2/10/76

Introduced by: TRACY J. OWEN

76-144

ORDINANCE NO. 2707

AN ORDINANCE relating to a general plan for a system of sanitary sewers for an area of King County; amending K.C.C. 20.12.040(3) by adopting said sewer general plan as an element of the Comprehensive Plan for King County under the provisions of Ordinance 263, Article 2, Section 3 of K.C.C. 20.12.030.

PREAMBLE:
The Council of King County declares it advisable and necessary for the public health and welfare of the inhabitants of the County to establish, purchase, acquire and construct a system of sewerage for an area of the County. Petitions were received by the County Council from the owners of over eighty percent of the property in an area designated "Trend".

A comprehensive sewage plan has been prepared entitled, "Sewerage General Plan Trend County Sewer Service Area", dated July 18, 1975. A King County Trend Area Plan Review Committee has been selected, organized and has reviewed the plan, all in accordance with the County Area Service Act, 36.94 R.C.W. Resolution 75-1 of the Committee has recommended that King County Council adopt said plan as an element of the comprehensive plan for the physical development of the County.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

NEW SECTION. SECTION 1. "Sewerage General Plan Trend County Sewer Service Area" attached hereto is hereby adopted as an addendum and element to the Comprehensive Plan for King County under the provisions of Ordinance 263, Article 2, Section 3, K.C.C. 20.12.030. The Sewerage General Plan for the Trend County Sewer Service Area is an amplification and augmentation of the County Comprehensive Plan, as provided in K.C.C. 20.12.040(3).

A Declaration of No Significant Environmental Impact has been prepared and circulated in accordance with provisions of Ordinance 1700.

INTRODUCED AND READ for the first time this 8th day of March, 1976.

PASSED this 3rd day of May, 1976.

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

Dave Mooney
Chairman

ATTEST:

Dorothy M. Owens
Clerk of the Council

APPROVED this 5th day of May, 1976.

John D. Spellman
King County Executive

KING COUNTY DEPARTMENT OF PUBLIC WORKS

JULY 18, 1975

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KING COUNTY DEPARTMENT OF PUBLIC WORKS

SEWERAGE GENERAL PLAN
TREND COUNTY SEWER SERVICE AREA

The following sewerage general plan for the proposed Trend sewer service area is prepared in accordance with the requirements of 36.94 and King County Ordinance No. 1709.

LOCATION OF THE AREA

The service area is located in unincorporated King County east of the City of Kirkland and east of Interstate 405. The area may be reached from I-405 via the NE 116th Street off-ramp. The service area is generally bounded on the west by 124th Avenue NE, on the east by 132nd Avenue NE, on the north by NE 116th Street, on the south by NE 104th Street. (A legal description of a proposed U.L.I.D. area is contained in the appendix to this report.)

The approved comprehensive plan of the Municipality of Metropolitan Seattle (Brown and Coldwell Report, 1958) has designated the plan area ELW-9. Interstate 405 was constructed several years after completion of the Metro study effectively cutting ELW-9 into two separate drainage areas. The Trend service area is the portion of ELW-9 situated easterly of I-405. The study area contains a small portion of the Metro plan area designated NLS-37. It is proposed to sewer approximately six acres of NLS-37 via a small lift station which will pump sewerage over the divide into ELW-9 facilities. The pump station will be for interim use prior to development of a system within NLS-37. When such development will occur cannot be predicted at this time.

HISTORY

The area, except for a few residences on 124th Avenue NE, was undeveloped until the early 1960's. At that time the plats of Palarama Estates and the various devisions of the Trend plat were developed and residences constructed and occupied. Development and construction followed in the plat of Merrywood No. 2 in 1965. All the homes were served by septic tanks and drain fields.

By 1965 septic tank/drain field failures were beginning to occur with great frequency in the Trend divisions, according to the records of the Seattle-King County Health Department. Similar problems were reported in Palarama Estates. Later in the decade several residents of Palarama Estates reported sewage disposal problems on their property were being compounded by seepage from Merrywood No. 2, situated at somewhat higher elevation to the north.

