OREGON STATE HIGHWAY DIVISION

HYDRAULICS MANUAL

Subject: DESIGN FREQUENCY	*Page:* 1-2
	Revision:
Approved: Victor D. Wolfe	*Effective Date:* February, 1973

PURPOSE

Flood frequencies for different class highways are established to produce a balance between the cost of the drainage facility and the cost of potential flood damage.

POLICY

All drainage structures shall be sized for the following design flood frequencies as set forth in Federal Highway Administration Instructional Memorandum 20-1-67.

DRAINAGE FACILITY	HIGHWAY CLASSIFICATION	
	A(4),A,B,C	D,E,F
Bridges*	50-year flood or the largest flood of record	25-year flood or the largest flood of record
Culverts*	50-year flood or the largest flood of record	25-year flood
Depressed Roadways	50-year flood	
Channel Changes*	50-year flood or the largest flood of record	25-year flood or the largest flood of record
Storm Sewers	10-year	10-year
Storm Sewers from Sags	50-year	10-year
Ditches, Gutters, and Inlets	10-year	10-year

*Note: Designs should be reviewed to ensure that backwater from 100-year flood or largest flood of record will not cause extensive property damage, result in loss of a bridge, or inundate the highway.

For Class D,E, or F highways, the design should be reviewed to ensure that backwater from the 50-year flood or the largest flood of record will not cause extensive property damage, result in loss of a bridge, or inundate the highway.

SUMMARY OF APPENDIX B

(Appendix B is submitted as a separate document)

List of materials contained in the "Notes and Calculations" submitted separately.

1. 1" = 300' Mylar Mosaics of Sweet Home Topographic drawings.
2. NOAA Atlas 2 values extracted for Sweet Home and Cascadia.
3. Synthetic Design Hyetographs for 10, 25 and 100 year average return periods.
4. Example calculations of detention criteria applied to Berdell's Addition Subdivision.
5. Devco field notes of culvert measurements.
6. Map of SWMM Discretization of Ames Creek Sub-basin above the Urban Growth Boundary.
7. National Weather Service Frequency-Duration-Precipitation Analysis of Cascadia 1940-1973.
8. Annual Data (1948-1973) and Annual Frequency Analysis of Wiley Creek Sub-basin above Old Gauge Site at Mile Station 3.8.
9. Corps of Engineers field notes of Ames Creek profile and cross-sections (33 pages)
10. Sensitivity Analysis of SWMM Subcatchment Parameter "width".
11. Sensitivity Analysis of SWMM Subcatchment Parameter "Per Cent Impervious"
12. Independent nomograph procedure calculations for Ames Creek peak discharge.
13. Computer punch cards of SWMM data for Existing and Full Development models.

APPENDIX C

SWMM Parameters and Hydrographs for Existing Land Uses

(Submitted as separate document)

APPENDIX D

SWMM Parameters and Hydrographs For
Land Uses Shown in the Proposed
Comprehensive Plan

(Submitted as separate document)

BIBLIOGRAPHY

1. "Hydrology for Engineer", Linsley, Kohler, Paulhus; McGraw-Hill, 1958.

2. "Practices in Detention of Urban Storm Water Runoff", APWA Special Report No. 43, 1974.

3. "Residential Storm Water Management - Objective, Principles and Design Considerations", ULI, ASCE and NAHB, 1975.

4. Climatological Data, Annual Summary, Oregon 1977, National Oceanic and Atmospheric Administration (NOAA).

5. "Regionalized Flood Frequency Data for Oregon", 1971 State Engineer of Oregon.

6. "Special Soil Survey Report for the City of Sweet Home, Soil Conservation Service, 1971.

7. "A Functional Program for Open Space, Sewer, Storm Drainage, and Water Capital Improvements 1975-1980, Linn, Benton & Lincoln Counties", Oregon District 4 COG, 1975.

8. "Magnitude and Frequency of Floods in U.S., Part 14 Pacific Slope Basins in Oregon and Lower Columbia Basin", U.S. Geological Survey, Water Supply Paper 1689. (Reprinted as a Pacific Northwest Concrete Pipe Association Technical Bulletin)

9. "Hydraulics Manual" Oregon State Highway Division.

10. "Flood Plain Information, South Santiam River, Sweet Home, Oregon", Corps of Engineers, 1974.

