

Financial Glossary

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Timothy McProuty, US EPA/OCFO/OETI, Environmental Finance Team. Available online:

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Accelerated Depreciation: Any depreciation method that allows for greater deductions or charges in the earlier years of an assets depreciable life, with charges becoming progressively smaller in each successive period. Examples would include the double declining balance and sum-of-the-years digits methods.

Accrual Accounting Method: A form of reporting profits or losses based on: the consummation of a transaction being accepted by form of contract or invoice without the realization of cash or an expense that has been incurred but has not yet been disbursed.

Accrual Basis: The practice of record keeping by which income is recorded when earned and expenses are recorded when incurred, even though the cash may be received or paid out later.

Ad Valorem Tax: A tax based on the assessed value of property. Counties, school districts, and municipalities usually are authorized to levy *ad valorem* taxes. Special districts can also be authorized to levy *ad valorem* taxes.

Amortization: A breakdown of periodic loan payments into two components: a principal portion and an interest portion. The gradual reduction of a debt by means of equal periodic payments sufficient to meet current interest and liquidate the debt at maturity. When the debt involves real property, often the periodic payments include a sum sufficient to pay taxes and hazard insurance.

Annualization: The process of adjusting a utility company’s annual historical information to reflect a full 12-month period for known changes reasonably expected to continue into the future. Annualization adjustments are routinely made in developing a utility company’s total cost of service.

Appreciation: The increase in the value of an asset in excess of its depreciable cost which is due to economic and other conditions, as distinguished from increases in value due to improvements or additions made to it.

Asset: Anything owned by an individual or a business, which has commercial or exchange value. Assets may consist of specific property or claims against others, in contrast to obligations due others. (See also Liabilities).

Asset Based Lending: A loan to an individual or company collateralized by a specific asset or group of assets. Typically asset based loans do not require real property as collateral.

Asset Sale: An asset sale is the transfer of ownership of government assets, commercial-type enterprises, or functions to the private sector. In general, the government has no role in the financial support, management, or oversight of a sold asset. However, if the asset is sold to a company in an industry with monopolistic characteristics, the government may regulate certain aspects of the business, such as utility rates.

Assurance/Performance Bonding: Performance or assurance bonding is a requirement that users of environmental resources place in an escrow account a sum of money adequate to cover potential future environmental damages.

Authority (Lease Revenue): A bond secured by the lease between the authority and another agency. The lease payments from the “city” to the agency are equal to the debt service.

Bond: An interest-bearing certificate issued by governments and corporations when they borrow money. The issuer agrees to pay a fixed principal sum on a specified date (the maturity date) and at a specified rate of interest. In measuring municipal bond volume, a bond is a security maturing more than one year from issuance; shorter-term obligations are usually termed notes or commercial paper.

Bond Anticipation Note (BAN): A note issued by public agencies to secure temporary (often partial) financing for a project that will eventually be fully financed (and the BAN repaid) through the sale of bonds.

Bond Bank: A state-chartered organization that purchases the bonds of local governments and secures its own debt with the pool of local bonds. This arrangement cuts borrowing costs for the local issuers because the bond bank's debt usually carries higher ratings than that of the municipalities, whose issues are usually too small to be rated anyway. Credit enhancements, such as bond insurance, are also cheaper when purchased for larger issues. Localities' use of the bond bank is voluntary.

Bond Counsel: A lawyer who reviews the legal documents and writes an opinion on the security, tax-exempt status and issuance authority of a bond or note.

Bond Discount: The excess of the face value of a bond over the price for which it is acquired or sold. The price does not include accrued interest at the date of acquisition or sale.

Bond Election: The process by which voters approve or reject bond issues.

Bond-Equivalent Yield: The annualized yield to maturity computed by doubling the semiannual yield.

Bond Fund: A fund formerly used to account for the proceeds of general-obligation bond issues. Such proceeds are not accounted for in a capital-projects fund.

Bond Indenture: The contract that sets forth the promises of a corporate bond issuer and the rights of investors.

Bond Insurance: Insurance that can be purchased by an issuer for either an entire issue or specific maturities, which guarantees the payment of principal and/or interest. This security usually provides a higher credit rating and thus a lower borrowing cost for an issuer.