King County Water District No. 81, which provides water service to the Rose Hill area easterly of Kirkland, prepared a Preliminary Planning Report for a Sanitary Sewer System for its area which includes Trend and the nearby developed plats. The report was published in January, 1967. Previously (in 1966) the City of Kirkland had made a preliminary study of a sewage collection system in the same general area.

Late in 1972, following requests made to members of the King County Council by local residents, petitions were prepared asking for a sewage collection system for their neighborhood. The petitions were received by the Council early in 1973. Checking disclosed that owners of over 81% of the land had signed the petition. The residents who had circulated the petitions advised that only

resident owners and not absentee owners had been contacted which made the 81% figure quite impressive. The King County Council passed its Motion No. 1303 early in 1973 declaring its intention to form the Trend Sewer U.L.I.D.

TOPOGRAPHY & PHYSICAL FEATURES

The westerly three quarters of the service area slopes gently toward the west and lies in the Lake Washington drainage basin. The easterly quarter slopes toward the east in the direction of the Sammamish River which is situated approximately two miles east.

The Soils Survey published by the United States Department of Agriculture, Soil Conservation Service, in November, 1973, classified the soils as Arents, Alderwood Material in those areas distrubed by development. This soil classification is charactorized as follows:

The upper part of the soil to a depth of 20 to 40 inches is brown to dark brown gravelly sandy loam. Below this is a grayish brown, consolidated and imprevious substratum. Water moves on top of the substratum in winter. Available water capacity is low. Run-off is slow and the erosion hazard is slight.

This type of soil is deemed generally unsatisfactory for septic type/drain field usage except on large parcels where space permits lengthly drain fields.

Undeveloped portions of the service area have a dense growth of second growth forest, largely hardwoods, with alder dominating.

DESIGN CRITERIA

The purpose of this section is to present design criteria to

be used in the planning of proposed facilities in accordance with the comprehensive sewerage plan set forth in this study.

These criteria include provisions for lift stations, trunk lines, and lateral sewers as well as provisions for individual service connections. The criteria are based on the requirements of the various regulatory agencies, the Municipality of Metropolitan Seattle, and on proven and accepted practices normally used in the design and construction of sewerage facilities.

The design period is the length of time that a given facility provide adequate service. The period selected for a given facility is based on the economic life of the facility. Factors which influence the economic life of a facility are the useful life of the facility, cost of replacing the facility, cost of increasing the capacity of the facility, and the projected rate of growth of population served by the facility.

Facilities with a long or indefinite life and which can be expanded only at a great expense and low population growth rates tend to favor increased design periods. These facilities include sewer trunks and lift stations. Facilities with a relatively short useful life or which can be replaced or expanded at a reasonable cost along with rapid population growth rates and stable economic conditions tend to favor shorter design periods. These facilities include lift station components such as pumps and motors. In planning for these facilities, consideration must also be given to the ability of the consumer to pay for the improvements.

The design period for this study is forty years for the area to be served. The existing trunk is sized for ultimate development.

The small lift station proposed, to serve approximately six acres in NLS-37, is an interim measure for use until its drainage area is served by gravity facilities.

BASIS OF SEWAGE QUANTITIES

Average Dry Weather Flow (ADWF)

Average Sanitary Sewage	70	
Average Industrial Waste Flow	0	
Summer Infiltration, 300 gpad at 10 persons per acre	30	100 gpcd

Peak Wet Weather Flow (PWWF)

Peak Sanitary Sewage, 70 gpcd x 3.33	233	
Peak Flow Industrial Waste	0	
Winter Infiltration, 600 gpad at 10 persons per acre	60	
Winter Storm Inflow, 500 gpad at 10 persons per acre	50	343 gpcd

Minimum Dry Weather Flow (MDWF)

Minimum Sanitary Sewage 70 x 0.5	35	
Industrial Waste Flow	0	35 gpcd

BASIS OF SEWAGE CHARACTERISTICS

5-Day BOD, lbs. per capita per day (PCD)

Sanitary Sewage	0.17	
Allowance for Garbage	0.06	0.23 pcd

Suspended Solids, lbs. per capita per day (pcd) 0.23 pcd

As the entire study area, except for one small parcel, has residential zoning it can be predicted there will be no appreciable industrial waste produced. (One lot, approximately 200' x 300' in size, is zoned Neighborhood Business).