11. "HEC-2, Water Surface Profiles", Corps of Engineers.

12. "A Drainage Investigation of the Proposed Junior High School Site, Vicinity of L Street and 22nd Avenue, Sweet Home, Oregon", CH2M Hill Engineer, 1960.

13. "Statistical Data Base, Linn, Benton, & Lincoln Counties", Oregon District 4 COG 1975-76

14. "Statewide Water Quality Management Plan, Nonpoint Source Program", Oregon Department of Environmental Quality (Pursuant to Section 208 of the Clean Water Act.)

BIBLIOGRAPHY

15. "NOAA Atlas No. 2, Precipitation-Frequency-Duration, Western United States", National Oceanic and Atmospheric Administration, Government Printing Office Stock No. 0317-00164.

16. EPA-SWMM Storm Water Management Model, User's Manual. Version II, March 1975.

17. EPA-SWMM, Volume 1, Final Report.

18. EPA-Short Course Proceedings, Applications of Stormwater Management Models.

19. EPA-Pratt Report, Interium Documentation, November, 1977, Release of EPA SWMM.

20. Water Resources Data for Oregon Water Year 1977.

21. Proceedings, Stormwater Management Model (SWMM) User's Group Meeting, May 24-25, 1979, EPA.

22. Storm Water Management Model Study, Vol. I, Research Report No. 47, Environment Canada.

23. Storm Water Management Model Study, Vol. II, Research Report No. 48, Environment Canada.

for services and funding.

The Stormwater Master Plan provides most of the information for Task 1 and the supreme court decision provides adequate guidance for Tasks 2 and 3 for the City to develop a storm drainage fee.

CHAPTER 4
CALCULATION OF SDC IMPROVEMENT FEE

The systems development fee for storm drainage is limited to an improvement fee. Insufficient data exist to develop a reimbursement fee.

We base the SDC improvement fee on the list of projects and costs in Table 1 and on the amount of private impervious surface the planned facilities are designed to serve. Table 2 shows the amounts of existing and future impervious surface, and the calculation of the SDC. Currently the City contains about 468.82 acres of impervious surfaces. About 123 acres, or 26 percent, of the total area is composed of public infrastructure such as sidewalks, streets, parking lots, and buildings. This amount includes all state, county, and city owned surfaces. The remaining 345.82 acres, or 46 percent of the total area, is in private ownership, e.g., commercial buildings, houses, warehouses.

Over the next several years, the plan forecasts an additional 6 acres in public impervious surfaces and 277.99 acres in private surfaces. More private than public surfaces will be built because most of the public infrastructure (e.g., Highway 101, City Hall, city streets) are already built. Most new developments will take advantage of existing public infrastructure.

The SDC improvement fee equals the cost of SDC-eligible projects divided by the amount of forecast private impervious surface, $0.014/square foot = $165,200 / 12,109,244 square feet). The 12,109,244 square feet equals the forecast of the number of acres 277.99 of private impervious surface. The impervious surfaces are comprised building footprints, paved driveway and off-street parking areas, paved walkways, and any other impervious surface on private land. It does <u>not</u> include public surfaces such as streets and sidewalks, even though they may be built by a private developer.

To implement the fee, the City will calculate the square footage of impervious surface at the time a building permit is applied for, and multiply that amount by $0.014 per square foot. For example, the SDC for a single family house with 2,500 square feet of building foot print (e.g., a 2-story, 2,500 square foot house with 1,500 square feet on the first floor, and 1,000 square feet in driveway and walkways) would be $35.

TABLE 2
LINCOLN CITY STORM DRAINAGE SYSTEM
CALCULATION OF SDC IMPROVEMENT FEE

	Acres	Square Feet	Percent of Sub-Total	Percent of Total
Existing Impervious Surfaces				
Public	123.00	5,357,880	26.2%	16.3%
Private	345.82	15,063,919	73.8%	45.9%
Sub-Total	468.82	20,421,799	100.0%	62.3%
Forecast Additions of Impervious Surfaces				
Public	6.00	261,360	2.1%	0.8%
Private	277.99	12,109,244	97.9%	36.9%
Sub-Total	283.99	12,370,604	100.0%	37.7%
Forecast Total Impervious Surfaces				
Public	129.00	5,619,240		17.1%
Private	623.81	27,173,164		82.9%
Total	752.81	32,792,404		100.0%
SDC Eligible Amount		$165,200		
SDC Improvement Fee/Square Foot of Impervious Surface		$0.014		
For Example: The SDC Improvement Fee for a development with 2,500 sq. ft. of surface area =		$35.00		

Source: Raymond J. Bartlett, Economic & Financial Analysis.

