operating costs than the lift station identified in Stage 1, and would also service the Winter Crescent

area. It is, therefore, the preferred outfall for the area west of Barbara Creek. It is proposed that this system be added to the 10 Year Servicing Plan, thus qualifying for DCC credits.

This system would however involve significant front-ending of capital costs and as well the right-of-way through the golf course may not be easy to obtain. Consequently, an interim service could be constructed involving an inverted twin siphon running from approximately 100 metres west of 150 Street, under the freeway and along Winter Crescent to King George Highway.

Since the siphon system is a temporary system and does not therefore qualify for DCC credits, the developers may elect to construct a portion of the 375mm permanent system at the same time, installing the siphon in the same trench. The first phase would involve a permanent system 100m west of 150 Street, and then twin 200mm siphons to King George Highway. The siphon system would be parallel 200mm pressure pipes, subject to detailed engineering at the time to confirm capacity requirements, cleansing velocities and the likely timing of the permanent system. The cost of the siphon system is estimated to be $316,000. It is proposed that the permanent portion of the system be included in the 10 year servicing plan and qualify for DCC credits, while the interim siphon system would not qualify.

Servicing of the area east of Barbara Creek depends upon the timing of development for the Central Neighbourhood. If the Central Neighbourhood proceeds in advance of the area east of Barbara Creek, the preferred alternative would be to outfall to the Central Neighbourhood sanitary sewer system. However, if the area east of Barbara Creek wishes to proceed in advance of the Central Neighbourhood, then an alternative service could be considered, involving a gravity sewer constructed across the Barbara Creek ravine to the western outfall. An assessment of whether the existing bridge may be used to carry this pipe will need to be determined by the applicant. Neither of these options qualify for DCC credits because the flows are below 40 lps. However, the outfall on 36 Avenue west from 150 Street is to be sized to accommodate this area, and this pipe does qualify for DCC credits.

On-site Services

Exhibit 13 presents the sanitary servicing system proposed for the plan area. The main components of the system are as follows:

- The lands west of 150 Street will drain north and west to the gravity sewer to be constructed across Highway 99.

- The lands between Barbara Creek and 150 Street and the lands south of 34 Avenue, including the industrial area in the Central Neighbourhood, would drain through a 250 mm diameter pipe on the west side of Barbara Creek, skirting the top of the property north of 36 Avenue and outfalling west to the outfall described above. A right-of-way will need to be obtained across the lots on the west side of Barbara Creek and around the lot on the north side of 36 Avenue.

- The lands east of Barbara Creek would drain either north and east along 37 Avenue to Morgan Creek pump station #2, a distance of 1.8 km; or to a gravity sewer across the bridge over Barbara Creek at 36 Avenue, connecting to the system described above. This

segment of sanitary sewer will require a right-of-way along the east side of Barbara Creek, and across the lot north of 36 Avenue if it outfalls to the Morgan Creek pump station. The flows for this area are estimated to be 14 lps, therefore these pipes do not qualify for DCC credits.

An area of Grandview Heights in the Central Neighbourhood lying above the 41 metre contour line may also be serviced through the plan area. This would involve a pressure sewer connecting to the forcemain on 36 Avenue. The sewer would be located within the 34 Avenue and 150 Street roadways, as shown in Exhibit 13. This pipe would be constructed by the developer for the Grandview Heights area, and is only presented here to identify the need to retain a right-of-way through Sector 1.

4.3.4 The City of Surrey 10-Year Sanitary Servicing Plan (1993)

The City of Surrey 10-year servicing plan provided for construction of the lift station and forcemain for Morgan Creek, described above. These works have already been constructed. Thus, there are no remaining works to be undertaken in the area within the current 10-year servicing plan.

As indicated above, it is proposed that the construction of the gravity sewer across Highway 99 to the sanitary sewer on King George Highway be added to the 10 year servicing plan

4.4 STORM SERVICING

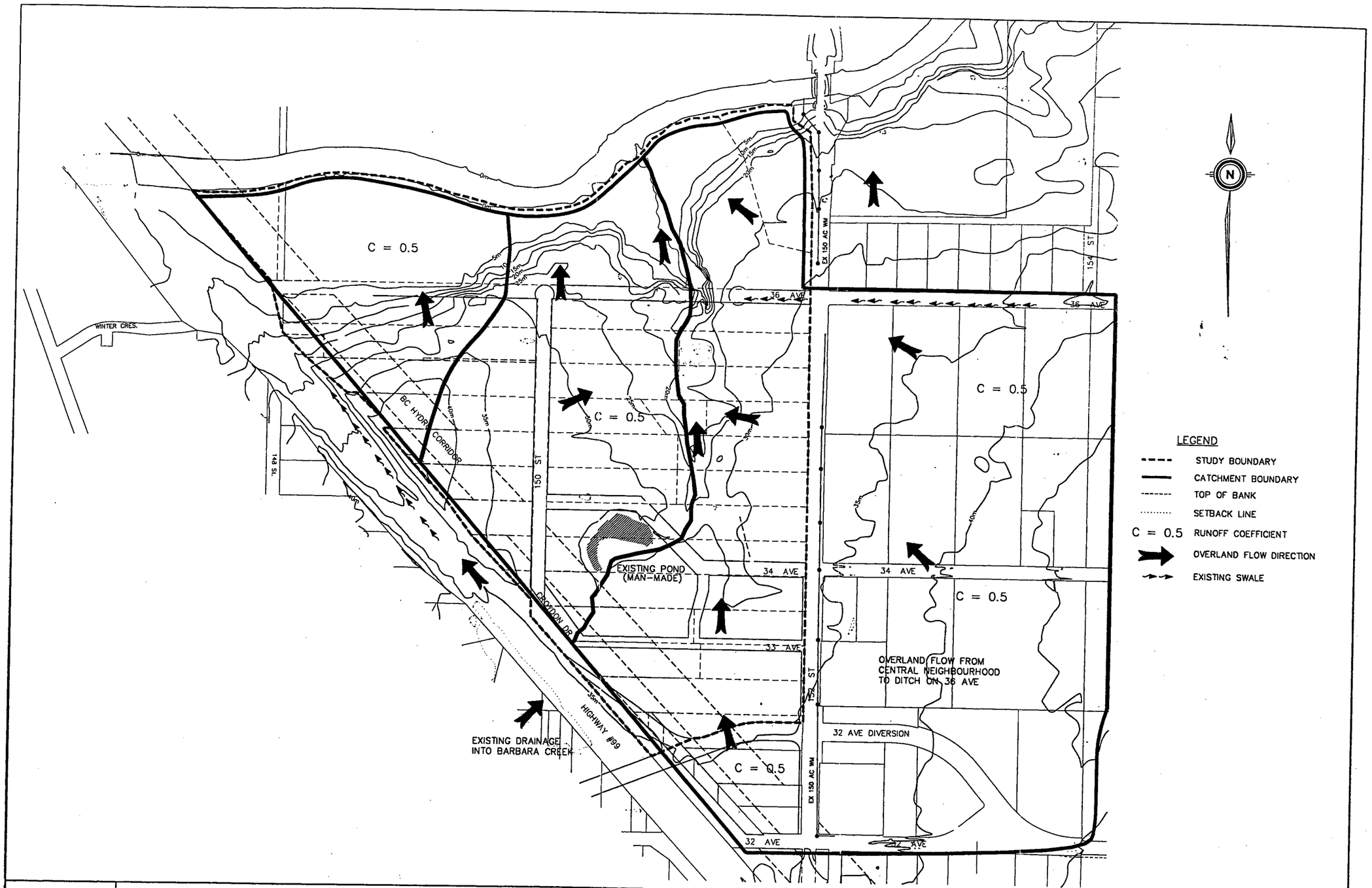
4.4.1 Existing Storm Drainage System

There are no storm sewers within the study area, except on the periphery along 152 Street where road drainage is conveyed north from 32 Avenue towards the Nicomekl River. These pipes will need to be upgraded to accommodate additional development east of 152 Street in conjunction with the Central Neighbourhood development.

Recently a corrugated metal pipe has been installed on the 36 Avenue alignment to convey flows from the ditch east of Barbara Creek to the bottom of the ravine to address bank erosion that was occurring from surface runoff. Additional erosion protection will be required to accommodate the major, overland drainage from the future Central Neighbourhood development.

Internally, the area is served by ditches outfalling to Barbara Creek and to the Nicomekl River. Recently some culverts along 150 Street, have overflowed, flooding some properties on the east side of 150 Street. The storm system will need to be upgraded to relieve flooding.

There is an existing man-made pond located within the Barbara Creek alignment, at approximately the 34 Avenue alignment. The pond was developed as an ornamental pond and does not have any storm water management value, as confirmed in the Barbara Creek Master Drainage Plan Update. The pond has been filling with silt over the past few years, further reducing the limited detention capacity of the facility. With the flooding and overflow of the pond occurring on a regular basis, Barbara Creek to the north has been subject to erosion,



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Rosemary Heights, West Neighbourhood
Existing Storm Catchment Boundaries

Exhibit 14

SCALE: NTS

DATE: APRIL, 1997

particularly the steeper section immediately north of the pond. Protection of the creek from erosion needs to be undertaken by the City.

Internally, the study area comprises three main catchment areas, as shown in Exhibit 14:

- The east side of Barbara Creek to 152 Street.
- The west side of Barbara Creek to the height of land west of 150 Street, which drains into Barbara Creek.
- The northwest portion of the neighbourhood which drains north towards the Nicomekl River.

External catchment areas impacting the NCP area are as follows:

- A large area to the south of Highway 99, which drains under the highway and into Barbara Creek.
- A large portion of land east of 152 Street which drains west through to Barbara Creek.

4.4.2 Elgin Creek 1995 Master Drainage Plan Update

In 1995, the City of Surrey commissioned a drainage study of the Elgin Creek watershed, including Elgin Creek, Anderson Creek and Barbara Creek. All three creeks drain northward and discharge stormwater flows into the Nicomekl River. Barbara Creek flows through this NCP area.

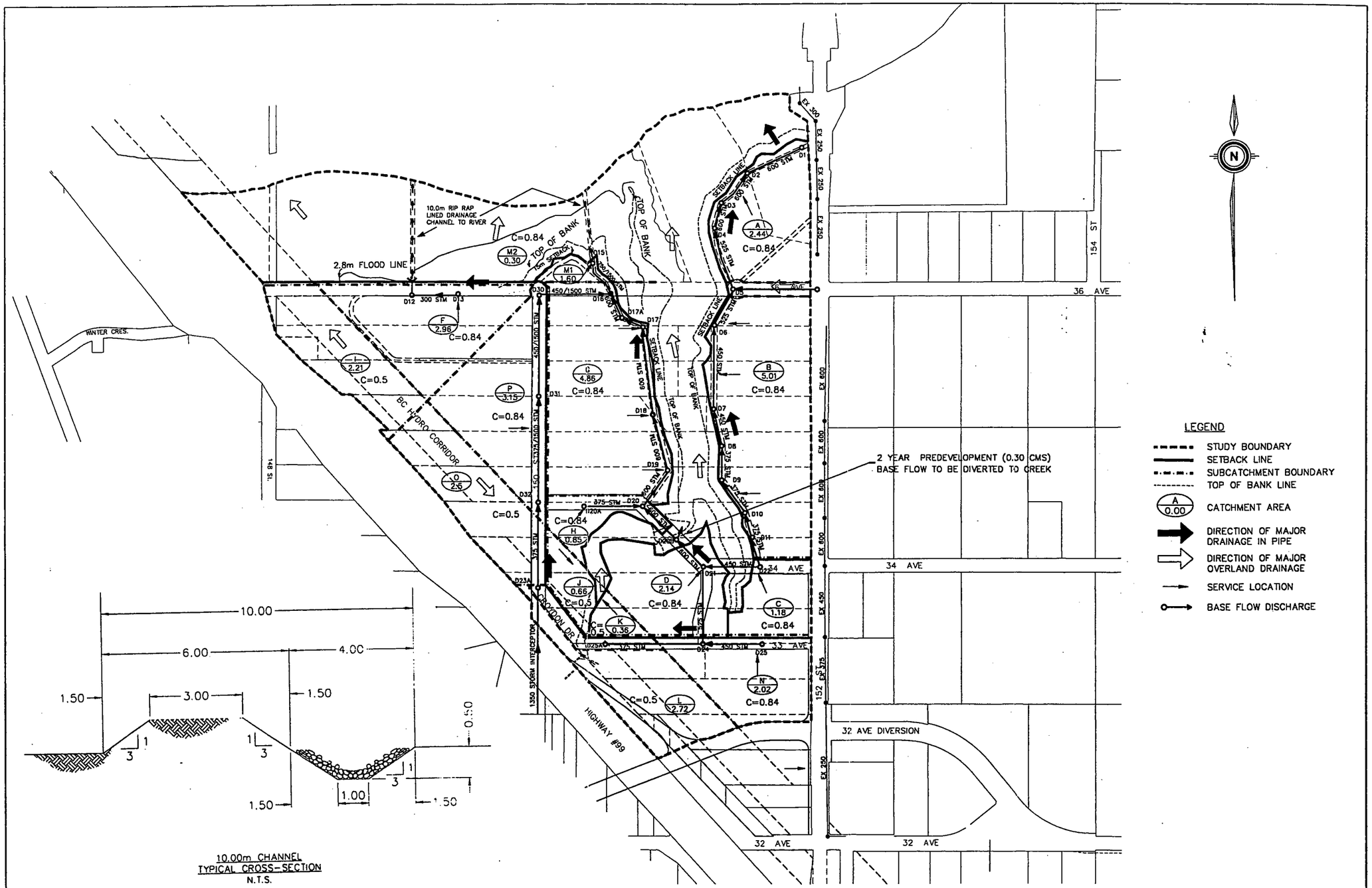
The study examined pre and post development flows and requirements for improvements to the system and recommended the following which impact this neighbourhood:

- the existing wet pond on Barbara Creek has limited capacity for expansion and if preserved, it would be for aesthetic purposes only;
- flows on 152 Street from King George Highway to Highway 99 should be diverted to a King George Highway trunk sewer, thus reducing flows to Barbara Creek;
- flows from the lands south of Highway 99 should be accommodated by construction of a 1350 mm diameter trunk sewer on 150 Street outfalling to the Nicomekl River. This pipe is to be sized to convey the 5 year flows, and is proposed in lieu of an upstream detention pond within the West Rosemary neighbourhood.
- miscellaneous creek improvements on Barbara Creek minimize erosion from the base flows.

4.4.3 Proposed Storm Drainage System

The proposed storm drainage system to service the neighbourhood is shown in Exhibit 15.

The east catchment will be serviced by sewers running north along the Barbara Creek top of bank setback line, from 34 Avenue past 36 Avenue, to 152 Street, where they will be



10.00m CHANNEL
TYPICAL CROSS-SECTION
N.T.S.

IBI GROUP

Rosemary Heights, West Neighbourhood
Storm Servicing Concept

Exhibit 15

SCALE: NTS

DATE: APRIL, 1997

combined with flows from the Central Neighbourhood, and conveyed to the Nicomekl River within the 152 Street right-of-way. The estimated five year flows at the outfall from this neighbourhood are 0.33 cubic metres per second. This catchment area is approximately 7.5 hectares in area and does not qualify for DCC rebates.

As discussed, the Barbara/Elgin Creek Master Drainage Plan commissioned by the City of Surrey has recommended the construction of a 1,350 mm diameter trunk interceptor sewer. The design consultants for the City propose that this sewer, which drains the lands south of Highway 99, should follow an alignment along 150 Street to 36 Avenue and then outfall to the Nicomekl River by way of three alternatives:

a) Direct it north to the Nicomekl River;
b) East along 36 Avenue and north adjacent to the short ravine immediately west of Barbara Creek;
c) West along 36 Avenue and north to the Nicomekl River.

The consultants are examining the alternatives and the City is attempting to obtain a right-of-way for the outfall from 36 Avenue to the Nicomekl River. This storm sewer will be constructed by the City of Surrey and is currently being designed. The sewer will need to be upgraded from 1,350mm diameter to 1,500mm diameter to accommodate storm flows from this neighbourhood, as noted below.

The south central catchment area, extending south to Highway 99 between Barbara Creek and 150 Street, will drain north in a storm sewer to be constructed on the west side of Barbara Creek. Most of this area will outfall to the major interceptor trunk in 150 Street, depending on design grades of the two pipes. The 5 year flows in the central portion of the system are expected to be as high as 0.47 cms, requiring 600 mm diameter pipe, prior to connecting to the major trunk interceptor. This catchment area is approximately 9 hectares and, therefore, the pipe section to the point of connecting to the main interceptor, does not qualify for DCC rebates.

The portion that cannot drain by gravity to the main interceptor, possibly comprising 2.5 ha, will require a separate detention facility for discharge to Barbara Creek, or discharge north to the Nicomekl River.

The northwest catchment area, comprising 3.26 hectares **and bounded by the Hydro right-of-way and the height of land** on the west side of 150 Street **(area F in Exhibit 15)**, will drain north across 36 Avenue and outfall to a riprapped ditch outfalling to the Nicomekl River. The peak five year flows for this area are estimated to be 0.15 cms. This system does not qualify for DCC rebates. The developer of the lands within this service area will need to negotiate with the landowner a right-of-way from 36 Avenue to the Nicomekl River.

The west catchment, consisting of the lands immediately west of 150 Street, will be serviced by the main interceptor trunk on 150 Street. As shown in Exhibit 15, the flows from the west sector require a 450 mm diameter pipe. The trunk interceptor sewer proposed in the Barbara Creek / Elgin Creek Drainage Study, is 1350 mm diameter. The combined sewer requirements will be 1500 mm diameter. This sewer will be constructed by the City of Surrey as part of the implementation of the Elgin Creek Master Drainage Plan as noted above.

If the developers wish to proceed before the City constructs the interceptor pipe on 150 Street, then they will be responsible to construct the storm services to accommodate their own development, as well as obtain necessary rights-of-way.

The areas within the BC Hydro right-of-way (area O, J, K, L, shown in Exhibit 15) will drain overland to Barbara Creek, requiring culverts to be constructed across 150 Street and 33 Avenue in conjunction with relocation of Croydon Drive. The storm system will be designed such that 2-year pre-development flows continue to drain into Barbara Creek in order to maintain waterflows and the biological features of Barbara Creek. The Hydro right-of-way on the northwest section of the sector will drain overland to the Nicomekl River, as at present.

An analysis has been carried out of the impact of the 100 year flow. It is estimated that the 100 year hydraulic grade line will be within the pipe throughout the system. Each project will need to be examined in detail at time of application to ensure that basements, if desired, are above the 100 year HGL.

The manholes adjacent to Barbara Creek at 34 Avenue to 36 Avenue will be designed to divert into Barbara Creek base flows equivalent to the 2-year/24 hour pre-development level. Flows in excess of this will be carried through the pipe system to the Nicomekl River. These base flows were derived from the Master Drainage Plan for the Barbara Creek and Elgin Creek basin amounting to 0.3 cms, and are shown in Exhibit 15.

The channels carrying runoff to the Nicomekl River will be designed to handle 100 year flows to prevent erosion to the floodplain, consistent with MOE and DFO design guidelines. These channels will be flat-bottomed and armored with riprap to ensure erosion does not occur during heavy rainfall events. These 100 year flows are detailed in the Barbara Creek/Elgin Creek Storm Water Management Plan. Statutory rights-of-way 10.0m in width to accommodate the channel and an adjacent maintenance road will be provided.

Stormwater quality will need to be maintained for flows discharging to both the Barbara Creek and the Nicomekl River. This will be accomplished by construction of oil separators, and by implementation of biofiltration swales intercepting flows from the parking lots adjacent to the Barbara Creek. It will be the developer's responsibility to install and maintain the oil separators and the biofiltration swales on private property. Details of the practices and procedures to maintain and enhance storm water quality are described in the Environmental Assessment Report presented in Appendix A, as well as in the "Land Development Guidelines for the Protection of Aquatic Habitat", published by Fisheries and Oceans, Canada.

4.4.4 Surrey 10 Year Storm Servicing Plan (1993)

Currently the City of Surrey has three major works in the 10 year servicing plan which are relevant to the Sector 1 area.

Table 6: City of Surrey 10 Year Storm Servicing Plan

Reference No.	Location	Description	Estimated Cost	Start Before
3206	36 Ave: 151 St to 152 St	new sewer	$100,000	2002
4080	151 St: 34 Ave - 37 Ave	erosion protection	$210,000	2002
3119	150 St at 32 Ave	community detention storage within the right-of-way	$610,000	2002

The storm sewer on 36 Avenue will be required when development on either side of 36 Avenue east of Barbara Creek proceeds. (#3206)

Erosion protection for Barbara Creek will be required, as discussed earlier (#4080). If this is not carried out earlier, it should be put in place with construction of 34 Avenue. This would be funded by the City of Surrey through the DCC's.