GROUND WATER INFILTRATION

The quantity of water which may infiltrate into a sewer can be estimated and will generally increase with the age of the sewer. However, the design of the sewer system and the inspection during the course of construction will have much to do with the amount of infiltration that will enter the sewer pipes. By the use of certain types of joint materials, it can be assured that pipe joints will be more effective, remain in better condition and last longer than would other types of joints.

On the basis of using rubber gaskets or other improved materials now available, the design allowance for infiltration would be as shown in the table below. Utilizing the data from this table and considering trunks, lateral sewers and side sewers, the design basis for ground water infiltration and storm inflow for new sewers is 600 and 500 gallons per acre per day, respectively.

ALLOWANCE INFILTRATION
FOR VARIOUS SIZED SEWERS

Pipe Sizes (Inches)	Infiltration in Gallons per hour per 100 feet
8"	3.2
10"	4.0
12"	4.8
15"	6.0
18"	7.2
21"	8.4
24"	9.6
30"	12.0

SEWER SIZING

Sewers shall be designed with sufficient capacity to carry peak flows from the tributary area at ultimate development. The

minimum diameter of gravity laterals shall be eight inches and side sewers, six inches. Four inch house sewers to serve a single residence will be permitted.

The ability of a sewer to transport suspended solids, contained in sewage is related to the velocity of flow in the sewer. A velocity of two feet per second is generally considered to be the minimum which will keep pipe surfaces clean and free of deposited material.

MINIMUM SLOPES FOR SEWER PIPE

Pipe Sizes In Inches	Slope Foot/Foot
8	0.005
10	0.004
12	0.003
15	0.0025
18-21	0.002
24-30	0.0015
36-54	0.0010

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Diameters of gravity sewers constructed of concrete are determined by means of Manning's pipe friction formula, using a roughness coefficient "n" of 0.0013 and considering the pipe to be flowing 0.8 full.

The design of force mains is predicted on the basis that they flow full and under pressure. Again, as in the case of gravity sewers, the mains must be capable of carrying the peak flow from a given area.

Force main design shall be based on a minimum self-cleansing velocity of 3 FPS. Roughness coefficient will depend on the pipe material selected.

Diameters of force mains and inverted siphons are determined by means of the Hazen and Williams formula, using a roughness coefficient "c" of 140.

POPULATION PROJECTIONS - PROPOSED ULID AREA

Existing Residences	154
Barber Shop	1

Based on an estimated population of 4.5 per residence, we may estimate an existing population of 693. Located within or immediately adjacent to the study area are three new plats. These have requested developer extension agreements.

North Firs	25 Lots
Orchard Park Lane	20 Lots
Evergreen Place	
Division 1	40 Lots
Division 2	40 Lots
Division 3	39 Lots
Vacant building lots with area	20 Lots
TOTAL Buildable Sites	184

Predicting a new residence construction rate of 30 per year we estimate a population of 1,360 by the year 1980, within the proposed U.L.I.D. area.

ZONING

With the exception of one parcel, 200' x 300' in size, the entire study area is presently zoned S-R (Suburban Residential). Following is a description of this zoning classification:

Provides for the orderly transition of areas from a suburban to an urban character. Within this classification small scale and intensive agricultural pursuits may be mixed with developing urban subdivisions.

Dimensional Standards

Lot area: 5 acres, except that the area may be reduced through subdividing..
7,200 sq. ft. with sewer, water, paved streets, curbs, drainage.
9,600 sq. ft. with approved sewage disposal system and paved streets.
35,000 sq. ft. with approved water and sewage disposal systems.

Min. lot width:	330 ft. unless platted.
Front yard depth:	30 ft. unless platted.
Side yard depth:	10 ft. unless platted.
Rear yard depth:	10 ft. unless platted.
Lot coverage:	35%
Height:	30 ft. except for acessory buildings.

It should be noted that the new plats in the area are being developed with sewers, water, paved streets, curbs, and drainage and 7,200 sq. ft. lots.

The excepted parcel noted above is zoned B-N (Neighborhood Business) contains a residence and a barber shop which serves juvenile trade.

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ASSESSED VALUATION

The assessed valuation of the proposed U.L.I.D. area is $1,714,016.00 (County Assessor's records, September, 1974).