Facsimile Cover Sheet

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Date: 04/23/97
Pages including this cover page: 5

Comments:

Please let me know if you have further questions.

COTTAGE GROVE

13.04.040 Monthly rates. A. The monthly rates and charges for water furnished through the city water system shall be as set forth in Exhibit A, attached to the ordinance codified in this section and by this reference incorporated herein. The rates and charges shall be set forth in the municipal code in the comprehensive fee schedule which fees and charges shall be subject to further amendment by resolution of the council.

B. All developed premises within the city limits that receive municipal water or water and sewer service and which have impervious surface shall have imposed upon them a just and equitable charge for storm sewer drainage service for operation and maintenance of the city's storm sewer drainage system. The storm sewer drainage fee shall be as set forth in Exhibit A, attached to the ordinance codified in this section, which charges shall be as set forth in the municipal code in the comprehensive fee schedule which fees and charges shall be subject to future amendment by resolution of the council.

C. The imposed fee shall be collected with the monthly water or water and sewer bill. The customer of the developed premises may avoid incurring the storm sewer drainage charge by removing all impervious surfaces from any improved premises, or the storm sewer drainage rate may be reduced for improved premises where approved runoff reduction measures have been taken; analysis of runoff control measures shall be made by the city engineer and shall be evaluated on a case-by-case basis.

D. Only one storm sewer drainage fee shall apply to developed premises. (Ord. 2685 §2(part), 1991)

13.04.050 Special monthly rates. A. The council shall have the authority by resolution to establish special rates for water service to public schools, for summer residential service and for summer irrigation service.

B. An economically disadvantaged widow, widower, elderly couple, or totally disabled person utilizing water service shall pay a minimum monthly residential rate as determined in Ordinance 2361, set out in this code in the fee schedule. The council shall by resolution establish definitions, qualifications and procedures related to eligibility of persons for this special rate. The fees may be adjusted by the council by resolution. (Ord. 2701 §2, 1992; Ord. 2519 §3, 1984; Ord. 2453 §2, 1982; Ord. 2301 §5, 1979)

13.04.060 Failure to read meters. In the event it shall be impossible or impractical to read a meter during the billing cycle, the bill shall be computed upon the average usage for the prior twelve months. If there is no usage history, the bill shall be computed on the consumption by the customer during the most recent billing period. Failure by the city to read a water meter does not relieve the customer's obligation to pay for actual or estimated water use. (Ord. 2790 §2, 1996; Ord. 2301 §6, 1979)

13.04.070 Cash deposits. Before the water service is turned on, applicants who do not own the property to be served shall do one of the following:

Ordinance	Title	Amending Resolution

Commercial Customers Using City Sewer Only:

1. Inside City: Sewer rate as established by city council pursuant to Section 13.08.060(B)(2).
2. Outside City: Sewer rate as established by city council pursuant to Section 13.08.060(C)(2).

Industrial Customers Using City Sewer Only:

1. Inside City: Sewer rate established by city council pursuant to Section 13.08.060(B)(2).
2. Outside City: Sewer rate established by city council pursuant to Section 13.08.060(C)(2).

Sec. 10 (13.08.090)	(5)	Inspection Fee; $55	1244 9/12/94
Sec. 11 (13.08.100)	(6)	Connection Fee; $300/unit	1078 11/20/89
Sec. 15 (13.08.140)	(7)	Sewer Dump Charge:	1196 3/08/93
		Tank capacity a. 100 gallons or less (RV type) $4.00/load	
2617		Storm Sewer Drainage Fee: $2.15/month for all inside-city water and/or sewer customers	
2662		Cash Deposit for "Sewer Only" Service: $60.00 (for exceptions see Section 13.08.075)	1238 7/11/94
(13.12.010)		Formation of zone of benefit: $251.00 Zone of benefit assessment: $196.00	1244 9/12/94

SPRINGFIELD