The community detention pond is not proposed (#3119). Rather, the 150 Street storm interceptor system with direct discharge to the Nicomekl River is proposed, with on-site storm quality control, such as oil separation man-holes and biofiltration swales, as discussed earlier.

The estimates of costs to construct the elements of each of the infrastructure systems and corresponding DCC recoveries are presented in Section 5.5.

5.0 IMPLEMENTATION

5.1 ZONING AND DEVELOPMENT GUIDELINES

Development of the NCP area should proceed based on Surrey's zoning bylaw. Specific standards for development, including minimum lot dimensions, building setbacks, densities and coverage, are established in Surrey's zoning and subdivision by-laws, and as well as other applicable development controls. The design and siting of multi-family development is regulated by the Development Permit process. Specific design guidelines are attached as Appendix C. A proposed zoning map for the residential areas is contained in Appendix D.

Basic Land Use Guidelines for Cluster Housing Areas:

- Additional setback requirements as stipulated by the environmental agencies will apply;
- Easements or rights-of-ways that will ensure public access along the ravine and around the pond area will be secured as part of the development approval process;
- The number of units may be derived using the maximum density of 6 units per acre, to be applied on the gross site area;
- The height of the principal building will be limited to two storeys (11 metres); and
- An appropriate CD zone will be drafted for this specific use.

Due to the environmental significance of the ravine and pond, specific development guidelines for the bordering areas are outlined below:

Development Guidelines for Areas Bordering Barbara Creek and West of 150 Street

- Adjacent to Barbara Creek ravine, the principle of density bonusing will apply wherein the calculation of unit entitlement will be based on the entire site, subject to the dedication of the ravine;
- West of 150 Street, the principle of density bonusing applied to the entire site, including the Hydro right-of-way;
- An appropriate CD Zone will be drafted for each development and will include Cluster Housing areas as well as Townhouse areas so as to integrate these developments;

Development Guidelines for the Cluster Housing around the Pond

- The principle of density bonusing will apply wherein, the calculation of unit entitlement will be based on 6 units per acre of the gross site area, subject to the dedication of the pond site;
- Consultation with BCE and DFO would be required prior to any alteration or enhancement of the pond area.

Development Guidelines for Area North of 36 Avenue West of Barbara Creek

Lands north of 36 Avenue and west of Barbara Creek have limited development potential due to the environmental and topographical characteristics. Recognizing that the site is designated as clustering at 6 units per acre (based on the gross site area), and in order to take advantage

of the site's view opportunities and isolated location at the end of 150 Street, a townhouse or other suitable form of residential development may be accommodated subject to the following development guidelines:

- Development shall occur on developable lands to be determined in consultation with environmental agencies;
- the height of residential buildings adjacent to 36 Avenue shall not exceed that of the RM-15 zone;
- the development form (eg. massing and height) must be compatible with adjacent development and with the site's physical characteristics;
- all setback requirements as stipulated by the Provincial and Federal environmental agencies must be adhered to;
- all undevelopable lands must be retained as open space;
- rights-of-ways or easements will be secured to allow public access, subject to approval from the environmental agencies;
- site development must adopt maximum tree preservation;
- Geotechnical reports may be required for development located on or near slopes; and
- environmental assessments may be required, as deemed necessary by the City at the time of development application.

5.2 ENVIRONMENTAL CONSIDERATIONS

5.2.1 Natural Features

The environmental assessment carried out by Scott Resources (Appendix A) has identified as following environmentally sensitive elements: the Barbara creek and ravine areas, Nicomekl River floodplain and escarpment, and significant stands of trees.

Wildlife:

- floodplain of the Nicomekl River providing wildlife habitat for migratory waterfowl;
- Sitka spruce trees along the floodplain south of the Nicomekl River previously utilized by the blue-listed great blue heron for nesting;
- wildlife habitat and migration corridors associated with the riparian zone of Barbara Creek;
- woodland areas (coniferous, mixed coniferous/deciduous, deciduous) providing suitable habitat to support upland game birds, raptors, and a diverse population of passerines;
- wildlife trees (cavity-nesting and feeding trees) along the upland area; and
- Nicomekl River great blue heron colony located between the Nicomekl River and 40th Avenue (outside of Rosemary Heights West Neighbourhood).

Aquatic:

- salmon-bearing waters of Barbara Creek (up to 600 m upstream) and the Nicomekl River;
- water quality, nutrient and insect production in the upper portion of Barbara Creek and the eastern ephemeral drainage.

5.2.2 MOE Requirements

The Ministry of Environment, in consultation with the Department of Fisheries, have identified the following requirements with respect to the future development of the plan area:

Stormwater Management

- The drainage strategy should be consistent with the recently approved Elgin Creek Master Drainage Plan document;
- No sacrifice of riparian vegetation within the 15m from top of bank can occur;
- Any flow that is split off of the trunk sewer to provide low flow input into the creeks must be treated through a biofiltration facility;
- Each development site that is considered high density must provide on-site sedimentation control, oil/water separators and biofiltration areas adjacent to paved areas; and
- Consultation with BCE and DFO would be required prior to any alteration or enhancement of the pond area.

Road Network

- If crossings of the Fisheries Sensitive Zone (FSZ) are to occur, compensation for the lost habitat will be necessary;
- Any FSZ crossings should be clearspan bridges, or on smaller drainages, open bottom culverts; and
- The relocation of Croydon Drive and any other roadway, would require compensation for habitat loss for any future crossing or infringement on the FSZ. This compensation could be defined at the time of detailed planning for the project.

Development Setbacks

- Setback requirements for development must be in accordance with the Land Development Guidelines;
- For the area north of 36 Avenue and west of Barbara Creek, Top of Bank is to be confirmed by BCE and DFO, and all areas within the setbacks from this top of bank should be registered under a restrictive covenant to MOELP; and
- The ravine and floodplain of the creek systems within the NCP must be left in a natural state.

Wildlife Considerations

- Trees containing nests of some raptors (hawks, owls, eagles etc.) and great blue herons are to be protected under section 35 of the Wildlife Act;
- It is the responsibility of the proponent to determine if trees containing raptor or great blue heron nests are present at the site to be developed;
- The proponent will be required to engage the services of a qualified environmental consultant to undertake a raptor survey according to BC Environment criteria prior to rezoning or building permit approval The results of the completed survey are to be forwarded to BC Environment. No land clearing is to occur at the site until the completed

survey has been reviewed and the proponent is notified in writing by BC Environment that such activity can proceed; and
- Section 35 of the Wildlife Act provides for protection of birds and their eggs and their nests during annual nesting activities. Land clearing must not be undertaken during the period of April 1 through July 31 to avoid possible contravention with the Act.

Pedestrian/Bike Trail System

- As an alternative to trails within the FSZ, lookout areas providing views of the creek system are encouraged;
- The jointly drafted BCE/DFO document, "A Guide to Access Management near Aquatic Areas" should be referred to when planning the construction of a trail system adjacent to a watercourse; and
- Trails should be constructed out of gravel or as a raised boardwalk to further reduce impervious area and allow for natural drainage and infiltration of rainfall.

Tree Community Management

- An arborist should be consulted prior to all developments proceeding, to ensure that possible hazard trees are identified before the buildings are constructed. This would include a survey of the trees in the setback areas, and the strategy for their protection, structure pruning, or removal; and
- Any work proposed within the setback area would have to be approved by Fish and Wildlife Management.

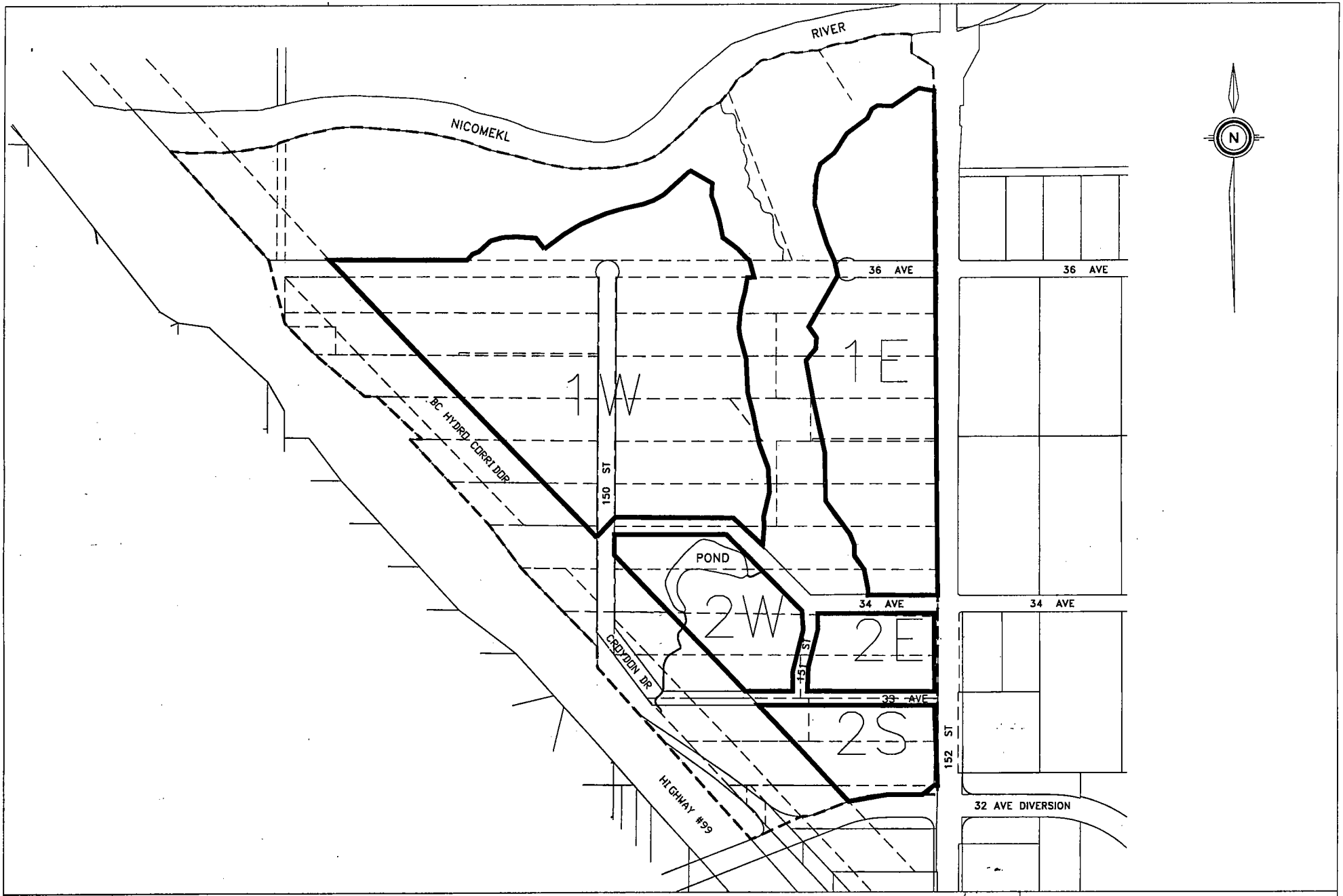
Existing trees worthy of retention and located outside of the protected areas will be reviewed with the intention of preserving as many as practically possible during the site planning and development review process. Preservation will be accomplished in accordance with the strict provisions of Surrey's Tree Removal and Replacement Bylaw, as amended. Quality trees identified by detailed survey, as required by the by-law at the time of subdivision/rezoning, will be incorporated into the planning for individual sites.

5.3 PHASING

Current plans and phasing for the Rosemary neighbourhood, such as the Major Road Network Study, assume that the west and central NCP areas could develop at an average rate of 200 units per year.

Although the West Sector represents less than one-third of the entire neighbourhood area, it is anticipated that the proximity of the West Sector to services and Highway 99 could result in this Sector attracting a greater proportion of the neighbourhood development over the next 10 years. Accordingly, for purposes of determining phasing of infrastructure and DCC revenues and costs, it was assumed that the West Sector would develop at the rate of 100 units per year.

An initial staging plan has been developed and is shown in Exhibit 16. This plan reflects the ease of providing services, likely timing of market acceptance of proposed housing forms and known landowner interest in development. Consideration was also given to minimizing early



IBI GROUP

Rosemary Heights, West Neighbourhood

PROPOSED PHASING

EXHIBIT 16

SCALE: N.T.S.

DATE: APRIL, 1997

major infrastructure costs and orienting development to single catchment areas. The resultant sequencing of development would be as follows:

- 1998/1999 - lands between Barbara Creek and 150 Street.(1W)
- 1999/2001 - lands west of 150 Street. (1W)
- 2000/2005 - lands east of Barbara Creek. (1E)
- 2005/2007 - land south of pond (2W and 2S)
- 2006/2008 - apartment site.(2E)

It is recognized that the sequencing of development may change in function of landowner interests, market considerations, and other factors. As long as a development proposal adequately deals with and/or front ends the provision of infrastructure required, it should be allowed to proceed.

5.4 COMMUNITY AMENITIES

The NCP Terms of Reference require that community amenities be included in each NCP Report. Requirements such as fire services, police services, library books, recreation facilities and affordable housing must be addressed.

The following amenity provisions have been supplied by the City of Surrey Planning Department. The formulas for police and fire protection are based on a projected population growth of 5% per year which translates to 14,250 persons per year. Five percent of the average annual capital expenditure is $23,250 for the RCMP, and $145,000 for the Fire Department. These are both derived from the respective 10 Year Capital plans.

Fire Protection

The plan area is currently served by Fire Hall No. 17, which is situated on 32 Avenue, at the southern edge of the Central Neighbourhood.

The City of Surrey Planning Department has recommended this contribution be $216.00 PER UNIT. This contribution is based upon a projected growth rate of 5% paying for 5% of the average annual capital expenditure for the next 10 years.

Police Protection

Police protection services are based on the capital costs of providing enough officers to serve the community. The contribution for this amenity, as supplied by Surrey, is $50.00 PER UNIT. This contribution is based on a projected growth rate of 5% of the average annual capital expenditure for the next 10 years.

Library

The Surrey Public Library has provided neighborhood costs based on a per capita contribution towards providing materials and books. The standard for providing these materials is 1.5 items per capita at $25.00 per item. Based on an average of 3 persons per unit, the estimated cost is $112.50 PER UNIT.

Parks and Open Space

The development costs of active and passive parks serving the NCP area are included as part of the amenity package. The City of Surrey Parks and Recreation Department has supplied the following costs for the West Neighbourhood:

Table 7: Parks - Open Space Development Costs

POND SITE	$72,000	
Open Space Clearing and Clean-up	$20,000	
Walkways	$114,375	
Pedestrian Bridge	$9,000	
Total Parks Amenity Cost		$215,375.00
Total PER UNIT Cost		$196.50

Credits will be given for actual works provided on the condition that such works are acceptable to the City's Parks & Recreation Department.

Assuming a per unit contribution of $575.00, the new neighbourhood is expected to generate a total of $630,200 at full build out. A minimal amount ($429.00) will be contributed by future developers of the 0.4 acre commercial site, specifically for fire and police protection.

Table 8 - Community Amenity Costs
(based on 1,096 dwelling units)

Service	Unit Cost	Total Projected Contributions
Fire Protection	$216.00/unit	$236,736
Police Protection	$50.00/unit	$54,800
Library	$112.50/unit	$123,300
Parks and Open Space	$196.50/unit	$215,364
TOTAL	**$575.00/unit**	**$630,200**

5.5 SERVICING COST ESTIMATES

Estimated costs of the roads, water, sanitary and storm servicing systems for this NCP are summarized below and are presented in detail in **Exhibits F.1 to F.5**. The timing of all expenditures and receipt of DCC revenues is based upon the initial staging plan outlined in Section 5.2, commencing in 1998.

5.5.1 Road Costs

The estimated cost of streets and lanes for each component of the network, those components that qualify for DCC rebate, and the estimated DCC revenues and expenditures by year including the cumulative cash flow are presented in Appendix G.1.

It is shown in the Exhibit that curb/gutter, sidewalk and streetlights associated with widening of 152 Street and installation of signals on 152 Street qualify for DCC rebates, amounting to $353,000. These expenditures would occur in 1998 ($85,000), and in the year 2000

($268,000). The costs and DCC rebates for the traffic signals may be due to the Central Neighbourhood if it proceeds before the West Neighbourhood.

DCC revenues for arterial roads amount to approximately **$480,000** per year, and for collector roads amount to approximately $120,000 per year, resulting in a net surplus after 10 years of $5.9 million.

5.5.2 Water Servicing Costs

The estimated costs of the watermains, and the segments recommended to qualify for DCC rebates are presented in Exhibit G.2. As shown in the table, the components recommended to be added to the 10 Year Servicing Plan, thus qualifying for DCC credits are as follows:

Table 9: Water Servicing Costs

Pipe Size	Location	Cost	Year	DCC Portion[2]	DCC Amount
350 mm watermain	152 Street, 32 Avenue to 36 Avenue	$248,000[1]	1998-2000	40%	$99,200
350 mm watermain	152 Street South, 32 Avenue to 28 Avenue	$279,000	2006	40%	$111,600
250 mm watermain	148 Street, 35 Avenue to 36 Avenue; 36 Avenue, 145 Street to 150 Street.	$216,400	1998	100%	$216,400
250 mm watermain	150 Street, 36 Avenue to 34 Avenue; 34 Avenue, 150 Street to 152 Street.	$190,200	1999-2000	40%	$76,080
Total		$933,600			$503,280

Note[1]: Full cost, to be shared with Central Neighbourhood.
Note[2]: Off-site portion to be 100% DCC rebate; on-site oversize to be 40% DCC rebate.

The estimated development phasing, water DCC revenues, and expenditures are also shown in Appendix G.2 which indicates:

- The total water DCC revenues are approximately $980,000.
- The total expenditures qualifying for water DCC rebates amount to approximately $500,000.
- The estimated deficiency in the water DCC account is $60,000 or less and would be funded by the private development.

5.5.3 Sanitary Servicing Costs

The sanitary system costs are shown in Exhibits F3.1 and F3.2. These cost estimates present respectively, both the permanent system involving a gravity sewer across Highway 99 through Winter Crescent, as well as the interim siphon system described earlier.

It is proposed that the permanent gravity system, from 150 Street to the King George Highway, be added to the 10 Year Servicing Plan and thus qualify for 100% DCC rebate, amounting to

approximately $775,000. The portion of the system which is to be oversized through the neighbourhood to accommodate this NCP and some Central NCP flows should also be added to the 10 Year Servicing Plan and also qualify for 40% DCC rebate, or $102,000.

Since the gravity system involves significant front-end expenditure, well in excess of the DCC revenues, and since there may be some difficulty in obtaining a right-of-way through the golf course, an alternative siphon system has been defined and costed, as shown in Exhibit F3.2. This alternative involves less expenditure in the first year and results in significantly less DCC short-fall in the first year (a $135,000 deficiency compared to $692,000 deficiency) than the gravity alternative. Accordingly, this option is proposed with the proviso that as much of the permanent system be constructed in phase 1 along with the siphon system as available DCC's permit.

5.5.4 Storm Servicing Costs

As indicated in Exhibit F.4, none of the storm sewers proposed to serve the neighbourhood would serve areas greater than 20 ha and none, therefore, qualify for DCC rebate. The 1500 mm interceptor pipe is to be constructed by the City of Surrey and is not, therefore, shown in the cost table. The creek improvement costs and the 36 Avenue trunk to serve the Central Neighbourhood are the only items qualifying for DCC credits, estimated to amount to $310,000.

The total storm DCC revenues are estimated to be $1.1 million.

5.5.5 Total DCC Revenues and Expenditures

Exhibit F.5 also presents a summary of total DCC revenues and expenditures by year. The exhibit indicates total DCC revenues of $9.2 million and expenditures of $1.5 million.