Bond Issued: Bond sold.

Bond Premium: The excess of the price at which a bond is acquired or sold over its face value. The price does not include accrued interest at the date of acquisition or sale.

Bond Proceeds: The money the issuer receives from its bond sale.

Bonded Debt: That portion of indebtedness represented by outstanding bonds.

Bonds Authorized and Un-issued: Bonds that have been legally authorized but not issued and which can be issued and sold without further authorization. This term must not be confused with the terms "margin of borrowing power" or "legal debt margin," either one of which represents the difference between the legal debt limit of a government and the debt outstanding against it.

Bonds, Debenture: A form of long-term loan included in debt capital, which is secured by the general credit worthiness of the utility.

Bonds, Mortgage: A form of long-term loan, included in debt capital, which is secured by the utility's property.

Budget: A budget is an itemized listing of the amount of all estimated revenue which a given business anticipates receiving, along with a listing of the amount of all estimated costs and expenses that will be incurred in obtaining the above mentioned income during a given period of time. A budget is typically for one business cycle, such as a year, or for several cycles (such as a five year capital budget).

Callable Bond: A bond that can be redeemed by the issuer prior to its maturity. Usually a premium is paid to the bond owner when the bond is called.

Capital: Funds necessary to establish or operate a business.

Capitalization: Also called financial leverage ratios, ratios that compare debt to total capitalization and thus reflect the extent to which a corporation is trading on its equity. These ratios can be interpreted only in the context of the stability of industry and company earnings and cash flow.

Capital Budget: This is the estimated amount planned to be expended for capital items in a given fiscal period. Capital items are fixed assets such as facilities and equipment, the cost of which is normally written off over a number of fiscal periods. The capital budget, however, is limited to the expenditures which will be made within the fiscal year comparable to the related operating budgets.

Capital Costs: Expenditures that typically result in the acquisition or addition to fixed assets that have a useful life of over one year and a cost greater than a threshold value established by the owner. Capital costs include expenditures for replacements and major additions, but not for repairs.

Capital Lease: A lease that meets at least one of the following criteria, and therefore must be treated essentially as a loan for book accounting purposes: title passes automatically by the end of the lease term; lease contains a bargain purchase option; lease term is greater than 75% of estimated economic life of the equipment; present value of lease payments is greater than 90% of the equipment's fair market value.

Capital Outlay: Expenditures that result in the acquisition of or addition to fixed assets.

Capital-Projects Fund: A fund created to account for financial resources to be used for the acquisition or construction of major capital facilities (other than those financed by proprietary funds, special funds, and trust funds).

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act.

Collateral: Assets pledged as security against a loan in case of default. The intangible or tangible property given as security to the lender by the account credit for any obligations and indebtedness of account creditor.

Commercial Loan: A loan from a privately-owned bank at market rates.

Community Water System: A water system which supplies drinking water to 25 or more of the same people year-round in their residences.

Connection Fee: A charge assessed to new users of a utility system to cover the costs of constructing capacity for their use.

Contracting Out: Contracting out is the hiring of private-sector firms or non-profit organizations to provide goods or service for the government. Under this approach, the government remains the financier and has management and policy control over the type and quality of goods or services to be provided. Thus, the government can replace contractors that do not perform well.

Cost of Capital: The weighted-average cost of funds that a firm secures from both debt and equity sources in order to fund its assets. The use of a firm's cost of capital is essential in making accurate capital budgeting and project investment decisions.

Coupon Rate: The interest rate specified on interest coupons attached to a bond. The term is synonymous with nominal interest rate.

Coverage: The ratio of revenue available for debt service to the average annual debt service requirements of an issue of revenue bonds.

Current Assets: Current assets are those assets of a company which are reasonable expected to be realized in cash or sold, or consumed during the normal operating cycle of the business (usually one year). Such assets include cash, accounts receivable and money due usually within one year, short-term investments, US government bonds, inventories, and prepaid expenses.

Current Liabilities: Liabilities to be paid within one year of the balance sheet date.

Debenture Bonds: *See Bonds, Debenture.*

Debt: An obligation resulting from the borrowing of money or from the purchase of goods and services. Debts of governments include bonds, time warrants, and floating debt.