BALANCE OF STUDY AREA

Fifty-one single family residences are scattered about the study area, not included in the proposed Trend U.L.I.D. Population is estimated at 150. These residences are in small clusters generally separated by undeveloped land which will not meet percolation standards set by the Seattle-King County Department of Public

Health. Two large parcels are owned by the Lake Washington School District as future school sites.

INTERGOVERNMENTAL AGREEMENTS

A County wide sewer agreement has been negotiated between King County and the Numicipality of Metropolitan Seattle. The agreement has been signed by the County Executive and has been recommended for approval by the Metro staff. At this writing an environmental assessment is being prepared to permit approval by the Metro Council.

Sewage from the proposed project will be transmitted a short distance via an 18" City of Kirkland trunk sewer to a Metro trunk west of I-405. Both the Kirkland and Metro facilities have ample capicity to handle projected, ultimate peak flows from the proposed service area. Following negotiations with Kirkland tentative agreement has been reached for payment of an area charge of approximately $65 per acre to help amortize the cost of Kirkland's trunk. A wheeling charge, not to exceed $6.00 per year per connection, is being discussed with Kirkland.

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DEVELOPER EXTENSIONS OF THE SEWER SYSTEM

In accordance with policy developed in other County sewer districts, developer extension agreements will be negotiated which will include, for example, the following requirements:

1. Plans and specifications shall be prepared by a licensed professional engineer.
2. Plans and specifications shall be approved by the Washington State Department of Ecology, Metro and King County.

3. Inspection and testing shall be by an egnineer approved by the County.
4. An area charge shall be paid prior to connection.
5. Upon acceptance of the work, the facilities shall be deeded to King County.

PROPOSED COLLECTION SYSTEM - TREND U.L.I.D. AREA

10,106 L.F.	8" Lateral Sewer
2,600 L.F.	6" Side Sewer
43 Each	Standard Manholes
2 Each	Drop Manholes
1 Each	Sewage Lift Station
845 L.F.	Force Main

. . . together with all appurtenances, fittings, bedding, backfill material, restoration and asphalt patching.

Construction cost of the above, including sales tax, and contingencies, is estimated at $210,000.00.

COST OF THE PROJECT

Following are estimated costs of the proposed work.

Construction including sales tax & contingency	$210,000.00
Engineering	35,000.00
Interest during construction	10,000.00
Bond printing, etc.	1,000.00
Legal	2,800.00
Inspection	4,000.00
Overlay streets	15,000.00
TOTAL	$278,000.00
SAY	$280,000.00

PREDICTED MAINTENANCE & OPERATION EXPENSE

Lift Station Power	$ 360.00
Lift Station Maintenance	960.00
Collection System	360.00
Supplies	40.00
Contingency	140.00
Annual M & O Expense	$1,860.00

155 connections at $1.00 per month = $1,860.00 per year.

ESTIMATED MONTHLY SERVICE CHARGE REQUIRED

Metro Charge	$3.55
Revenue Bond Fund (Including Coverage)	2.25
M & O Expense	1.00
Billing Expense	.50
Wheeling Charge	.50
Monthly Service Charge	$7.80

FINANCING THE IMPROVEMENTS

The construction may be financed by the issuance of sewer revenue bonds. Amortization is planned on the basis of 85 percent from assessments against the property benefited and 15 percent from revenues of the district.

The estimated assessment would be $1,375.00 per lot plus $0.02 per square foot of land area. The assessment roll would total $240,000.00. Unless otherwise prohibited by County ordinance and State law the special assessments shall be for the sole purpose of payment into a revenue bond fund created for the payment of revenue bonds issued to pay the cost of the proposed improvement.

Revenues from customers at $27.00 per year would produce in excess of $4,000.00 per year for bond retirement. This figure would increase as additional services are connected.