Location	Class	Length	Local Streets (8.5m)		Thru Local & Minor Collector (11m)		Collector and Arterial Roads						Sidewalks		Lanes		Streetlights		Total Cost	Arterial DCC Walks/Lights	Collector DCC alks/Lights	Year Requested
							Asphalt 12.2m Width		Asphalt 14.3m Widening		Curb & Gutter											
		l.m.	l.m.	Cost	l.m.	Cost	l.m.	Cost	l.m.	Cost	l.m.	Cost	l.m.	Costs	l.m.	Cost	l.m.	Cost				
152 ST, 32 AV-36AV	Arterial	1050		$ -		$ -	0	$ -	1050	$ 450,450	1050	$ 26,250	1050	$ 52,500		$ -	1050	$ 105,000	$ 634,200	$ 183,750		2000
34 AV/152 ST SIGNAL		0		$ -		$ -		$ -		$ -	0	$ -		$ -		$ -		$ 85,000	$ 85,000	$ 85,000		1998
36 AV/152 ST SIGNAL		0		$ -		$ -		$ -		$ -	0	$ -		$ -		$ -		$ 85,000	$ 85,000	$ 85,000		2000
TOTALS		1050	0	$ -	0	$ -	0	$ -	1050	$ 450,450	1050	$ 26,250	1050	$ 52,500	0	$ -	1050	$ 275,000	804200	$ 353,750		
UNIT PRICES				$ 255		$ 330		$ 360		$ 429		$ 25		$ 50		$ 180		$ 100				

2. Sources of Funds - DCC Qualifying Roads

Location	Type of Works	Current or Addition	ID # 10 Year Plan	Amt ($) Current Program	Additions to Prog. ($)	Eligible for DCC Prog. (Y / N)	Refinement of DCC Program	Type of Funding Methods		Construction by Surrey / Developer	Year Requested
								Existing	Proposed		
152 ST, 32 AV-36AV	Arterial Widening	Current	2948	$2,400,000		Y	$183,750	DCCR		Surrey	2000
34 AV/152 ST SIGNAL	Signals	Current				Y	$85,000	DCCR		Surrey	1998
36 AV/152 ST SIGNAL	Signals	Current				Y	$85,000	DCCR		Surrey	2000
TOTALS				$ 2,400,000	$ -		$ 353,750				

3. Cash Flow-DCC Qualifying Roads

Year	Phase	Units				Commercial Space (Sq. Ft.)	Arterial DCC			Collector DCC			Arterials & Collector DCC +/(-)
		Cluster/ Townhouses	Garden Apts	High Apts	Total		Revenues	Expenses	Cumm. +/(-)	Revenues	Expenses	Cumm. +/(-)	
1998	1W	100			100		$ 480,000	$ 85,000	$ 395,000	$ 122,000		$ 122,000	$ 517,000
	1E												
1999	1W	100			100		$ 480,000		$ 875,000	$ 122,000		$ 244,000	$ 1,119,000
	1E												
2000	1W	50			100		$ 480,000	$ 268,750	$ 1,086,250	$ 122,000		$ 366,000	$ 1,452,250
	1E	50											
2001	1W	50			100		$ 480,000		$ 1,566,250	$ 122,000		$ 488,000	$ 2,054,250
	1E	50											
2002	1W	50			100		$ 480,000		$ 2,046,250	$ 122,000		$ 610,000	$ 2,656,250
	1E	50											
2003	1W	65			100		$ 480,000		$ 2,526,250	$ 122,000		$ 732,000	$ 3,258,250
	1E		35										
2004	1W				85		$ 408,000		$ 2,934,250	$ 103,700		$ 835,700	$ 3,769,950
	1E		85										
2005	1E		85		85		$ 408,000		$ 3,342,250	$ 106,700		$ 942,400	$ 4,284,650
	2W					6250							
2006	2W				115	6250	$ 481,608		$ 3,823,858	$ 122,780		$ 1,065,180	$ 4,889,038
	2S		58	57									
2007	2S		58		115		$ 469,920		$ 4,293,778	$ 122,780		$ 1,187,960	$ 5,481,738
	2E			57		6250							
2008	2E			96	96	6250	$ 334,248		$ 4,628,025	$ 85,560		$ 1,273,520	$ 5,901,545
Totals		565	321	210	1096	25000	########	$ 353,750	$ 4,628,025	########	$ -	$ 1,273,520	$ 5,901,545

DCC Charges Used:

Arterial Roadways:	
Cluster Housing(RM10)	$ 4,800
Townhouses(RM10	$ 4,800
Garden Apts(RM30)	$ 4,800
High rise Apts(RM70)	$ 3,360
Commercial	$ 1.87
Collector Roadways:	
Cluster Housing(RM10)	$ 1,220
Townhouses(RM10	$ 1,220
Garden Apts(RM30)	$ 1,220
High rise Apts(RM70)	$ 860
Commercial	$ 0.48

Surrey West Rosemary NCP
Recommended 10 Year Servicing Plan
Exhibit F2: Watermains

Location	150mm		200mm		250mm		300mm		350mm		Cost By St / Area	DCC Cost	Year
	Lm.	Cost	Lm.	Cost	Lm.	Cost	Lm.	Cost	Lm.	Cost			
152 ST, 32 AV-36AV		$ -		$ -		$ -		$ -	800	$ 248,000	$ 248,000	$ 99,200	1998/2000
152 ST, 32 AV-28AV		$ -		$ -		$ -		$ -	900	$ 279,000	$ 279,000	$ 111,600	2006
150 ST N, 34 AV-36 AV		$ -		$ -	300	$ 78,000		$ -		$ -	$ 78,000	$ 31,200	1998
36 AV W, 150 ST-148 ST		$ -		$ -	640	$ 216,400				$ -	$ 216,400	$ 216,400	2000
34 AV, 150 ST-152 ST		$ -		$ -	270	$ 70,200	150	$ 42,000		$ -	$ 112,200	$ 44,880	1998
TOTALS	-	$ -	-	$ -	1,210	$ 364,800	150	$ 42,000	1,700	$ 527,000	$ 933,600	$ 503,280	
UNIT PRICES		$ 200		$ 250		$ 260		$ 280		$ 310			

2. Sources of Funds - DCC Qualifying

Location	Type of Work	Current or Addition	ID # 10 Year Plan	Amt ($) Current Program	Additions to Prog. ($)	Eligible for DCC Prog. (Y / N)	Refinement of DCC Program	Type of Funding Methods		Construction by Surrey/ Developer	Year Requested
								Existing	Proposed		
152 ST, 32 AV-36AV	New Main	Current	2444	$ 240,000		Y	$99,200	DCCR		Developer	1998/2000
152 ST, 32 AV-28AV	New Main	Addition	-			Y	$111,600	DCCR		Developer	2006
150 ST N, 34 AV-36 AV	New Main	See below	2441				$31,200	DCCR		Developer	1998
36 AV W, 150 ST-148 S	New Main	Current	2443	$ 144,000		Y	$ 216,400	DCCR		Developer	2000
34 AV, 150 ST-152 ST	New Main	See above	2441			Y	$44,880	DCCR		Developer	1998
TOTALS				$ 384,000	$0		$503,280				

3. Cash Flow-DCC Qualifying

Year	Phase	Units				Commer-cial Space (Sq. Ft.)	Watermains DCC		
		Cluster/ Townhous	Garden Apts	High Apts	Total		Revenues	Expenditures	Cumulative +/ (-)
1998	1W	100			100		$ 94,000	$ 125,680	$ (31,680)
	1E								
1999	1W	100			100		$ 94,000		$ 62,320
	1E								
2000	1W	50			100		$ 94,000	$ 216,400	$ (60,080)
	1E	50							
2001	1W	50			100		$ 94,000	$ 49,600	$ (15,680)
	1E	50							
2002	1W	50			100		$ 94,000		$ 78,320
	1E	50							
2003	1W	65			100		$ 94,000		$ 172,320
	1E		35						
2004	1W				85		$ 79,900		$ 252,220
	1E		85						
2005	1E		85		85	6250	$ 81,963	$ -	$ 334,183
	2W								
2006	2W				115	6250	$ 94,773	$ 111,600	$ 317,355
	2S		58	57					
2007	2S		58		115	6250	$ 94,773	$ -	$ 412,128
	2E			57					
2008	2E			96	96	6250	$ 66,383		$ 478,510
Totals		565	321	210	1096	25000	$ 981,790	$ 503,280	$ 478,510

DCC Charges Used:

Cluster Housing(RM10)	$ 940
Townhouses(RM10	$ 940
Garden Apts(RM30)	$ 940
High rise Apts(RM70)	$ 670
Commercial	$ 0.33

Location	200 mm		250mm		300mm		375mm		Total	DCC	Year
	l.m.	Cost	l.m.	Cost	l.m.	Cost	l.m.	Cost	Cost	Portion	
~~36 AV E~~	~~1888~~	~~$ 612,888~~							~~$ 612,888~~		
36 AV W, HWY99-BARB CK		$ -		$ -		$ -	600	$ 326,250	$ 326,250	$ 244,688	1998
34 AV, 150 ST-152 ST	200	$ 68,000	130	$ 46,800		$ -		$ -	$ 114,800	$ 45,920	2005
BARB CK LANE W		$ -	400	$ 144,000		$ -		$ -	$ 144,000	$ 57,600	1999-2005
HWY 99 CROSS/PIPE BRG		$ -						$ 230,000	$ 230,000	$ 230,000	1998
HWY 99 to KGH		$ -		$ -		$ -	550	$ 299,063	$ 299,063	$ 299,063	1998
TOTAL	200	$ 68,000	530	$ 190,800	-	$ -	1,150	$ 855,313	$ 1,114,113	$ 877,270	
UNIT PRICES		$ 340		$ 360		375		$ 544			

2. Sources of Funds - DCC Qualifying

Location	Type of Work	Current or Addition	ID # 10 Years Plan	Amt ($) Current Program	Addition To Program ($)	Eligible for DCC Prog. (Y/N)	Refinement of DCC Program	Type of Funding Method		Construction By Surrey / Developer	Year Requested
								Existing	Proposed		
36 AV W, HWY99-BARB CK	New	Current	4032		$ 244,688	Y	$ 244,688	DCCR	Front End	Developer	1998
34 AV, 150 ST-152 ST	New	Current	4032		$ 45,920	Y	$ 45,920	DCCR	Front End	Developer	2005
BARB CK LANE W	New	Current	4032	See Below	$ 57,600	Y	$ 57,600	DCCR	Front End	Developer	1999-2005
HWY 99 CROSS/PIPE BRG	New	Current	4032	$ 3,000,000	$ 230,000	Y	$ 230,000	DCCR	Front End	Developer	1998
HWY 99 to KGH	New	Current	4032	See Above	$ 299,063	Y	$ 299,063	DCCR	Front End	Developer	1998
TOTAL				$ 3,000,000	$ 877,270		$ 877,270				

3. Cash Flow-DCC Qualifying

Year	Phase	Units				Commer-cial Space (Sq.Ft)	Sanitary DCC			
		Cluster/ Townhous	Garden Apts	High Apts	Total		Revenue	Expenditures	Net +/(-)	Cumul. +/(-)
1998	1W	100			100		$ 81,000	$ 773,750	$ (692,750)	$ (692,750)
	1E									
1999	1W	100			100		$ 81,000	$ 9,600	$ 71,400	$ (621,350)
	1E									
2000	1W	50			100		$ 96,222	$ 9,600	$ 86,622	$ (534,728)
	1E	50								
	SECTOR 2				2.36 ha					
2001	1W	50			100		$ 96,222	$ 9,600	$ 86,622	$ (448,106)
	1E	50								
	SECTOR 2				2.36 ha					
2002	1W	50			100		$ 81,000	$ 9,600	$ 71,400	$ (376,706)
	1E	50								
2003	1W	65			100		$ 81,000	$ 9,600	$ 71,400	$ (305,306)
	1E		35							
2004	1W				85		$ 68,850	$ 9,600	$ 59,250	$ (246,056)
	1E		85							
2005	1E		85		85		$ 74,038	$ 45,920	$ 28,118	$ (217,939)
	2W					6250				
2006	2W				115	6250	$ 85,228		$ 85,228	$ (132,711)
	2S		58	57						
2007	2S		58		115		$ 85,228		$ 85,228	$ (47,484)
	2E			57		6250				
2008	2E			96	96	6250	$ 60,868		$ 60,868	$ 13,384
TOTALS		565	321	210	1096	25000	$ 890,654	$ 877,270	$ 13,384	$ 13,384

DCC Charges Used:

Cluster Housing(	$ 810
Townhouses(R	$ 810
Garden Apts(R	$ 810
High rise Apts(R	$ 580
Commercial	$ 0.83
Industrial/ha	$ 6,450

Surrey West Rosemary NCP
Recommended 10 Year Servicing Plan
Exhibit F3.2:Siphon Sanitary Sewer

P

Location	200mm		250mm		375mm		200mm Siphon		Total Cost	DCC Portion	Year
	l.m.	Cost	l.m.	Cost	l.m.	Cost	l.m.	Cost			
36 AV W, HWY99-150 St		$ -		$ -	250	$ 136,000	350	$ 140,000	$ 276,000	$ 136,000	1998
34 AV, 150 ST-152 S	200	$ 68,000	130	$ 46,800		$ -		$ -	$ 114,800	$ 45,920	2005
BARB CK LANE W		$ -	400	$ 144,000		$ -		$ -	$ 144,000	$ 57,600	1999-2005
HWY 99 CROSS(375mm in 450		$ -				$ - $ 80,000			$ 80,000	$ 80,000	1998
WINTER CR		$ -		$ -		$ -	440	$ 176,000	$ 176,000	$ -	1998
TOTAL	**200**	**$ 68,000**	**530**	**$ 190,800**		**$ 216,000**	**790**	**$ 316,000**	**$ 790,800**	**$ 319,520**	
UNIT PRICES		**$ 340**		**$ 360**		**544**		**$ 400**			

2. Sources of Funds - DCC Qualifying

Location	Type of Work	Current or Addition	ID # 10 Years Plan	Amt ($) Current Program	Addition To Program ($)	Eligible for DCC Prog. (Y/N)	Refinement of DCC Program	Type of Funding Method Existing	Type of Funding Method Proposed	Construction By Surrey / Developer	Year Requeste
36 AV W, HWY99-15	New	Current	4032		$ 136,000	Y	$ 136,000	DCCR	Front End	Developer	1998
34 AV, 150 ST-152 ST	New	Current	4032		$ 45,920	Y	$ 45,920	DCCR	Front End	Developer	2005
BARB CK LANE W	New	Current	4032	See Below	$ 57,600	Y	$ 57,600	DCCR	Front End	Developer	1999-2005
HWY 99 CROSS(375	New	Current	4032	$ 3,000,000	$ 80,000	Y	$ 80,000	DCCR	Front End	Developer	1998
WINTER CR	New	Current	4032	See Above	$ -	Y	$ -	DCCR	Front End	Developer	1998
TOTAL				**$ 3,000,000**	**$ 319,520**		**$ 319,520**				

3. Cash Flow-DCC Qualifying

Year	Phase	Units Cluster/ Townhous	Garden Apts	High Apts	Total	Commer-cial Space (Sq.Ft)	Sanitary DCC Revenue	Expenditures	Net +/(-)	Cumul. +/(-)
1998	1W	100			100		$ 81,000	$ 216,000	$ (135,000)	$ (135,000)
	1E									
1999	1W	100			100		$ 81,000	$ 9,600	$ 71,400	$ (63,600)
	1E									
	1W	50			100		$ 96,222	$ 9,600	$ 86,622	$ 23,022
2000	1E	50								
SECTOR 2					2.36 ha					
	1W	50			100		$ 96,222	$ 9,600	$ 86,622	$ 109,644
2001	1E	50								
SECTOR 2					2.36 ha					
	1W	50			100		$ 81,000	$ 9,600	$ 71,400	$ 181,044
2002	1E	50								
	1W	65			100		$ 81,000	$ 9,600	$ 71,400	$ 252,444
2003	1E		35							
	1W				85		$ 68,850	$ 9,600	$ 59,250	$ 311,694
2004	1E		85							
	1E		85		85		$ 74,038	$ 45,920	$ 28,118	$ 339,812
2005	2W					6250				
2006	2W				115	6250	$ 85,228		$ 85,228	$ 425,039
	2S		58	57						
2007	2S		58		115		$ 85,228		$ 85,228	$ 510,267
	2E			57		6250				
2008	2E			96	96	6250	$ 60,868		$ 60,868	$ 571,134
TOTALS		**565**	**321**	**210**	**1096**	**25000**	**$ 890,654**	**$ 319,520**	**$ 571,134**	**$ 571,134**

DCC Charges Used:	
Cluster Housin	$ 810
Townhouses(R	$ 810
Garden Apts(R	$ 810
High rise Apts(	$ 580
Commercial	$ 0.83
Industrial/ha	$ 6,450

Surrey West Rosemary NCP
Recommended 10 Year Servicing Plan
Exhibit F4: Storm Sewers

Location	300mm		375mm		450mm		525mm		600mm		Storm by St / Area	DCC Portion	Year
	Lm.	Cost	Lm.	Cost	Lm.	Cost	Lm.	Cost	Lm.	Cost			
36 Av, 151 St-152 St		$ -		$ -		$ -		$ -	120	$ 100,200	$ 100,200	$ 100,200	1999
Barbara Ck Errosion Protect		$ -		$ -		$ -		$ -		$ 200,000	$ 200,000	$ 200,000	2000
TOTAL	-	$ -	-	$ -	-	$ -	-	$ -	120	$ 300,200	$ 300,200	$ 300,200	
UNIT PRICES		$ 375		$ 435		$ 480		$ 510		$ 835			

2. Sources of Funds - DCC Qualifying

Location	Type of Work	Current or Addition	ID # 10 Year Plan	Amt ($) Current Program	Addition to Prog. ($)	Eligible for DCC Prog. (Y / N)	Refinement of DCC Program	Type of Funding Methods		Construction by Surrey / Developer	Year Requested
								Existing	Proposed		
150 ST N, 34 AV-36 AV	New	Current	3119	$ 610,000		Y	$ -	Capital		Surrey	1998
150 ST S, 34 AV-33 AV	New	Current	3119	See Above		Y	$ -	Capital		Surrey	1998
36 AV W, 150 ST-BARB CK	New	Current	3119	See Above		Y	$ -	Capital		Surrey	1998
36 Av, 151 St-152 St	New	Current	3119	See Above	$ 100,200	Y	$ 100,200	Capital		Surrey	1998
TOTAL				$ 610,000	$ 100,200		$ 100,200				

3. Cash Flow-DCC Qualifying

Year	Phase	Units				Commer-cial Space (Sq. Ft.)	Storm DCC			
		Single Family	Multi-Family	Apart-ment	Total		Revenue	Expenditures	Net +/ (-)	Cumm. +/ (-)
1998	1W	100			100		$ 114,000	$ -	$ 114,000	$ 114,000
	1E									
1999	1W	100			100		$ 114,000	$ 100,200	$ 13,800	$ 127,800
	1E									
2000	1W	50			100		$ 114,000	$ 200,000	$ (86,000)	$ 41,800
	1E	50								
2001	1W	50			100		$ 114,000	$ -	$ 114,000	$ 155,800
	1E	50								
2002	1W	50			100		$ 114,000	$ -	$ 114,000	$ 269,800
	1E	50								
2003	1W	65			100		$ 114,000		$ 114,000	$ 383,800
	1E		35							
2004	1W				85		$ 96,900	$ -	$ 96,900	$ 480,700
	1E		85							
2005	1E		85		85		$ 102,088		$ 102,088	$ 582,788
	2W					6250				
2006	2W				115	6250	$ 98,098		$ 98,098	$ 680,885
	2S		58	57						
2007	2S		58		115		$ 98,098		$ 98,098	$ 778,983
	2E			57		6250				
2008	2E			96	96	6250	$ 50,308		$ 50,308	$ 829,290
TOTALS		565	321	210	1096	25000	$ 1,129,490	$ 300,200	$ 829,290	$ 829,290

DCC Charges Used:

Cluster Housing(RM10)	$ 1,140
Townhouses(RM10	$ 1,140
Garden Apts(RM30)	$ 1,140
High rise Apts(RM70)	$ 470
Commercial	$ 0.83

Re

TOTAL DCC EXPENDITURES

LOCATION	SANITARY SEWERS	STORM SEWERS	WATER	ARTERIAL ROADS	COLLECTOR ROADS	TOTAL
152 ST	$ -	$ -	$ 99,200	$ 183,750	$ -	$ 282,950
152 ST S	$ -	$ -	$ 111,600	$ -	$ -	$ 111,600
150 ST N	$ -	$ -	$ 31,200	$ -	$ -	$ 31,200
36 AVE W	$ 136,000	$ 100,200	$ 216,400	$ -	$ -	$ 452,600
34 AVE	$ 45,920		$ 44,880	$ 85,000	$ -	$ 175,800
33 AVE	$ -		$ -	$ 85,000	$ -	$ 85,000
BARB CK LANE W	$ 57,600	$ 200,000	$ -	$ -	$ -	$ 257,600
HWY 99 CROSSING	$ 80,000		$ -	$ -	$ -	$ 80,000
CONNECT TO WINTER CRESCEN	$ -		$ -	$ -	$ -	$ -
Total	$ 319,520	$ 300,200	$ 503,280	$ 353,750	$ -	$ 1,476,750

TOTAL DCC CASH FLOW

Year	Phase	Cluster Townhouses	Garden Apts	High Apts	Total Units	Commercial Space (sq. ft)	Total DCC Revenues	Total DCC Expenses	Cumulative DCC Surplus/Deficiency
1998	1W	100			100		$ 891,000	$ 426,680	$ 464,320
	1E								
1999	1W	100			100		$ 891,000	$ 109,800	$ 1,245,520
	1E								
2000	1W	50			100		$ 906,222	$ 694,750	$ 1,456,992
	1E	50							
	Industrial								
2001	1W	50			100		$ 906,222	$ 59,200	$ 2,304,014
	1E	50							
	Industrial								
2002	1W	50			100		$ 891,000	$ 9,600	$ 3,185,414
	1E	50							
	Industrial								
2003	1W	65			100		$ 891,000	$ 9,600	$ 4,066,814
	1E		35						
	Industrial								
2004	1W				142		$ 757,350	$ 9,600	$ 4,814,564
	1E		85	57					
	Industrial								
2005	1E		85		85	6250	$ 772,788	$ 45,920	$ 5,541,432
	2W					6250			
	Industrial								
2006	2W				58	6250	$ 882,485	$ 111,600	$ 6,312,317
	2S		58						
2007	2S		58		115		$ 870,798	$ -	$ 7,183,114
	2E			57		6250			
2008	2E			96	96	6250	$ 597,365	$ -	$ 7,780,479
Totals		565	321	210	1096	25000	$ 9,257,229	$ 1,476,750	$ 7,780,479

APPENDIX A

LETTER FROM ENVIRONMENTAL CONSULTANT AND PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT

SCOTT RESOURCE SERVICES INC.

Environmental Consultants
8426 Jennings Street, Mission, B.C. V2V 6M5
Tel: (604) 820-1415 Fax: (604) 820-1621
E-mail Scottres@uniserve.com

Your file:
Our file: 220-01

September 5, 1996

IBI Group
Suite 1500, 510 West Hastings Street
Vancouver, B.C. V6B 1L8

ATTN: Mr. Phil Levine

REGARDING: *Rosemary Heights West Neighbourhood Concept Plan*

Thank you for addressing the revisions I requested to the final report. I believe the general form of the concept plan conforms to the Federal/Provincial "Land Development Guidelines for the Protection of Aquatic Habitat," particularly with regard to fisheries sensitive zone protection areas. I can also confirm the proposed 34th Avenue road location has taken the environmentally sensitive elements of the site into consideration.

It should be noted that I did not review the major storm water management plan or outfall location in detail as I understand negotiations with environmental agencies regarding this aspect of the development are being undertaken by other consultants, working for the City of Surrey.

I trust it is understood by users of the document that, as more detailed site specific planning is undertaken, additional review and approval regarding particular details will be required by the environmental agencies.

Thank you for involving us in this most interesting project. I hope we will be able to work together in the future.

Sincerely,

SCOTT RESOURCE SERVICES INC.

K.J. (Jim) Scott, R.P. Bio, Asc.T.
Principal

APPENDIX B

LANDOWNERS COMMENTS

August 28, 1996

Surrey City Hall
14245 56th Avenue
Surrey, B.C.
V3X 3A2

Surrey City Hall and Steering Committee
Re: Rosemary Heights West Neighborhood Concept Plan

We are writing this letter to voice some concerns in relation to the above plan.

1. The main roadway accessing this area is proposed to go 100% from 152nd Street to 150th Street on our property. There appears to be no compensation allowance for this land.

   a. Is it possible to charge each unit approved for this area a proportionate cost?
   b. Would the City of Surrey be prepared to negotiate on D.C.C.'s or other fees as a trade in acquiring this roadway?
   c. Would the City of Surrey be prepared to purchase this property?

2. The amount of land proposed to be dedicated as park. Again no one seems to be prepared to compensate for this land. We would like to inform you that the existing pond was man made. It is not a natural pond. The property that the pond is on could very easily be re-filled and used for development. Therefore we think that this area should not have to be deducted as park land.

The developer has informed us that because of these two items, they are reducing this 10-acre parcel to approximately 4 acres of land that they can actually build on. On this basis, we would not be prepared to sell our property as only 4 acres. Our land will only be available on the market as a 10-acre piece of property.

We would like to state that generally we are in favor of the report, but we do have reservations about whether we are going to be totally re-imbursed in the above noted matters. These two properties will only be sold as one unit and will not be available piece meal as this would destroy the current living conditions now being enjoyed.

We appreciate you taking the time to read our concerns and would like our comments to be recorded in the N.C.P. report.

Yours truly,

Robert & Shirley Blair — Elizabeth E. Blair

Bob and Shirley Blair
3415 152nd Street
Surrey, B.C.

Mrs. E. Blair
3442 150th Street
Surrey, B.C.

Estate Landscape Services
Div. of Hemsworth Enterprises Ltd.

3533 150 th St Surrey B.C. V3S 4N7
Bus. 538-1806 Fax. 538-7452

August 23, 1996

Philip J. Levine
I.B.I. Group
1500 510 West Hastings
Vancouver, B.C.

Dear Mr. Levine:

On behalf of Dave and Joy Hemsworth, as well as Hemsworth Enterprises Ltd. I ask that this letter of concern be attached to the final N.C.P. Document and amendments.

It now appears that council wants to lock the N.C.P. into an O.C.P. Bylaw and any deviation from the N.C.P. will require an O.C.P. amendment.

I must strongly protest to this new change in the process which comes at the tail end of a long N.C.P. process. I feel that locking the N.C.P. in through a Bylaw could seriously jeopardize the entire process.

At this time I am going on the record as requesting the Planning Department to allow bare land strata to be included in the Single Family Cluster Definition.

Yours truly,

Dave Hemsworth
President, Hemsworth Ent. Ltd.

c.c.
Wendy Whelen — Planning Department
Duncan Irvine — Steering Committee
Merlin Kirk — Steering Committee
Mayor & Council — City Of Surrey

P.S. If there are any questions please feel free to contact Dave Hemsworth 538-1806

B R O O K

Development Planning Inc.

July 3, 1996

IBI Group
1500 - 510 West Hastings Street
Vancouver, BC
V3X 3A2

Attention: Mr. Phil Levine &

Dear Sir:

Re: Rosemary Heights - West Neighbourhood Concept Plan

We represent the owners of the "Irvine" and "Roddell" parcels fronting on 152 Street, as described in the *Neighbourhood Concept Plan - May, 1996*, by IBI Group.

In order to keep the Neighbourhood Planning process moving ahead, the owners generally support the recommendations of the plan, with the following observations:

1. **Dedication of 33 Avenue Right of Way**

   The single greatest impact upon the properties is the dedication of a 20m right-of-way to accommodate the creation of 33 Avenue, a limited collector linking 152 Street to Croydon Drive. The 11.1m pavement will accommodate parking on one side and 4.3m lanes for bicycles. Streets and sidewalks are to be developed on both sides, and it is assumed that the 20m width is to de dedicated equally; i.e. 10m from each property.

   The 1995 Local Area Plan contemplates a bridge over Barbara Ravine at 36 Avenue, with a loop around to 34 Avenue. As such, only a lane dedication appears to be required.

1834 West 1st Avenue
Vancouver, BC, V6J 1G5
Tel 604.731.9053 Fax 604.731.9075

The new 33 Avenue serves the vital function of providing a second access to the lands to be developed along 150 Street, a long cul-de-sac; yet nowhere in the report is the issue of compensation to the owners of the Irvine and Roddell sites addressed.

The imposition of 33 Avenue does not create sufficient benefit for the Irvine and Rodell properties as to increase their development potential by enhancing access. In fact, the development capacity of the properties has been diminished by reducing the overall site area.

The NCP Committee discussed the issue of the dedication of land for 33 Avenue at its meeting of May 15, 1995. The minutes of the meeting indicate that the matter would be addressed at a later date. This issue of compensation must be resolved in order for the owners to proceed with any request for land dedication.

2. Phasing

Specific dates for phasing should be deleted, as market forces will ultimately determine the actual sequence of development.

We trust that the above comments are helpful. In order to endorse the final report, the owners of the Roddell and Irvine properties hereby request that this letter be incorporated directly into the final NCP Plan report.

Please contact us if you have any questions.

Yours very truly,
BROOK DEVELOPMENT PLANNING INC.

Charles I. Brook

cc: Mr. Dave Hemsworth, Chairman, NCP Committee Chairman

9503dun2.doc

IBI GROUP
c/o MR. PHILIP J. LEVINE
SUITE 1500
510 WEST HASTINGS STREET
VANCOUVER, B.C.
V6B 1L8

VANCOUVER, NOV. 9, 1995

REGISTERED MAIL

DEAR PHIL:

AT THE NCP STEERING COMMITTEE MEETING ON NOV. 6, 1995, WE RECEIVED A MARK-UP OF THE PROPOSED AREA CONCEPT PLAN.
THE MARK-UP FROM THE CITY SHOWS THE ROAD THROUGH THE WESTERN PORTION OF OUR PROPERTY ALONGSIDE THE 15m SETBACK FROM THE BANK.
A GENEROUS RADIUS GOING THROUGH THE PRIME PORTION OF OUR PROPERTY, CUTS OFF A CONSIDERABLE CHUNK OF LAND, ODD SIZED, RENDERING IT USELESS.
YOU BRUSHED MY OBJECTIONS ASIDE AND DID NOT WANT TO LISTEN TO THEM. YOU STATED THAT YOU KNEW, I WOULD OBJECT TO THIS LAYOUT.

C.C.: MS. WENDY WHELEN
CITY OF SURREY, PLANNING AND DEVELOPMENT

SINCE I AM UNDER THE IMPRESSION, THAT YOU ARE GOING AHEAD WITH THIS LAYOUT, I WOULD LIKE TO REMIND YOU AGAIN, THAT I TOLD YOU IN PREVIOUS CONVERSATIONS, THAT I WILL OBJECT TO ANY OTHER ROAD LOCATION OVER OUR PROPERTY, EXCEPT THE ONES SHOWN IN THE ACP.

THE CHANGE FROM A PUBLIC ROAD, WINDING IN A NORTH-NORTH-WEST DIRECTION TOWARD OUR PROPERTY INTO A SUB-STANDARD ROAD ALONGSIDE THE WESTERN SETBACK, TOOK PLACE, AFTER THE PUBLIC INFORMATION MEETING ON MAY 2, 1995, WITHOUT ANY CONSULTATION WITH ME.

THE PROPOSED LAYOUT CONTRAVINES WITH THE ACP, WHICH SHOWS THE ROAD AT APPROXIMATELY 100m EAST AND PARALLEL TO 150TH STREET.

THIS IS THE ONLY LOCATION WHERE YOU CAN SHOW A ROAD, PERPENDICULAR BETWEEN THE NOTHERN AND SOUTH PROPERTY LINE THROUGH THE WEST SIDE OF OUR PROPERTY. IF OTHERS DO NOT LIKE A BEND OR A DIAGONAL ON THEIR PROPERTY, THAN PLEASE, SHOW THE ROAD IN COMPLIANCE WITH THE ACP.

I DO NOT SEE THE RATIONALE BEHIND THE CONCEPT OF HAVING A ROAD ALONG THE SET BACK OF THE BANK. THE RAVINE CANNOT BE SEEN DUE T THE 15m SETBACK AND THE DENSE FOLIAGE, WHICH HAS TO BE LEFT UNDISTURBED. THE ROAD ONLY SERVES ONE SIDE OF HOUSING AND WILL HAVE A SIX FOOT FENCE ON THE OPPOSITE SIDE, WHICH DOES NOT LOOK APPEALING TO ME.

IN ONE OF THE EARIER MEETINGS, YOU ELABORATED ON THE NUISANCE OF A ONE SIDE SERVING STREET AND THAT YOU WOULD NEVER RECOMMEND IT. ONE OF THE FACTORS FOR YOUR OPPOSITION WAS THE COST EFFECTIVENESS. JUST CONSIDER THE DEVELOPER WHO IS FACED WITH THIS CONTRAPTION.

THE STORM SEWER AND THE GRAVITY SANITARY SEWER LINE WILL NOT SERVE THE LAND IN THE DEPRESSION WEST OF THE RAVINE, IF LOCATED UNDER THIS ROAD. AN ADDITIONAL 6m EASEMENT WOULD BE REQUIRED.

I WOULD FURTHER POINT OUT, THAT NO CONSIDERATION HAS BEEN GIVEN TO MY SUGGESTION, TO INVESTIGATE THE POSSIBILITY OF A SEWER LINE CROSSING SOUTH OF 36TH AVE. AT LEAST, I AM NOT AWARE OF IT. THIS WOULD BE A LESS EXPENSIVE LINE RUN, THAN THE CONNECTION TO THE MORGAN CREEK LIFT STATION. IT WOULD ALSO ALLOW THE DEVELOPMENT OF THE AREA BETWEEN 152nd STREET AND THE RAVINE. AT THE PRESENT TIME A GRAVITY LINE TO MORGAN CREEK IS NOT ACHIEVABLE. PLEASE CORRECT ME, IF I AM MISINFORMED.

I HOPE YOU WILL THIS TIME CONSIDER MY CONCERNS SERIOUSLY, BECAUSE I WILL NOT CHANGE MY MIND, UNLESS I AM CONVINCED BY A BETTER SOLUTION.

YOURS TRULY

Günter Wöckener

(GUENTER WOECKENER)

4288

Pg___ Date SEPT 15

Steven Scarlett
3685-152nd St
Surrey, BC
V4P 2J9

September 13, 1995

Mr. Phil Levine
IBI Group
510 West Hastings Street
Suite 1500
Vancouver, BC
V6B 1L8

VIA FACSIMILE *#683-0492*

Subject: Rosemary Heights West Neighborhood Stage 1 NCP

Dear Mr. Levine,

I received a copy of your recent report in my mail box just the other day, and after reviewing the document closely wish to make the following strong objections:

- Your report deals with Sanitary Services, and uses a map entitled "Sanitary Services Concept" (Exhibit 11) to depict the course of the service throughout our neighborhood. You have, without my consent, positioned a 250mm service line across the south east corner of my property. Your report indicates this will require "A 6 m statutory .....across 36 Avenue to 152 Street at approximately 37 Avenue."

- Your report deals with Storm Services, and uses a map entitled "Storm Servicing Concept" (Exhibit 12) to indicate the proposed route of the Storm Services. You have, without my consent, positioned a service line will inside the "Top of Bank" line, I assume this will also require some sort of right of way.

cont'd /2

Please accept this correspondence as my official objection to these and any future plans you may have for changes to my property without my prior consent.

For a variety of reasons, my property is very special to both myself and my family, I have roots here which go back to my childhood. This is a home and a place I wish to call home for many years to come. While it is not my intent to stand in your way with your plans to develop this neighborhood, I can not foresee the day in which I would give permission to interfere with our lives by allowing the installation of these services through our front yard!

Should you wish to discuss other options for the above noted services, or any future intentions for my property, please contact me at any time.

Yours Truly

Steve Scarlett

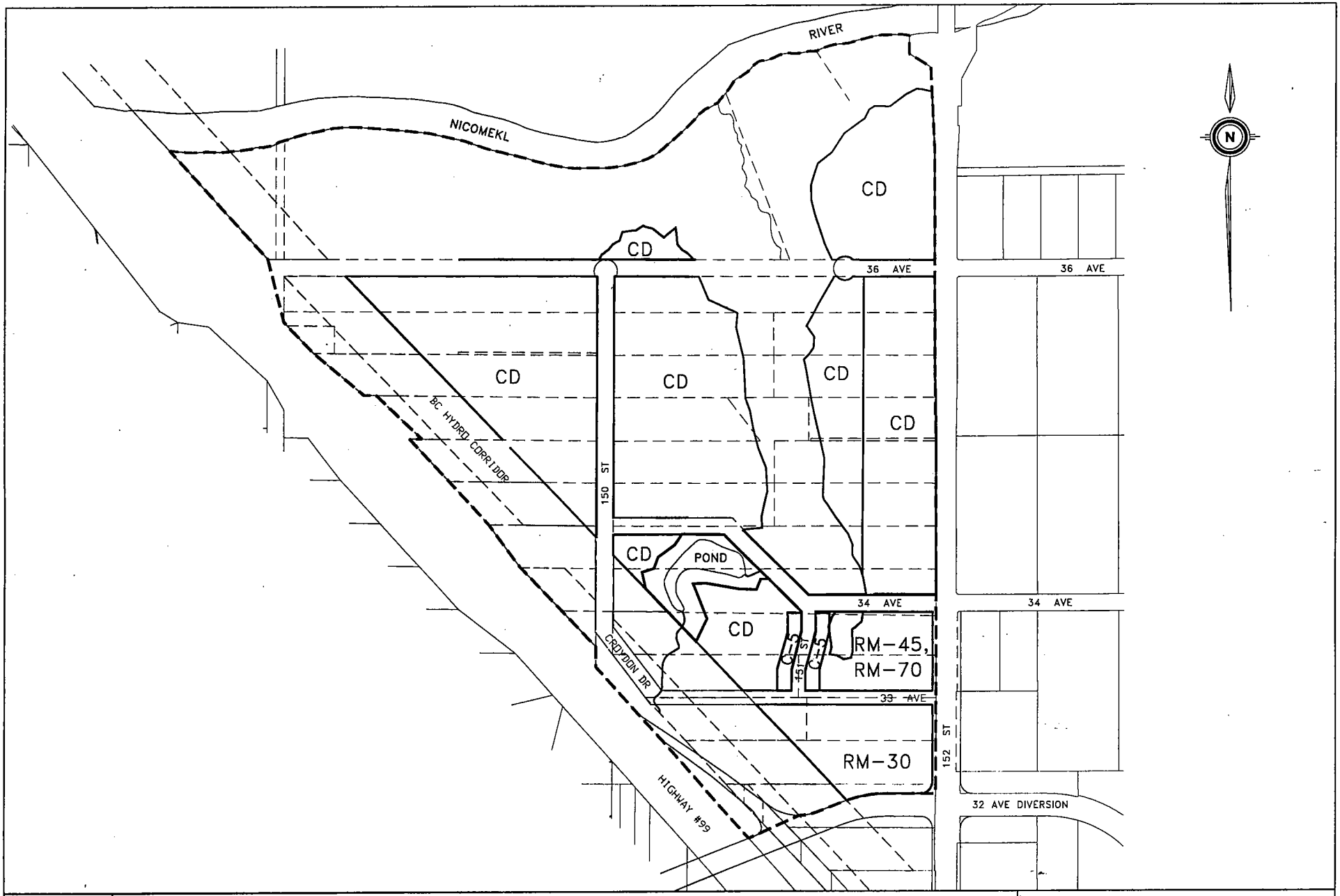
cc: Wendy Whelan HAND DELIVERED

APPENDIX C

DESIGN GUIDELINES

APPENDIX D

PROPOSED ZONING PLAN



IBI GROUP

Rosemary Heights, West Neighbourhood

PROPOSED ZONING

APPENDIX B

SCALE: N.T.S.

DATE: APRIL, 1997

APPENDIX E

WATER NETWORK ANALYSIS

West Rosemary Neighbourhood Sector 1 Concept Plan
Water Network Analysis

1.0 INTRODUCTION

The purpose of this analysis is to examine water network requirements for the proposed West Rosemary Neighbourhood Concept Plan Sector 1.

1.1 LAND USE

The subject lands are located in South Surrey, between 152 Street and Highway 99, between 32 Avenue and the Nicomekl River.

The land use plan specifies a range of housing densities, comprising garden apartments and cluster housing east of Barbara Creek, townhouse and cluster housing west of Barbara Creek, mid rise apartments between 33 Avenue and 34 Avenue at 152 Street, and garden apartments and cluster housing west of this area.

The overall population for Sector 1 is 2,760 persons.

2.0 EXISTING WATER NETWORK

The study area is served by an existing 150 mm diameter watermain located on 152 Street, connecting to a 250 mm watermain along 32 Avenue. This watermain is supplied from two major points:

1. A 700 mm diameter feed main at 144 Street at 32 Avenue, which feeds a 300 mm main at 32 Avenue, running east to a 250 mm main on King George Highway, and then northeast to 32 Avenue/152 Street.

2. A 400 mm feed main on King George Highway at 152 Street, which extends north on 152 Street as a 300 mm main, reducing to 250 mm and then to 150 mm at 32 Avenue.