The following table indicates preliminary cash flow requirements projected for Debt Service on the proposed project:

(ESTIMATED)

CASH FLOW FOR DEBT SERVICE $280,000 BOND ISSUE 20 YEARS AT 7%

2707

INCOME

ASSESSMENT ROLL - $240,000

YEAR	PRINCIPAL	INTEREST 7.25%	TOTAL INCOME	REVENUE ($27 PER CUSTOMER)	INTEREST ON RESERVE (5%)
1976	$12,000	$17,400	$29,400	$4,050*	$ 0
1977	12,000	16,530	28,530	4,050	192
1978	12,000	15,660	27,660	4,050	386
1979	12,000	14,790	26,790	4,050	581
1980	12,000	13,920	25,920	4,860**	777
1981	12,000	13,050	25,050	5,670	1,015
1982	12,000	12,180	24,180	6,480	1,297
1983	12,000	11,310	23,310	7,290	1,624
1984	12,000	10,440	22,440	7,290	2,001
1985	12,000	9,570	21,570	7,290	2,387
1986	12,000	8,700	20,700	7,290	2,748
1987	12,000	7,830	19,830	7,290	3,193
1988	12,000	6,960	18,960	7,290	3,614
1989	12,000	6,090	18,090	- ***	4,047
1990	12,000	5,220	17,220	-	4,129
1991	12,000	4,350	16,350	-	4,206
1992	12,000	3,480	15,480	-	4,279
1993	12,000	2,610	14,610	-	4,347
1994	12,000	1,740	13,740	-	4,410
1995	12,000	870	12,870	-	4,467
1996	-	-	-	-	4,519

	DEBT SERVICE PAYMENT				RESERVE ACCOUNT	
YEAR	TOTAL INCOME	PRINCIPAL	INTEREST (7%)	TOTAL	PAYMENT TO RESERVE	ACCUMULATE RESERVE
1976	$33,450	$10,000	$19,600	$29,600	$ 3,850	$ 3,850
1977	32,772	10,000	18,900	28,900	3,872	7,722
1978	32,096	10,000	18,200	28,200	3,896	11,618
1979	31,421	10,000	17,500	27,500	3,921	15,539
1980	31,557	10,000	16,800	26,800	4,757	20,296
1981	31,735	10,000	16,100	26,100	5,635	25,931
1982	31,957	10,000	15,400	25,400	6,557	32,488
1983	32,224	10,000	14,700	24,700	7,524	40,012
1984	31,731	10,000	14,000	24,000	7,731	47,743
1985	31,247	10,000	13,300	23,300	7,947	55,690
1986	30,774	10,000	12,600	22,600	8,174	63,864
1987	30,313	10,000	11,900	21,900	8,413	72,277
1988	29,864	10,000	11,200	21,200	8,664	80,941
1989	22,137	10,000	10,500	20,500	1,637	82,578
1990	21,349	10,000	9,800	19,800	1,549	84,127
1991	20,556	10,000	9,100	19,100	1,456	85,583
1992	19,759	10,000	8,400	18,400	1,359	86,942
1993	18,957	10,000	7,700	17,700	1,257	88,199
1994	18,150	10,000	7,000	17,000	1,150	89,349
1995	17,337	10,000	6,300	16,300	1,037	90,386
1996	4,519	80,000	5,600	85,600	-81,081	9,305

* 150 Customers

** Development of Evergreen Place will add 120 customers beginning in 1980 at a rate of 30 customers per year.

*** Some revenue may be required to maintain coverage on debt service after 1988.

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The figures shown in the foregoing table are very conservative in that prepayment of assessments is not taken into account. Thus, cash in the reserve fund will accumulate much more rapidly than indicated in the early years. However, conversly, interest income from unpaid assessments will also decline.

Our financial advisor has informed us that interest rates on municipal revenue bonds are now rising and are greater than 7%. It is contemplated that interest on unpaid assessments will be 8% rather than the 7% shown in the table.

SUMMARY

The U.L.I.D., as proposed, has a great deal of public support and the firm backing of the Seattle-King County Department of Public Health. No serious construction problems are forseen and the proposed assessment and charges will benefit the property. Payments of assessments may be paid over a period of 20 years and should not work a hardship on the residents. The proposed U.L.I.D. is economically feasible.

With sewers available in the neighborhood it is predicted that the vacant lands of ELW-9 within the study area will soon be developed. The area southerly designated in the Metro plan as ELW-11 will develop following construction of the proposed Slater Avenue Interceptor which will serve both study areas situated east of I-405.