The northwest portion of the study area is served by a 100 mm watermain extending from 148 Street/35 Avenue north and across Highway 99 to 150 Street.

The study area lies within the Crescent pressure zone of which the HGL is set at 80 metres.

3.0 PROPOSED WATER NETWORK

The objectives considered in developing the water network are as follows:

1. Identify at least two sources of water services to achieve security of service.

2. Provide adequate fire flow protection for the mid rise apartment development.

These objectives were considered for each stage of development, although the fireflows for interim level of development may be 75% of the ultimate fireflow requirements.

4.0 WATER NETWORK ANALYSIS

A large number of water network analyses were undertaken to determine the ultimate water network and the staging of the network. These alternatives involved the following:

- alternative sources from the south, east and/or west;
- a fire incident along 150 Street, requiring fireflow of 120 l/s, or 90 l/s for an interim phase;
- a fire incident at the mid rise apartment, requiring 200 l/s or 150 l/s in the interim phase.

The alternate water sources used in the analysis comprised the following:

- a south feed on 152 Street from 28 Avenue, comprising 350 mm diameter pipe;
- an east feed, comprising a 350 mm main on 32 Avenue;
- a west feed from 148 Street across Highway 99 at 36 Avenue.

The network of nodes and links is shown in Exhibit E3 and the pipe data is shown in Table E1. The water demand for the maximum day, peak hour and fireflow rates are shown in Table E2.

Peak hour demand and maximum day demand were calculated using per capita demand rates of 2,000 litres per day, 1,000 litres per day, respectively. Separate fireflow demands of 120 and 200 l/s were simulated at nodes 11 and 8, representing cluster housing and mid rise apartment developments, respectively.

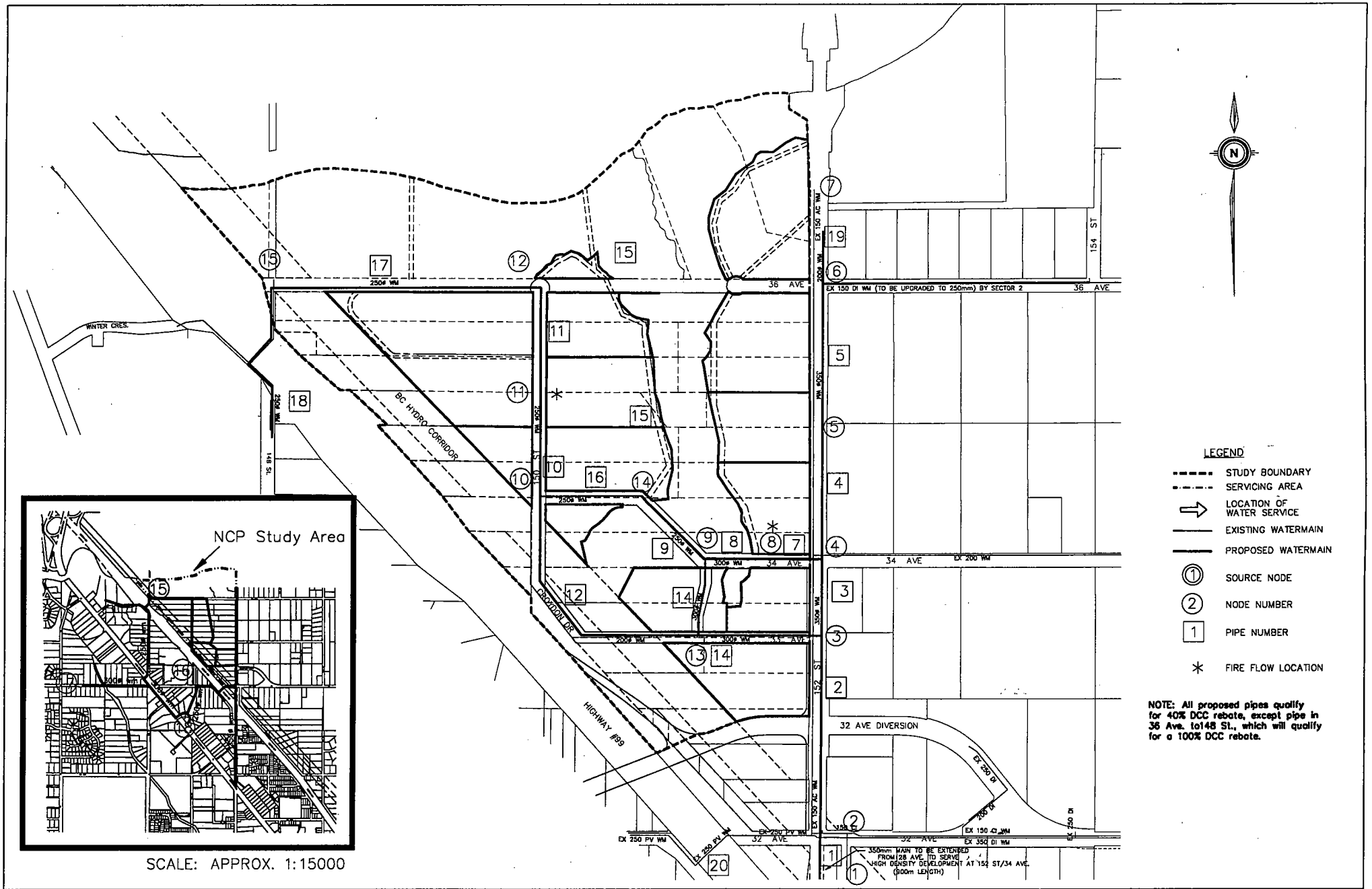
Table E3 presents the summary of the alternative network simulations.

The analysis indicates the following:

1. For the first stage of development involving the lands west of 150 Street, the minimum required off-site water feed is construction of a 250 mm watermain on 148 Street, across Highway 99 to 36 Avenue and to 150 Street.

2. For the development of the remainder of the plan area, excluding the mid-rise apartment site, the minimum off-site improvement required is the 250 mm main from 148 Street, and a 350 mm main on 152 Street, from 32 Avenue to 36 Avenue.

3. The ultimate development including the mid-rise apartment site will require improvements in 1 and 2 above, and construction of the 350 mm watermain on 152 Street from 28 Avenue to 32 Avenue.



IBI GROUP

Rosemary Heights, West Neighbourhood
Water Network Analysis

Exhibit D1

SCALE: NTS

DATE: APRIL, 1997

TABLE 1 12-May-96
WATER NETWORK ANALYSIS - PIPE DATA
PROJECT: ROSEMARY HEIGHTS NCP
NO.: VO-4887

ROUGHNESS COEFFICIENT
250mm AND LARGER 125
200mm AND SMALLE 100

PIPE #	NODE FROM	TO	LENGTH (m)	SIZE(mm)	ROUGHNESS COEF.
1	1	2	820	350	125
2	2	3	300	350	125
3	3	4	115	350	125
4	4	5	200	350	125
5	5	6	200	350	125
6	6	7	140	150	100
7	4	8	50	300	125
8	8	9	105	300	125
9	9	14	120	250	125
10	10	11	150	250	125
11	11	12	160	250	125
12	10	13	395	200	100
13	13	3	180	300	125
14	13	9	120	300	125
15	12	14	480	200	100
16	14	10	160	250	125
17	15	12	390	250	125
18	16	15	850	250	125
19	17	16	820	300	125
20	18	2	780	250	125
21	18	16	380	300	125

TABLE 2 12-May-96

WATER NETWORK ANALYSIS - NODE DATA

PROJECT: ROSEMARY HEIGHTS NCP

NO.: VO-4887

PER CAPITA DEMANDS: (l/d)		
PEAK HOUR	2000	
MAXIMUM DAY	1000	
FIRE FLOW DEMANDS: (l/s)	ULTIMATE	INTERIM
MULTI FAMILY	120	90
HIGH RISE	200	150

NODE NO.	POPULATION	MAX DAY DEMAND (l/s)	PEAK HOUR DEMAND (l/s)	FIRE FLOW (l/s)	MAX DAY + FIRE FLOW (l/s)	ELEVATION (m)
	0					
1	0	0.00	0.00		0.00	45.00
2	0	0.00	0.00		0.00	38.00
3	0	0.00	0.00		0.00	35.00
4	190	2.20	4.40		2.20	35.00
5	195	2.26	4.51		2.26	33.00
6	277	3.21	6.41		3.21	31.00
7	284	3.29	6.57		3.29	25.00
8	294	3.40	6.81	200.00	203.40	31.00
9	180.5	2.09	4.18		2.09	31.00
10	58	0.67	1.34		0.67	33.00
11	575	6.66	13.31	120.00	126.66	32.00
12	396	4.58	9.17		4.58	27.00
13	234	2.71	5.42		2.71	33.00
14	126	1.46	2.92		1.46	31.00
15		0.00	0.00		0.00	5.00
16		0.00	0.00		0.00	40.00
17		0.00	0.00		0.00	35.00
18		0.00	0.00		0.00	40.00
TOTALS:	2809.50	32.52	65.03			

TABLE 3:
WATER NETWORK ANALYSIS RESULTS
PROJE ROSEMARY HEIGHTS WEST NCP
NO: VO-4887

21-May-96

NALYSI	WEST	EAST	SOUTH	PEAK	FIREFLOW	FIREFLOW	STAGE OF DEVELOP			INPUT	OUTPUT	HIGHEST FLOW VELOCITIES		LOWEST RESIDUAL	REMARKS	OKAY
UMBE	FEED	FEED	FEED	HOUR	@ NODE 8	@ NODE 11	1ST	2ND	ULT	FILE	FILE	OFFSITE	ONSITE	PRESSURE		Y/N
					(l/s)	(l/s)										
1	X	X	X		200				X	ff8ewc.dat	ff8ewc.out		1.98m/s in pipe	231kPa @ node 4	350mm pipe on 152 St, 28 - 34 Ave	Y
2	X		X		200				X	ff8w&c.dat	ff8w&c.out		3.27m/s in pipe	ALL NEGATIVE PRESSURES	350mm pipe on 152 St, 32 - 34 Ave	N
3	X		X		150				X	ff8iw&c.dat	ff8iw&c.out	3.0m/s in pipe 20		MANY NEGATIVE PRESSURES	350mm pipe on 152 St, 32 - 34 Ave	N
4		X	X		200				X	ff8e&c.dat	ff8e&c.out		2.41m/s in pipe	147kPa @ node 4	350mm pipe on 152 St, 28 - 34 Ave	N
5		X	X		150				X	ff8ie&c.dat	ff8ie&c.out	1.89m/s in pipe 2		213kPa in node 10		Y
6	X	X	X			120		X		ff11ewc.dat	ff11ewc.out		173m/s in pipe 1	278kPa @ node 11	250mm pipe on 152 St, 28 - 36 Ave	Y
7	X		X			120		X		ff11w&c.dat	11w&c.out	2.08m/s in pipe 17		101 kPa @ node 11	250mm pipe on 152 St, 28 - 34 Ave	N
8	X		X			90		X		ff11iw&c.dat	ff11iw&c.out	1.67m/s in pipe 11		179 kPa @ node 10		Y
9		X	X			120		X		ff11e&c.dat	ff11e&c.out		2.07m/s in pipe	242kPa @ node 11		Y
10			X			120		X		ff11c.dat	11c.out	2.08m/s in pipe 19	2.66m/s in pipe	ALL NEGATIVE PRESSURES	300mm pipe on 152 St, 32 - 34 Ave	N
11			X			90			X	ff11ic.dat	ff11ic.out	2.39m/s in pipe 20	2.04m/s in pipe	-19kPa @ node 11		N
12	X					120			X	ff11w-nw.dat	ff11w-nw.out	2.50m/s in pipe 17	2.04m/s in pipe	17kPa @ node 10		N
13	X					90			X	ff11iwnw.dat	ff11iwnw.out	1.89m/s in pipe 17		149kPa @ node 10		N
14			X			120			X	ff11c-nw.dat	11c-nw.out	2.66m/s in pipe 18	2.05m/s in pipe	41kPa @ node 11	north-west portion of site only	N
15			X			90			X	ff11icnw.dat	ff11icnw.out	1.98m/s in pipe 20	1.50m/s in pipe	164kPa @ node 11	north-west portion of site only	N
16	X	X	X	X					X	pkhrewc.dat	pkhrewc.out	all <<2m/s	all<<2m/s	320kPa @ node 3	350mm pipe on 152 St, 28 - 34 Ave	Y
17	X		X	X					X	pkhrw&c.dat	pkhrw&c.out	all <<2m/s	all<<2m/s	261 kPa @ node 4	250mm pipe on 152 St, 32 - 36 Ave	Y
18		X	X	X					X	pkhre&c.dat	pkhre&c.out	all <<2m/s	all<<2m/s	321kPa @ node 10	400mm on 152 St S,300mm on 15	Y
19			X	X					X	pkhrc.dat	pkhrc.out	all <<2m/s	all<<2m/s	278kPa @ node 10	350mm pipe on 152 St, 32 - 34 Ave	Y

MAXIMUM ALLOWABLE FLOW VELOC		2m/s
MINIMUM ALLOWABLE RESIDUAL PRESSURE		
a)	MAXIMUM DAY DEMAND + FI	140kPa
b)	PEAK HOUR DEMAND	280kPa

APPENDIX F

STORM AND SANITARY SEWER CALCULATIONS

IBI GROUP

SANITARY SEWER COMPUTATION FORM
(INCLUDING SECTOR 2 INDUSTRIAL AREA)

Project: ROSEMARY HEIGHTS WEST NEIGHBOURHOOD
Computed By: JAC
Job No: VO-4887
Checked By: RAM

Gross Developable Area:
Total Population
per cap flow rate: 0.35 m3/Person/Day
infiltration: 0.1 l/s/ha.
Mannings n: 0.013

Date: 24-Nov-96
Page No: 1/1

CATCH-MENT ID	LOCATION	MANHOLE FROM	MANHOLE TO	CATCHMENT AREA A ha	CATCHMENT AREA TOTAL A	POPULATION	TOTAL POPULATION	PEAK FLOW FACTOR	DESIGN Q m3/sec	INFILT. & INFLOW m3/sec	TOTAL DESIGN Q m3/sec	Slope %	Diam. mm	SEWER DESIGN(pipe 1/2 full) Cap. m3/sec	Pipe Full Vel m/s	Length m	Invert Upper	Invert Lower	Rim Upper	Rim Lower
	EAST CATCHMENT																			
A		S29	S28	0.835	0.835	94.0	94.0	4.25	0.0016	0.0001	0.0017	2.50	200	0.052	1.65	40	28.500	27.500	30.500	29.000
		S28	S27	0.835	1.670	94.0	188.0	4.16	0.0032	0.0002	0.0033	1.67	200	0.042	1.35	60	27.500	26.500	29.000	28.000
		S27	S26	0.835	2.505	94.0	282.0	4.09	0.0047	0.0003	0.0049	2.00	200	0.046	1.48	50	26.500	25.500	28.000	27.000
		S26	S25	0.835	3.340	94.0	376.0	4.03	0.0061	0.0003	0.0065	1.82	200	0.044	1.41	55	25.500	24.500	27.000	26.000
		S25	S24	0.835	4.175	94.0	470.0	3.99	0.0076	0.0004	0.0080	0.42	200	0.021	0.67	120	24.500	24.000	26.000	25.000
		S24	S23	0.835	5.010	94.0	564.0	3.95	0.0090	0.0005	0.0095	1.00	200	0.033	1.04	60	24.000	23.400	25.000	26.000
B		S23	S22	2.440	7.450	284.0	848.0	3.85	0.0132	0.0007	0.0140	0.53	200	0.024	0.76	170	23.400	22.500	26.000	26.000
	WEST CATCHMENT																			
C	IND. AREA S OF 32 AVE	S20	S19	4.800	4.800	432.0	432.0	4.01	0.0070	0.0005	0.0075	1.00	200	0.033	1.04	205	39.500	37.450	41.000	39.000
		S19	S18	0.000	4.800	0.0	432.0	4.01	0.0070	0.0005	0.0075	1.40	200	0.039	1.24	300	37.390	33.190	39.000	34.500
D		S18	S17	1.710	6.510	234.0	666.0	3.91	0.0105	0.0007	0.0112	1.40	200	0.039	1.24	170	32.900	30.520	34.500	32.000
		S17	S16	0.000	6.510	0.0	666.0	3.91	0.0105	0.0007	0.0112	1.40	200	0.039	1.24	35	30.500	30.010	32.000	32.000
		S16	S15A	0.000	6.510	0.0	666.0	3.91	0.0105	0.0007	0.0112	0.70	200	0.027	0.87	45	30.000	29.685	31.500	31.500
		S15A	S14	0.000	6.510	0.0	666.0	3.91	0.0105	0.0007	0.0112	0.70	200	0.027	0.87	40	29.600	29.320	31.500	31.500
E		S15	S14	1.000	1.000	368.0	368.0	4.04	0.0060	0.0001	0.0061	0.70	200	0.027	0.87	75	29.300	28.775	31.000	31.000
F		S14	S12	1.260	8.770	142.0	1176.0	3.75	0.0179	0.0009	0.0188	0.70	250	0.050	1.01	140	28.700	27.720	31.000	31.000
G		S13	S12	0.440	0.440	29.0	29.0	4.36	0.0005	0.0000	0.0006	1.00	200	0.033	1.04	50	29.000	28.500	31.000	30.500
H		S12	S9	1.215	10.425	91.0	1296.0	3.72	0.0196	0.0010	0.0206	1.20	250	0.065	1.33	60	27.700	26.980	30.500	29.000
		S9	S8	1.215	11.640	91.0	1387.0	3.70	0.0208	0.0012	0.0220	3.00	250	0.103	2.10	85	27.000	24.450	29.000	26.000
		S8	S7	1.215	12.855	91.0	1478.0	3.68	0.0221	0.0013	0.0233	4.00	250	0.119	2.42	130	24.500	19.300	26.000	20.000
		S7	S6	1.215	14.070	91.0	1569.0	3.67	0.0233	0.0014	0.0247	1.00	250	0.059	1.21	70	19.240	18.540	20.000	21.000
I		S6	S5	0.800	14.870	198.0	1767.0	3.63	0.0260	0.0015	0.0274	1.00	250	0.059	1.21	85	18.480	17.630	21.000	20.000
		S5	S4	0.000	14.870	0.0	1767.0	3.63	0.0260	0.0015	0.0274	1.00	250	0.059	1.21	30	17.570	17.270	20.000	19.000
		S4	S3	0.000	14.870	0.0	1767.0	3.63	0.0260	0.0015	0.0274	0.70	300	0.081	1.14	100	17.210	16.510	19.000	20.000
		S3	S2	0.800	15.670	198.0	1965.0	3.59	0.0286	0.0016	0.0302	0.50	300	0.068	0.97	100	16.510	16.010	20.000	18.000
J		S11	S10	2.390	2.390	189.0	189.0	4.16	0.0032	0.0002	0.0034	1.60	200	0.041	1.32	305	30.700	25.820	32.000	27.000
		S10	S2	0.000	2.390	0.0	189.0	4.16	0.0032	0.0002	0.0034	7.80	200	0.092	2.92	125	25.760	16.010	27.000	18.000
		S2	S1	0.000	17.260	0.0	2154.0	3.56	0.0311	0.0017	0.0328	10.50	200	0.106	3.38	90	16.350	6.900	18.000	8.000
K	LOT SERVICE CONNECTION		S1	2.380	2.380	189.0	189.0	4.16	0.0032	0.0002	0.0034	10.50	200	0.106	3.38	90	16.350	6.900	18.000	8.000
		S1	EX375	0.000	19.640	0.0	2343.0	3.53	0.0335	0.0020	0.0355	0.50	375	0.124	1.12	750	4.000	0.250	8.000	4.000

IBI GROUP

STORM SEWER COMPUTATION FORM

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Project: Rosemary Heights West Neig Computed By: JAC Runoff Coeff See Attached

Job No: Vo-4887 Checked By: RAM "n" = 0.013 Rainfall Curv 5 YR STORM
100 YR STORM
SURREY MUNICIPAL HALL IDF CURVES

CATCH-MENT #	LOCATION	MANHOLE FROM	MANHOLE TO	TRIBU AREA (ha	RUNOFF COEFF. R	A x R	TOTAL A x R	TIME OF CONCENTRATION INLET	(MIN) PIPE	TOTAL	I5 mm/hr	Q5 m3/sec	I100 mm/hr	Q100 m3/sec	SEWER DESIGN Slope %	Diam. mm	Cap. m3/sec	Vel. m/sec	Length m	Invert Upper	Invert Lower	Rim Upper	Rim Lower	100 YR HGL
	EAST CATCHMENT																							
B		D11	D10	0.800	0.588	0.470	0.470	15.000	0.297	15.30	31.7	0.041	61.4	0.080	2.00	375	0.248	2.25	40.000	29.45	28.650	31.300	31.300	IN PIPE
B		D10	D9	0.410	0.588	0.241	0.711	15.297	0.445	15.74	31.3	0.062	60.5	0.120	2.00	375	0.248	2.25	60.000	28.65	27.450	31.300	31.000	IN PIPE
B		D9	D8	0.730	0.588	0.429	1.141	15.742	0.371	16.11	30.9	0.098	59.8	0.189	2.00	375	0.248	2.25	50.000	27.45	26.450	31.000	29.000	IN PIPE
B		D8	D7	0.730	0.588	0.429	1.570	16.114	0.362	16.48	30.5	0.133	59.0	0.258	2.00	450	0.403	2.54	55.000	26.45	25.350	29.000	28.000	IN PIPE
B		D7	D6	1.680	0.588	0.858	2.428	16.475	0.789	17.26	29.7	0.201	57.5	0.388	2.00	450	0.403	2.54	120.000	25.35	22.950	28.000	27.000	IN PIPE
B		D6	D5	0.660	0.588	0.388	2.817	17.264	0.356	17.62	29.4	0.230	56.8	0.444	2.00	525	0.608	2.81	60.000	22.95	21.750	27.000	25.000	IN PIPE
A		D5	D4	0.000	0.588	0.000	2.817	17.620	0.504	18.12	28.9	0.226	55.8	0.436	2.00	525	0.608	2.81	85.000	21.75	20.050	25.000	23.000	IN PIPE
A		D4	D3	0.000	0.588	0.000	2.817	18.124	0.384	18.51	28.5	0.223	55.0	0.430	1.00	600	0.614	2.17	50.000	20.05	19.550	23.000	22.000	IN PIPE
A		D3	D2	2.440	0.588	1.435	4.251	18.508	0.343	18.85	28.1	0.332	54.3	0.641	1.25	600	0.686	2.43	50.000	19.55	18.925	22.000	22.000	IN PIPE
A		D2	D1	0.000	0.588	0.000	4.251	18.851	0.618	19.47	27.5	0.325	53.1	0.627	1.25	600	0.686	2.43	90.000	18.93	17.800	22.000	22.000	IN PIPE
A		D1	D0	0.000	0.588	0.000	4.251	19.469	0.070	19.54	27.5	0.324	52.9	0.625	30.00	600	3.363	11.89	50.000	17.80	2.800	22.000	4.000	IN PIPE
				7.450																				
N	CENTRAL CATCHME	D25	D24	2.020	0.588	1.188	1.188	15.000	1.315	16.31	30.7	0.101	59.4	0.196	0.50	450	0.202	1.27	100.000	29.45	28.945	32.000	32.000	IN PIPE
		D24	D21	0.000	0.588	0.000	1.188	16.315	1.305	17.62	29.4	0.097	56.8	0.187	0.50	525	0.304	1.40	110.000	29.12	28.570	32.000	32.000	IN PIPE
C		D22	D21	1.180	0.588	0.694	0.694	15.000	0.986	15.99	31.0	0.060	60.0	0.116	0.50	450	0.202	1.27	75.000	28.95	28.570	32.000	31.000	IN PIPE
D		D21	D20	2.140	0.588	1.258	3.140	17.620	1.201	18.82	28.2	0.246	54.4	0.474	0.80	600	0.549	1.94	140.000	28.57	27.450	31.000	31.000	IN PIPE
H		D20A	D20	0.850	0.588	0.500	0.500	18.821	1.188	20.01	27.0	0.037	52.0	0.072	0.50	375	0.124	1.12	80.000	27.45	27.050	31.000	31.000	IN PIPE
G		D20	D19	0.600	0.588	0.353	3.993	20.009	0.412	20.42	26.8	0.297	51.5	0.571	1.25	600	0.686	2.43	60.000	27.05	26.300	31.000	29.000	IN PIPE
G		D19	D18	1.200	0.588	0.706	4.698	20.421	0.326	20.75	26.6	0.347	51.1	0.667	4.00	600	1.228	4.34	85.000	26.30	22.900	29.000	25.000	IN PIPE
G		D18	D17	1.900	0.588	1.117	5.815	20.747	0.705	21.45	26.3	0.424	50.3	0.812	2.00	600	0.868	3.07	130.000	22.90	20.300	25.000	25.000	IN PIPE
G		D17	D16	1.160	0.588	0.682	6.497	21.453	0.172	21.62	26.2	0.473	50.1	0.903	5.00	600	1.373	4.86	50.000	20.30	17.800	25.000	21.000	IN PIPE
				11.05																				
M2	NORTH -WEST CAT	D14	D13	0.300	0.588	0.176	0.176	15.000	2.988	17.99	29.0	0.014	56.0	0.027	0.60	300	0.075	1.06	190.000	15.94	14.800	18.000	16.000	IN PIPE
F		D13	D12	2.960	0.588	1.740	1.917	17.988	0.276	18.26	28.7	0.153	55.5	0.295	12.50	300	0.342	4.84	80.000	14.74	4.740	16.000	6.000	IN PIPE
		D12	DITC	0.000		0.000																		
				3.260																				
	WEST CATCHMENT	D32	D31	0.000	0.588	0.000	0.000	15.000	2.875	17.88	29.1	0.000	56.2	0.000	0.30	375	0.096	0.87	150.000	28.75	28.300	31.500	31.500	IN PIPE
P		D31	D30	3.150	0.588	1.852	1.852	17.875	0.986	18.86	28.1	0.145	54.3	0.279	2.00	450	0.403	2.54	150.000	28.30	25.300	31.500	27.000	IN PIPE
		D30	D16	0.000	0.588	0.000	1.852	18.861	0.624	19.49	27.5	0.142	53.0	0.273	5.00	450	0.638	4.01	150.000	25.30	17.800	27.000	21.000	IN PIPE
M1		D16	D15	1.300	0.588	0.764	9.11	19.485	0.172	19.66	27.3	0.692	52.7	1.334	5.00	600	1.373	4.86	50.000	17.80	15.300	21.000	20.000	IN PIPE
		D15	DITC	0.000	0.588	0.000	9.11								25.00	NA	0.000		50.000	15.30	2.800	20.000		
				4.450																				
I	HYDRO ROW			2.210	0.425	0.939	0.939	15.000	0.000	15.00	32.0	0.083	62.0	0.162										
	SURFACE TO RIVER																							
L	HYDRO ROW			2.720	0.425	1.156	1.156	15.000	0.000	15.00	32.0	0.103	62.0	0.199										
J	SURFACE TO CREEK			0.660	0.425	0.281	0.281	15.000	0.000	15.00	32.0	0.025	62.0	0.048										
K				0.360	0.425	0.153	0.153	15.000	0.000	15.00	32.0	0.014	62.0	0.026										
O				2.500	0.425	1.063	1.063	15.000	0.000	15.00	32.0	0.094	62.0	0.183										

APPENDIX G

OTHER AGENCIES COMMENTS

DESIGN GUIDELINES FOR PEDESTRIAN/BICYCLE CORRIDORS (MULTI-USE CORRIDORS) AND LINKAGES

1. General Design Principles for Corridors and Linkages

The following guidelines are intended to ensure that a continuous, safe and attractive pedestrian/bicycle network is provided in Rosemary Heights West to allow access to the protected treed and landscaped areas near the river and ravines, hydro corridor, commercial street, and the City's public transportation corridors and bicycle commuter routes.

The components of the local multi-use network; corridors, linkages and buffers, have been classified according to their width and function within the local pedestrian/bicycle transportation network. The main components of the network are indicated on Map II.

The different widths of the various components of the system reflect their hierarchical function within the local pedestrian/bicycle network. The various widths are intended to maintain a strong sense of safety for users (an appropriate relationship between length and width of the corridor).

Corridor refers to the right-of-way of the bicycle/pedestrian/linear open space network (multi-use corridors). ***Path*** or ***pathway*** refer to the paved surface for walking/biking contained within the corridor.

2. Landmarks and Focal Points

The development of focal points that include open spaces, view corridors, the pond site, the northern extent of 150 Street and the commercial area is necessary to ensure that Rosemary Heights West Neighbourhood is a livable and attractive neighbourhood.

These focal points and other significant features (e.g. amenity buildings, clusters of existing trees, resting and/or play structures, arbours, gateways, landmarks, etc.) will act as reference points within the neighbourhood.

The location of the focal points is indicated on Map II. Development and establishment of these focal points should be undertaken as part of the proposed developments.

Site planning and the ultimate design of these nodes should be responsive to the contours and natural features of the site, and to the specific conditions of the area (views, noise, slopes, etc.).

3. Reference Standards

The design of all multi-use pathways should consider the guidelines contained in the document entitled "Review of Standards for Multi-use Pathways" and the recommendations on gradients and physical design contained in Section B.1 of the "City of Surrey Bicycle Blue Print".

Lighting of bicycle paths should take into consideration the recommendations contained in the "Bikeway Design Supplement to the Urban Geometric Design Guide for Canadian Roads".

4. Perimeter Commuter Bicycle Routes

These routes form part of the City-wide bicycle route network. It is recommended that bicycle routes along 152 Street and 32 Avenue consist of a 3.00 metre wide pathway incorporated in the required landscaped buffer along these two arterial roads.

The landscaped buffer along 152 Street and 32 Avenue diversion should contain a 0.6 to 0.8 metre high landscaped mound (see Sketch #1) and a 3.0 metre wide pedestrian/bike pathway should be constructed within the buffer (this may eliminate the need for the construction of a sidewalk within the 152 Street and 32 Avenue road right-of-way).

5. Major Linear Open Space Corridors (see Map II)

Multi-use pathways will be integrated as part of the linear open space system, including the landscaped buffer strip at the edges of the neighbourhood, the trail along the Nicomekl River and hydro right-of-way.

These major linear open space corridors should not be less than 12.00 metres.

The width of all multi-use pathways should not be less than 3.00 metres which is required to accommodate the various potential uses (walkers, joggers, bikers).

The pathway may meander within the total width of the pedestrian/bicycle corridor right-of-way.

6. Neighbourhood Pedestrian /Bicycle Routes (see Map II)

These multi-use pathways will complete the neighbourhood pedestrian/bicycle network and include the trails along the ravine and throughout the residential areas, and connections to the major linear open space corridors. These pathways will also facilitate connections to the bicycle commuter routes (152 Street and 32 Avenue diversion) and to the corridor along the Nicomekl River where it may ultimately connect to the Central Neighbourhood of Rosemary Heights.

The recommended width of these corridors is **8.00 metres** and the recommended width for the pathways within the corridors is not less than **3.00 metres** in order to accommodate various potential users (walkers, joggers, bikers, wheelchairs).

In some cases, these pathways may meander within the total width of the corridor right-of-way.

An asphalt surface is recommended for all multi-use pathways in the neighbourhood pedestrian/bicycle (multi-use) network.

The edges of these pathways should be well identifiable.

Where applicable (in potentially environmentally sensitive areas), the pathway surface material and precise location of the pathway will require approval from the Ministry of Environment.

7. Bollards

Bollards should be used at the approaches to intersections of the pedestrian/bicycle (multi-use) pathways with streets.

In the case of narrow pathways, hinged bicycle baffles should be used. These safety devices should be placed at the setback line from the street (see Sketch #2).

8. Street Crossings

Changes in texture and/or colour should be introduced to the pathway surface, starting at **5.00 metres** before reaching the bollards or bicycle baffles.

9. Connections to the Corridors

Direct connections from cluster housing/townhouse sites to the pedestrian/bicycle corridors should be located central to the corridor's length.

10. Recommendations to Achieve Safety Based on CPTED (Crime Prevention Through Environmental Design) Principles

10.1. Pathway Alignment

Sudden changes in alignment or interruptions of the corridors should be avoided.

The alignment and dimensions of corridors should be sufficient to avoid a service alley character.

10.2. Surveillance

It is desirable that dwelling units located along the multi-use corridors provide second floor windows and balconies toward the corridor to increase opportunities for casual surveillance.

To help develop a sense of ownership over these public spaces, the provision of arbours, low gates and sidewalks from individual units to the pedestrian/bicycle corridors is recommended.

10.3. Lighting

Lighting should increase the sense of security for both users and residents of the units fronting on to the corridors. Low level lighting that does not interfere with the privacy of adjacent residential units is favoured for all components of the network.

Wall mounted lighting in units abutting the corridor may help to add to the corridor's lighting level and increase the user's (and resident's) perception of safety.

10.4. Fences Along Bicycle/Pedestrian Linkages

Wherever possible, fences along multi-use corridors should be transparent and installed in combination with landscaping.

No fences should extend within the area of the required building setback from the street.

10.5. Landscaping

Landscaping within multi-use corridors that are **6.00 metres** wide or less should consider low shrubs and bushes only.

DESIGN GUIDELINES FOR PUBLIC STREETS

1. General Design Principles for Public Streets

The following general guidelines are focused on providing opportunities for resident's social interaction and achieving a strong residential neighbourhood character; where pedestrians, not the vehicles, define the design and characteristics of the street.

The overall character of Rosemary Heights West Neighbourhood will be mostly defined by the width of the streets from building face to building face, pavement textures and the way that the buildings and associated uses relate to the street.

These guidelines identify the development concept to achieve a special character for the neighbourhood's streets and for the main entrances into the neighbourhood.

The guidelines recognize the need to adjust and tailor the City's present road standard cross-sections to achieve the design objectives.

It is noted that the proposed cross-sections identified and the specific treatment of the rights-of-way may require adjustments and be further detailed to the satisfaction of the City's Engineering Department.

2. Street Rights-of-Way

Where possible, in consultation with Surrey's Engineering Department and appropriate to the context, the distance between buildings across the street and the width of pavement should be reduced (a combination of narrower right-of-way and/or reduced front yard setbacks may be appropriate).

3. Access to Garages

In townhouse or cluster housing sites located along 150 Street, all units should have access to the garage from an internal driveway (i.e., at the rear).

4. Treatment of Intersections

All intersections should consider curb extensions (narrowing) to reduce the crossing distance for pedestrians and to lower vehicle's speed (see Sketch #2).

Curb narrowing (chokers) and landscaping (with trees) should be considered every 6 to 8 on-street parking spaces (see Sketch #2).

Different texture, decorative pavers or other paving materials, should be used on the major street intersections (see Sketch #2) and the crossings near the commercial area (see Sketch #3).

This treatment of the intersections is also important at the entrances to the neighbourhood. It is recommended that a landscaped median be constructed at the main entrance to the neighbourhood (34 Avenue and 152 Street).

5. Traffic Signs

The number of traffic signs in the interior of the neighbourhood should be minimized.

If traffic signs are unavoidable, wherever possible they should be grouped and mounted on light posts in the immediate area. A single traffic sign on a single pole should be avoided.

6. Special Pavement

Decorative pavers or other pavement that adds texture and colour differentiation should be used at the entrances to the neighbourhood and on the neighbourhood commercial street.

The sidewalks of the commercial portion of 151 Street (the commercial street) should consider a unique pavement pattern and formal tree planting on grates (see Sketch #3).

7. On-Street Parking

A concrete band, separating traveling lanes from on-street parking lanes should be used to identify all on-street parking areas.

Short term on-street parking should be provided on both sides of the commercial street (151 Street).

8. Street Lighting

The type of lamp post and single luminaire used in the Rosemary Heights Central Neighbourhood, or the equivalent, should be used throughout the Rosemary Heights West Neighbourhood. This type of public lighting should be primarily oriented to serve pedestrians (lower posts, with a gentler glow and placed at shorter intervals - see Sketches #4 and #5).

Lamp post and double luminaries which permit attachments for hanging flower baskets and/or banners should be considered along 151 Street and at the entrance to the neighbourhood at 34 Avenue.

For consistency from project to project, the type of lamp, its height, intensity, intervals, etc., should be carried throughout the neighbourhood.

Implementation of the street lighting concept will be co-ordinated by Surrey Engineering through the servicing agreement process.

DESIGN GUIDELINES FOR BUILDINGS

1. General Design Principles for Buildings

This set of guidelines focuses on achieving a harmonious architectural relationship and co-ordination among buildings, and between buildings and the street. It is expected that the presence of some architectural details throughout the neighbourhood and the establishment of several landmark/reference points will achieve a unity of character and provide a strong identity for Rosemary Heights West Neighbourhood.

The design of buildings should ensure architectural coordination and lend visual integration among the various projects in the area.

2. Residential Architectural Character

The design of proposed garden apartments, townhouses and cluster housing units along public streets should have a strong street-oriented character. The layout of the residential units should focus on the street.

Garden apartment units at the ground level facing a public street should be provided with a pedestrian access from the street.

Similarly, townhouses and cluster housing development abutting public streets should be provided with pedestrian access to the front door of the unit.

To retain some of the existing flavour of the area, the design of garden apartments, townhouses and cluster housing units fronting onto the street should incorporate as a dominant facade component, one or more of the following architectural features/elements:

- Gable roof components with a 8/12 or 12/12 slope, gabled dormers, pitched roofs.
- Strong roof overhangs/eave projections.
- Louvered ventilation on gables, shingled or scaled gable end walls, etc.
- Bay windows, windows with muntins and mullions, rectangular/square shaped windows, french doors.
- Porches, verandas, horizontal siding and wide trim board and batten siding.

The following architectural elements are not recommended:

- Vinyl siding as an exterior cladding material (unless it is applied as narrow horizontal siding and in combination with wide trim).
- Stucco (unless it is used in combination with other exterior finishing materials).

Garages should not be the dominant element on the streetscape or dominate the facade of multiple residential developments (also, see "Driveways" in "Design Guidelines for Yards Abutting Public Streets").

No flat roofs should be permitted in the Rosemary Heights West Neighbourhood. The recommended range of roof slopes is between 8/12 to 12/12. Articulation and variation of roof lines are encouraged.

No metal or red roof tiles should be permitted in residential proposals in Rosemary Heights West Neighbourhood. Roof tiles and duroid may be acceptable if they resemble cedar shakes in terms of texture, form and colour.

Corner units of a townhouse development and any housing unit which is part of a multiple residential development and which is exposed to side views should provide sufficient architectural detailing to the side and street fronting elevations.

3. Multiple Residential Building Form

Townhouse and cluster housing along the local streets should provide a variety of forms, details and groupings. The design of townhouse clusters along the street should not be repetitive and duplex clusters should avoid the mirror image effect.

Where townhouse cluster housing units front on existing multiple residential development, the quality of materials and the overall design of these units should be compatible with the development across the street.

Simple forms and dominant gable roofs, which help differentiate units within the cluster are recommended for townhouses and cluster developments fronting on the streets.

To achieve visual diversity within projects, variations in building height, separations, roof lines and set backs may be considered between clusters.

Site layout and designs should be based on the principles of defensible space (CPTED principles) and should provide ample opportunities for the casual surveillance of public spaces (these principles attempt to strengthen two kinds of basic social behavior: territoriality and natural surveillance).

4. Privacy from Public Views

In order to achieve privacy on porches, verandahs and patios/decks of townhouse and cluster housing units which front on a public street, the finished grade of these units should be between **0.60 to 1.00 metre** above the level of the sidewalk.

5. Retaining Walls

No retaining walls should be allowed along the front property lines unless required as a result of natural site conditions.

Where retaining walls are absolutely necessary, they should not exceed 1.00 metre in height. Landscaping should be provided in front of the retaining wall. The distance to a retaining wall from any property line should be at least equal to the height of the retaining wall (1.00 metre maximum).

A smooth finished grade or ground level transition from lot to lot is preferred.

DESIGN GUIDELINES FOR THE COMMERCIAL AREA (151 Street)

1. Commercial Uses on 151 Street

The commercial street should achieve continuity of frontage along both sides of the street. Continuous frontage and small front yard set backs should be considered.

It is desirable that at least 80% of the commercial frontage at street level be dedicated to retail, eating establishments and/or personal service stores.

Residential uses are preferred above ground level but residential/professional office uses are acceptable if they provide a strong local residential character.

Second and third levels above the street level should be set back from the ground floor level.

Articulation of storefronts are encouraged along the continuous frontage.

Various narrow frontage CRU bays are preferred to a single large commercial area.

A continuous lane is recommended at the rear of the commercial uses to provide access to loading bays and employee parking.

2. Commercial Parking Areas

Parking lots and loading areas for commercial areas should be located behind the buildings. They should be screened and located away from direct views from the street. Access to parking areas is recommended from a service lane or driveway at the back of the commercial buildings.

A combination of low planter/wrought iron fence (maximum 1.00 metre high) is recommended, in combination with landscaping and wide canopy tree planting, to enclose and screen parking areas from views from lanes and adjacent streets.

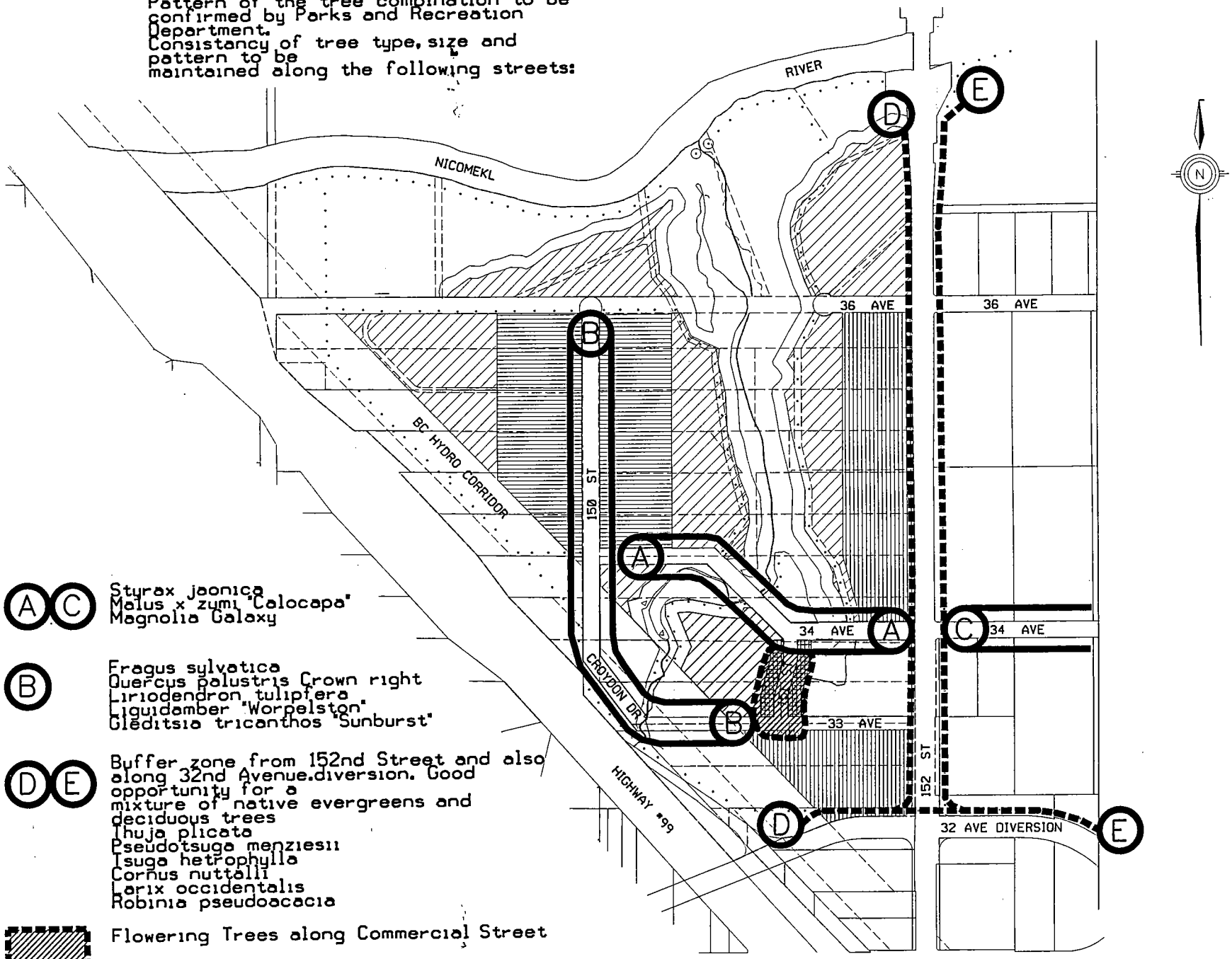
3. Canopies and Signs

Commercial developments should provide canopies over the sidewalk (1.50 metre projection is recommended) in order to achieve weather protection continuity along the whole length of the commercial street. Round canopies are not encouraged.

It is recommended that canopies have an inclination between 30 and 45 degree slope toward the street and provide no more than a 0.30 metre wide vertical edge (fascia) for identification signage purposes. No sign or lettering should be permitted on the sloping part of the canopy.

In addition to the canopy identification signs, other recommended signage includes flood lighting over wooden routed signs, neon, or lettering painted on the windows of the retail/office space. The use of plexiglass backlit illuminated fascia bands or pylon signs are strongly discouraged in the commercial area.

Pattern of the tree combination to be confirmed by Parks and Recreation Department.
Consistancy of tree type, size and pattern to be maintained along the following streets:



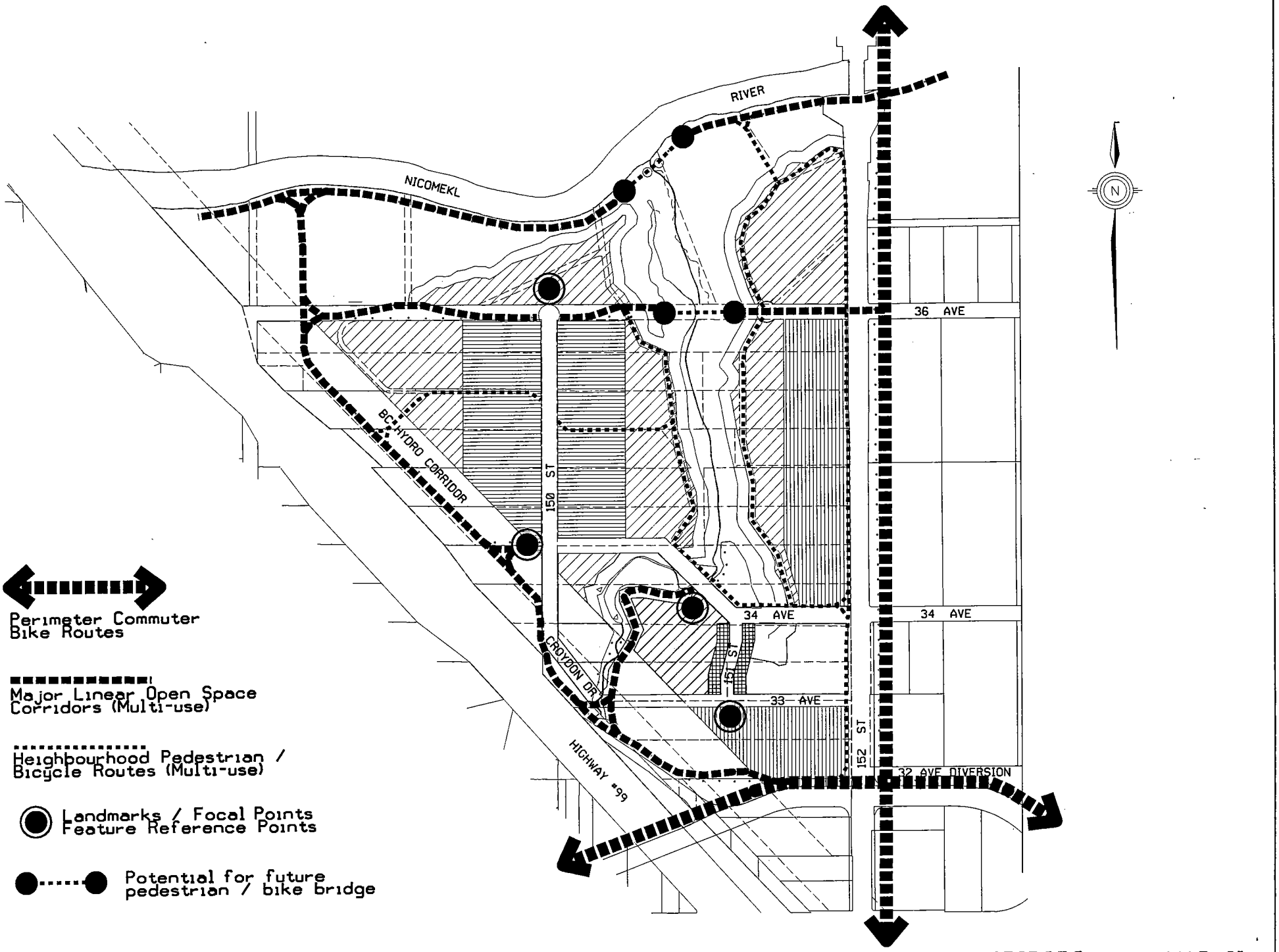
A C — Styrax japonica
Malus x zumi 'Calocapa'
Magnolia Galaxy

B — Fragus sylvatica
Quercus palustris Crown right
Liriodendron tulipfera
Liquidamber 'Worpelston'
Gleditsia tricanthos 'Sunburst'

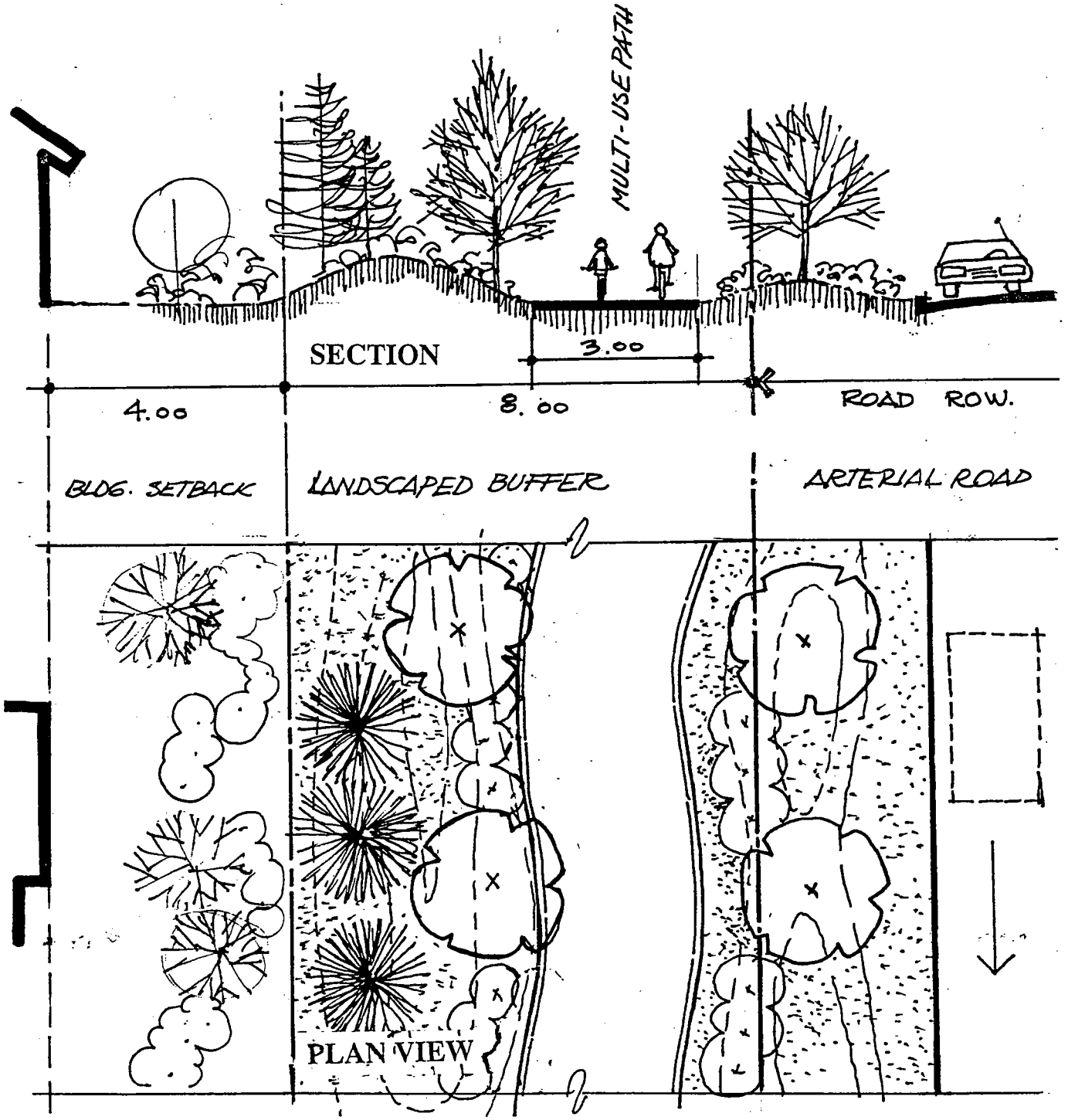
D E — Buffer zone from 152nd Street and also along 32nd Avenue.diversion. Good opportunity for a mixture of native evergreens and deciduous trees
Thuja plicata
Pseudotsuga menziesii
Tsuga hetrophylla
Cornus nuttalli
Larix occidentalis
Robinia pseudoacacia

Flowering Trees along Commercial Street

RECOMMENDED STREET TREES MAP 1



PEDESTRIAN / BIKE (MULTI-USE) CORRIDORS MAP II



PLANTED INTERIOR MOUND

Coniferous:

Pinus Nigra (Austrian Pine)
Picea Pungens (Colorado Spruce)

To be combined with deciduous trees and medium and large shrubs: Photinia, Portuguese Laurel, Barberis or similar.

PLANTED EXTERNAL MOUND

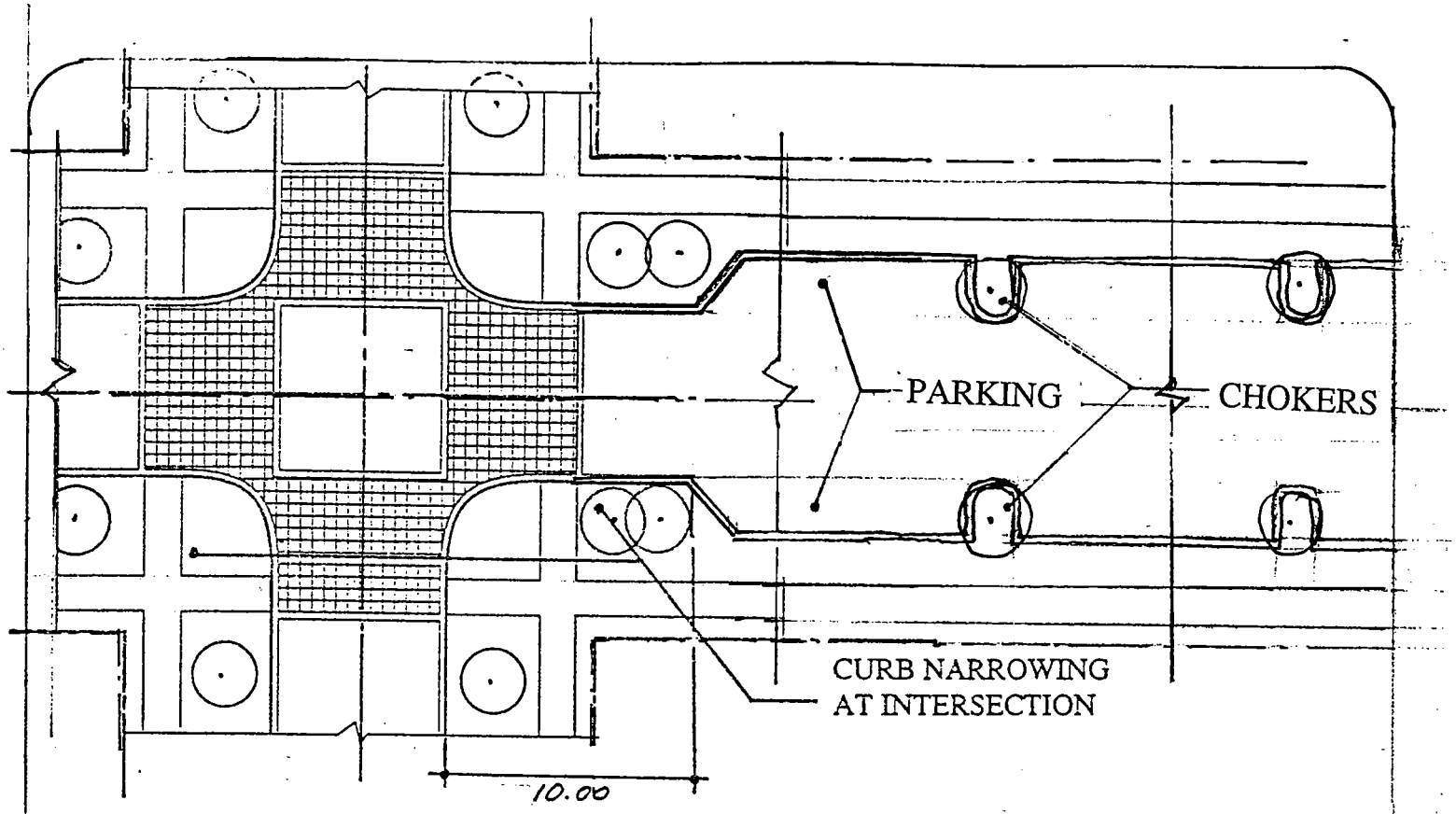
Deciduous:

Fraxinus Exelsior 'Westhoffs Glory' (Westhoffs Glory Ash)
Acer Platanoides 'Deborah' (Deborah Maple)

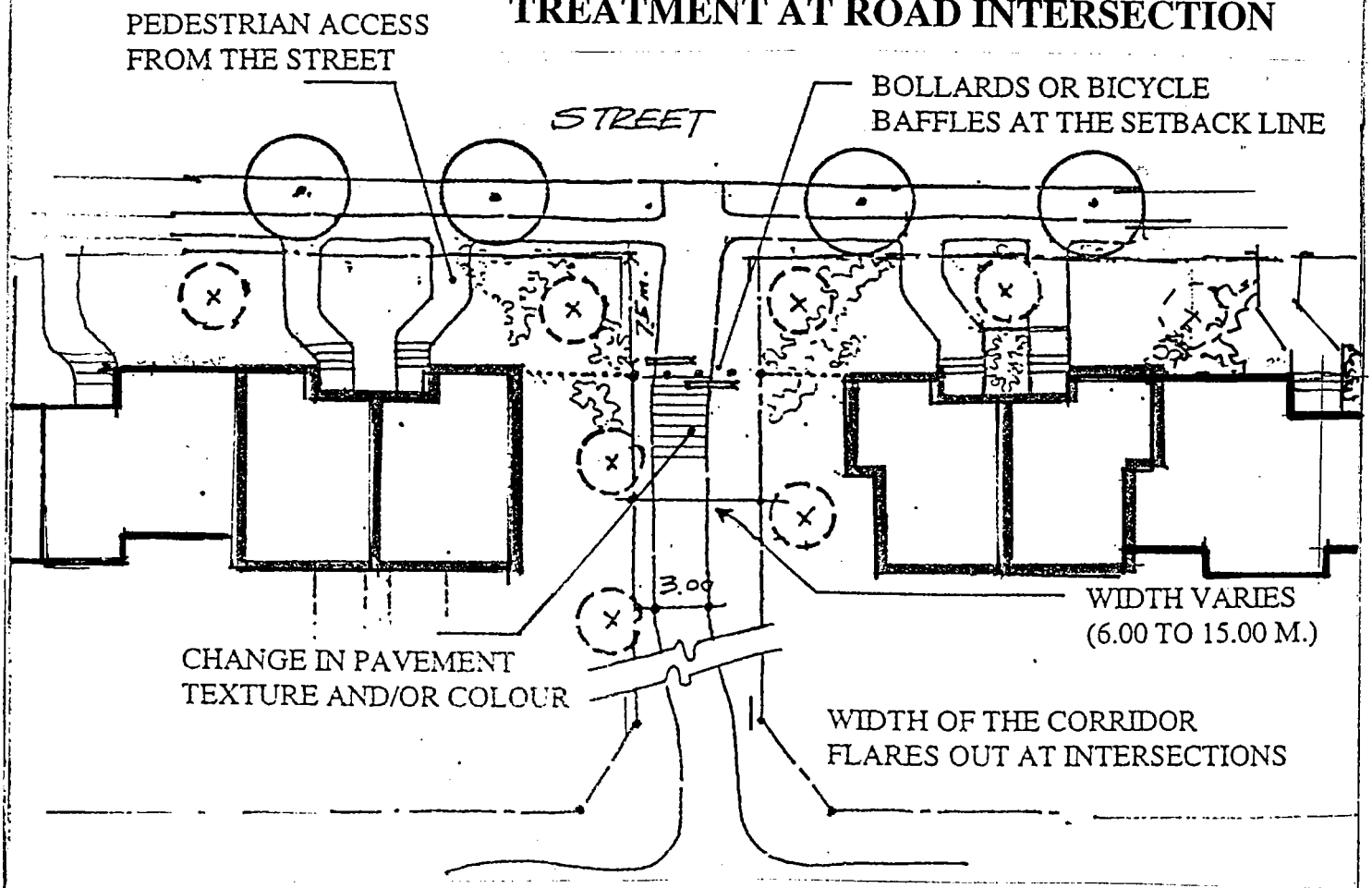
To be combined with low shrubs: Genista Lidia, Shrub Rose, Rosa Foetida or similar

Sketch # 1

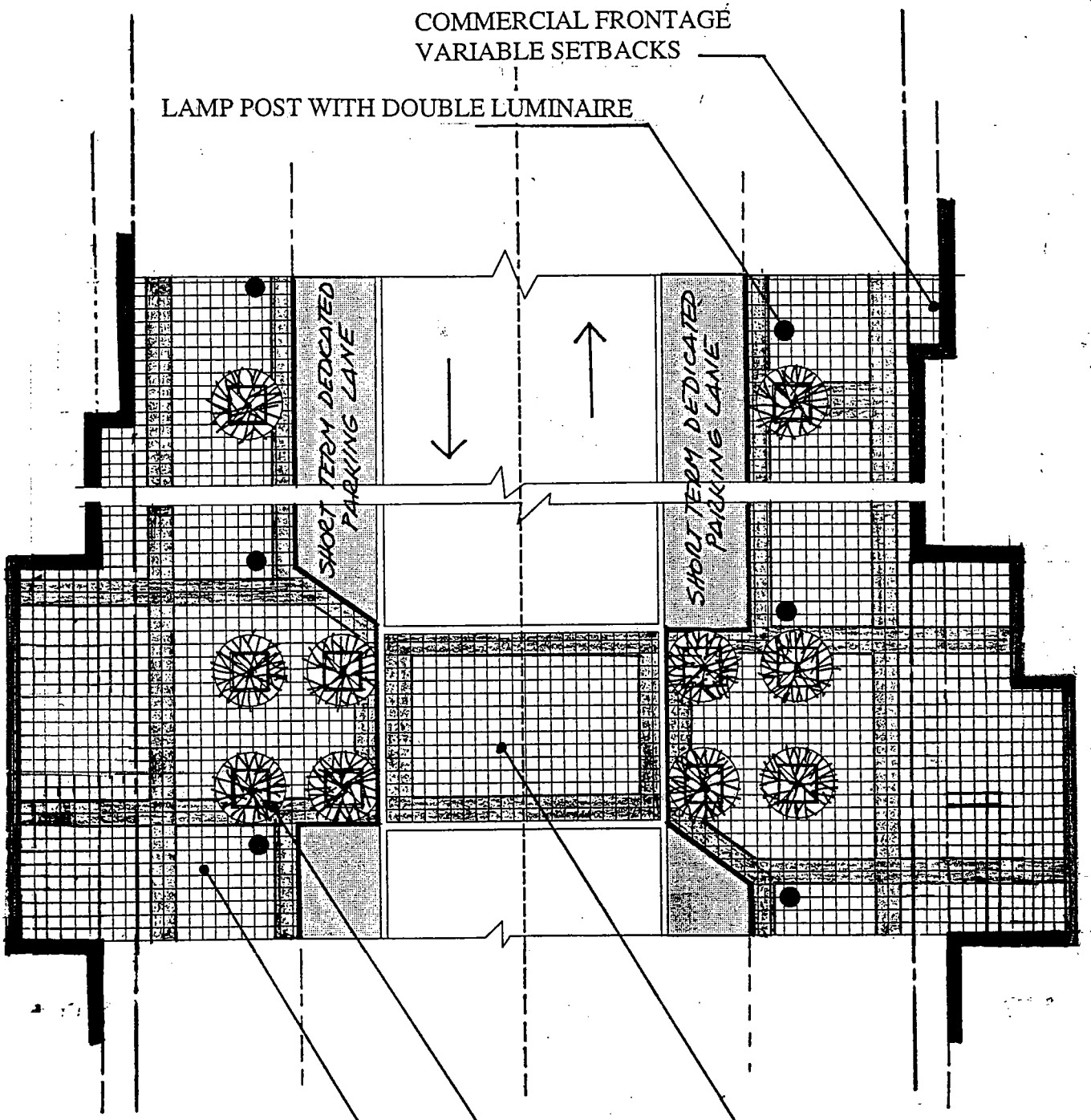
LANDSCAPED BUFFER AND MULTI USE PATHWAY



TREATMENT AT ROAD INTERSECTION

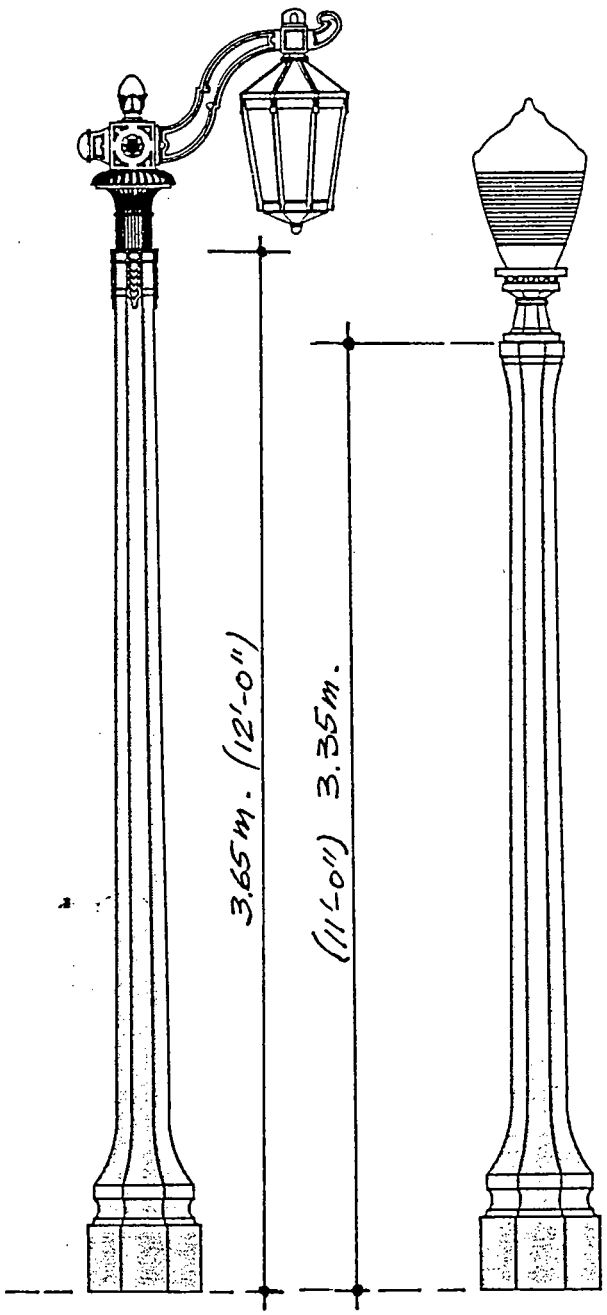


INTERSECTION TREATMENT / MULTI-USE CORRIDORS AND PATHWAYS Sketch #-2



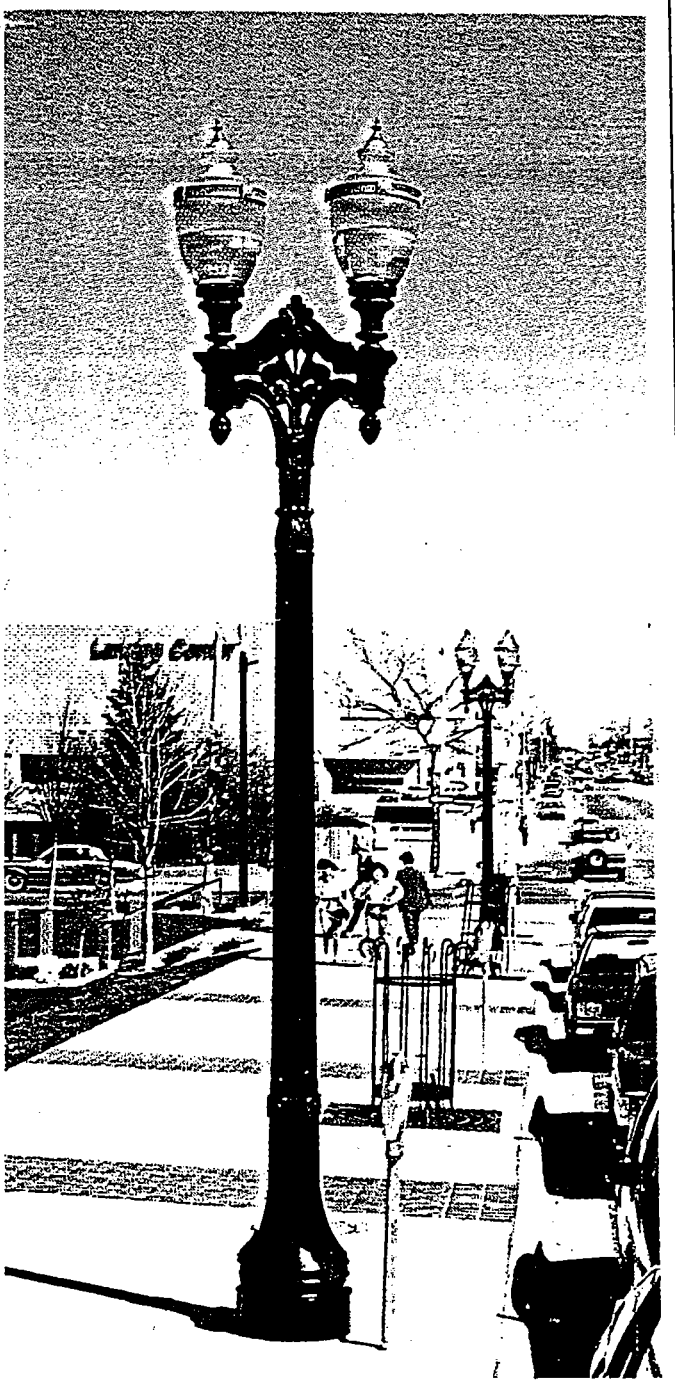
Sketch # 3

COMMERCIAL STREET. DEVELOPMENT CONCEPT



RECOMMENDED TYPE OF LAMP POST AND SINGLE LUMINAIRE (OR EQUIVALENT)

Sketch # 4



RECOMMENDED TYPE OF LAMP POST AND DOUBLE LUMINAIRE. (OR EQUIVALENT)

Sketch # 5

STREET LIGHTS. COMMERCIAL AND ENTRANCE AREAS.

GENERAL DESIGN GUIDELINES

ROSEMARY HEIGHTS WEST
NEIGHBOURHOOD CONCEPT PLAN (NCP)

SURREY
CITY OF PARKS

These guidelines were prepared by the Planning and Development Department in consultation with the Parks and Recreation Department and the Engineering Department. Some of the recommendations are based on recurring comments and recommendations made by the Surrey Advisory Design Panel on the subject of residential development proposals.

GENERAL DESIGN GUIDELINES
ROSEMARY HEIGHTS WEST
NEIGHBOURHOOD CONCEPT PLAN

OBJECTIVES

The main objective of these guidelines is to facilitate the co-ordinated development of an identifiable, well defined, pedestrian friendly residential neighbourhood in the west neighbourhood of Rosemary Heights.

The design guidelines are intended to provide overall directions to achieve the intended neighbourhood character, preserve and enhance natural spaces, encourage pedestrian access to destination areas, facilitate social interaction and achieve the overall development objectives defined in the final Neighbourhood Concept Plan (NCP).

The overall identity and character of the neighbourhood will be largely determined by the appearance of the main streets, bike/pedestrian routes and public spaces used by the local residents. These urban elements also outline the overall image received by visitors to the neighbourhood.

Used in conjunction with the NCP, the guidelines will enable the co-ordinated design of this new neighbourhood by developers and the various City Departments. The guidelines will assist in the evaluation of specific development proposals by providing a reference point regarding the degree to which they meet the urban design objectives for the neighbourhood in terms of streetscape, public spaces, urban form, and function.

APPLICABILITY

These guidelines provide the design principles and minimum standards that will permit the co-ordinated design and development of individual sites in the west neighbourhood of Rosemary Heights. They will serve as a reference in the preparation and evaluation of specific development proposals. The guidelines may be refined in conjunction with applicants at the time of rezoning and will be used as a reference in preparing Development Permit Area Guidelines for multiple-residential and commercial developments.

Please note that these guidelines are for general use only and are subject to change upon finalization of the engineering road standards for this neighbourhood. The guidelines may be refined in consultation with Surrey's Engineering and Parks and Recreation Departments as standards and requirements are developed for this neighbourhood.

GENERAL DESIGN GUIDELINES
ROSEMARY HEIGHTS WEST
NEIGHBOURHOOD CONCEPT PLAN

CONTENTS

DESIGN GUIDELINES FOR YARDS ABUTTING PUBLIC STREETS

1. General Design Principles for Yards Abutting Public Streets

Yards abutting the street have a strong impact in determining the character and liveability of the street. The yards of townhouses, cluster housing and apartment building sites should have consistent treatments in order to unify the streetscape. The landscaping, definition of yard edges, and design of open areas along public streets should achieve continuity and be complementary.

The following general guidelines are oriented to improve the quality and aesthetics of the streetscape in the west neighbourhood of Rosemary Heights.

2. Gates/Entrances

Gates should not be permitted in multiple residential developments. If extenuating circumstances make this enclosure justifiable, gates should be located at the front yard setback line (7.50 m. from the property line), consist of swing doors, and adequate space should be provided in front of the gate for queuing and turn around of vehicles.

Instead of gates, the entrances to multiple residential sites should consider the use of architectural or landscaping elements which identify the threshold between public and private property. Any minor structure used for this purpose should be located at the dominant front yard setback line.

A combination of walls, pavement change, landscaped medians, treed boulevards, arbours, trellises, pedestrian gatehouses, feature lighting posts, etc. are recommended for identification of the entrance to multiple residential developments.

3. Fences

3.1. General

No chain link fences should be permitted in Rosemary Heights West Neighbourhood.

Consistency of treatment of yards toward the street should be ensured by the use of shrubs and hedges as a standard boundary definition on cluster and townhouse sites.

3.2. Fences on Multiple Residential Sites

To maintain a consistent residential character in the neighbourhood, no fences should be allowed on multiple residential sites. If fences are unavoidable, transparent, low fences (wrought iron, picket fences, three board fences, low stone wall/wrought iron fence combination, etc.) are recommended in combination with landscaping on both sides of the fence.

Continuous, straight fences should provide a 0.60 m. wide space in front of the fence for landscaping on private property. Articulation of fences, with landscaping on both sides, is recommended as an alternative.

3.3. Fences Along 150 Street

The frontages of townhouse or cluster housing sites along 150 Street should have a uniform, strong definition of the street-oriented character. This type of edge definition should be consistent along both sides of 150 Street.

Continuous, straight fences should allow for a **0.60 metre** wide space between the property line and the fence to accommodate landscaping on private property.

3.4. Side and Back Yard Fences

Where a side or back yard flanks a public street and is open to view by the public, fences along the side and/or rear property lines should not be higher than **1.80 metres.** It is recommended that the upper **0.60 metres** of the fence be lattice.

3.5. Fences Along Open Space, Parkland and Multi-Use Corridors

Fences on lots along open space and major pedestrian/bicycle corridors should be transparent (wrought iron, low stone wall/wrought iron fence combination, etc.) and low landscaping adjacent to fences should be considered. The intent is to visually increase the overall width of the corridors by incorporating landscaping on private lots, and to increase casual surveillance and overall safety along these corridors (in accordance with CPTED principles).

4. Driveways

In order to reinforce pedestrian dominance on the street, achieve the integration/continuity of landscaping in front yards, and allow for boulevards with

regularly spaced trees, the following are recommended for all residential developments:

- Garages should be located toward the back or side of the unit, and a window should be provided on the side of the garage that is visible from the street.
- The continuity of the public sidewalk should not be interrupted by the pavement of driveways (sidewalk pavement should be continued across the driveway pavement).

5. Service and Parking Areas in Multiple Residential Housing Sites

Recreational vehicle, visitor/common parking areas, garbage container enclosures, satellite dishes and other service elements should not be visible from a public street.

If these are located toward the street, a **7.50 metre** wide landscaped area (equivalent to the front yard setback) should be provided toward the street.

Shrubs and hedges should be considered to screen direct views to these service areas.

DESIGN GUIDELINES FOR TREES ON AND ADJACENT TO PUBLIC STREETS

1. General Design Principles for Trees On and Adjacent to Public Streets

The following guidelines are intended to ensure an identifiable and integrated public streetscape by establishing the different role and character of the streets through specific species of trees and their locations. This will be accomplished through conformance with the Street Tree Planting Scheme indicated in Map I, and through the general application of these guidelines.

2. Street Trees

Recommended trees along the major neighbourhood streets and trees at the entrances to the neighbourhood are shown in Map I, "Recommended Street Trees".

Recommended trees along the same street include a combination of species in order to provide bio-diversity, and to promote tree health by lowering the impact of common pests and diseases. Recommended species have been chosen from the list of *Replacement Trees* recommended for boulevards as per "Schedule K" of the Tree Preservation Bylaw (No. 12880).

Continuity and spacing of street trees along streets should meet the spacing standards defined by the Parks and Recreation Department.

A gradual increase in spacing should be considered to satisfy the required distances to utilities, instead of creating a gap.

Tree planting on boulevards should meet the "Boulevard Tree Planting Standards" developed by Surrey Parks Maintenance.

It is mandatory that planting of trees on all boulevards be done at the completion of all construction and landscaping in the development site where the City boulevard is contiguous with private property and/or where the grade at the root zone will be altered or damaged with further construction or landscaping.

Trees may be planted in the medians following all other landscape installations, including grass, and only upon completion of final grade of the median. Should the developer not wish to wait until completion of construction and landscaping, cash-in-lieu of street trees can be deposited and the Parks and Recreation Department will undertake the tree planting once development in the area is complete. The developer may plant the entrance boulevards with trees as embellishments to indicate that trees will be planted in the future.

3. Trees Adjacent to Streets

3.1. General

To enhance the overall quality of the neighbourhood, the site layout design of new developments should retain and incorporate existing large clusters of trees. Native trees should be retained through careful site planning and/or subdivision design. The publication "Saving Native Trees in the Pacific Northwest" is recommended as a guideline on this matter.

The "Tree Preservation Bylaw" is applicable to any new development in the west neighbourhood of Rosemary Heights.

Flowering trees in front yards are recommended to add colour and texture to the streetscape. The following are some of the trees recommended for yards toward the street:

- Stewartia (*Stewartia nonadelpha*),
- Ivory Silk Tree Lilac (*Syringa reticutata 'Ivory Silk'*),
- Stag's Horn Sunac (*Rhus typhina*),
- Magnolia (*Magnolia grandiflora*),
- Lavalle Hawthorn (*Crataegus lavallei*), and,
- Smoke Tree (*Cotinus coggygria*).

At least two trees should be provided in the front yard of every dwelling unit fronting on the street on a townhouse or cluster housing project.

One of these trees should be a flowering tree; the other should be planted not less than 0.60 m. from the property line and 2.10 m. from the sidewalk, follow the planting pattern, and be of the same species as the boulevard trees identified along that street.

Tree planting in front yards should be co-ordinated with the tree replacement plan required for every proposed development.

3.2. Tree Retention

Stands of mature trees should be identified, preserved and incorporated into the overall site landscaping design of new developments.

Unique tree species, significant vegetation and nesting areas should be retained.

4. Calliper

All trees should be 5-6 cm. calliper, branched at or above 1.3 metres. No pruning of the scaffold branches or leader should be undertaken.

5. Consultation with Parks & Recreation

The Parks and Recreation Department should be consulted for specific suggestions regarding pattern, spacing, frequency of species or possible changes to the species of trees recommended along any of the routes identified.

6. Landscaped Buffer (152 Street)

A combination of a mound and landscaping is recommended for this perimeter buffer along 152 Street and 32 Avenue diversion (see Sketch #1). This buffer should be a minimum of 8.00 metres wide.

A minimum 4.00 m. set back from the buffer is recommended for all buildings along 152 Street.

7. Neighbourhood Entrance

The main entrance to the neighbourhood at 34 Avenue (from 152 Street) should include a landscaped median.