Debt to Equity Ratio: A return on investment; an investment created by a form of debt, i.e., bank loan, investor funds, etc. of which is converted to profit then retained in earnings which is referred to as "owner" or "stockholder" equity.

Debt Financing: Raising funds for a business by borrowing, often in the form of bank loans.

Debt Limit (Ceiling): The legal maximum debt-incurring power of a State or locality. Debt limits are often imposed by constitutional, statutory, or local charter provisions.

Debt, Long-term: Debt that is payable more than one year from the date it was incurred.

Debt Per Capita: Bonds divided by population. When compared with other jurisdictions, this statistic serves as an indicator of the use of public debt capacity in the area in question.

Debt Ratio: The ratio of an issuer's debt outstanding to a measure of property value.

Debt Service: The amount of money necessary to pay interest and principal charges on an outstanding debt.

Debt Service Fund: A fund created by a bond indenture and held by the trustee, usually amounting to principal and interest payment for one year, and used only if normal revenues are not sufficient to pay debt service.

Debt Service Fund Requirements: The amount of revenue that must be provided for a debt service fund so that all principal and interest payments can be made in full on schedule.

Debt Service Requirements: The amount of money required to pay interest on outstanding debt, serial maturities of principal for serial bonds, and required contributions to accumulate monies for future retirement of term bonds.

Debt Service Reserve Fund: A fund created by a bond indenture and held by the trustee, usually amounting to principal and interest payment for one year, and used only if normal revenues are not sufficient to pay debt service.

Debt, Short-term: Debt that falls due in a period of under a year.

Default: The failure to make timely payment of interest or principal on a debt instrument; or the occurrence of an event as stipulated in the indenture of trust resulting in an abrogation of that agreement. An issuer does not default until it fails to make a payment.

Depreciation: The amount of expense charged against earnings by a company to write off the cost of a plant or machine over its useful life, giving consideration to wear and tear, obsolescence, and salvage value. If the expense is assumed to be incurred in equal amounts in each business period over the life of the asset, the depreciation method used is straight line (SL). If the expense is assumed to be incurred in decreasing amounts in each business period over the life of the asset, the method used is said to be accelerated. Two commonly used variations of the accelerated method of depreciating an asset are the sum-of-years digits (SYD) and the double-declining balance (DDB) methods. Frequently, accelerated depreciation is chosen for a businesses' tax expense but straight line is chosen for its financial reporting purposes.

Direct Cost: A cost that can be economically traced to a single cost object.

Discount Rate: The time value of money or the rate of interest a company wants to earn on its investments.

Easement: In most states, an easement is a legal restriction contained within a deed that prohibits certain land uses in perpetuity. For example, an easement might prohibit development of more than one house on 20 acres of oceanfront property. Private landowners who place easements on their property for natural resources protection can take a tax write-off representing the value lost on the property due to the deed restrictions.

Earmarking: Statutory or constitutional dedication of revenues to specific government projects or programs.

Economic Life of Leased Property: The estimated period during which the property is expected to be economically usable by one or more users, with normal repairs and maintenance for the purpose for which it was intended at the inception of the lease.

Environmental Cost Accounting: The addition of environmental cost information into existing cost accounting procedures and/or recognizing embedded environmental costs and allocating them to appropriate products and processes.

Estimated Useful Life: The period in which an asset is expected to be useful in trade or business.

Equity: Equity reflects the fairness of the distribution of the funding burden for an AFM among individuals. Equity can be approached from two directions: those who create or contribute to environmental problems should bear the funding burden (the "polluter" pays), or those who benefit from program activities should bear the funding burden (the "beneficiary" pays.)

Equipment Leasing: Contracting to pay monthly fees to use equipment, instead of buying it.

Fee: A fee is generally a charge for services rendered. Although laws vary widely, many states require that fees be set at rates that will cover only the costs of the services provided.

Finance Lease: A lease used to finance the purchase of equipment; not a true lease. Finance leases are generally considered to be capital leases from an accounting perspective and non-tax leases from a tax perspective.

Fines and Penalties: Fines and penalties require offenders to pay monetary damages for violating government laws or regulations.

Fixed Assets: Those assets of a permanent nature required for the normal conduct of a business, and which will not normally be converted into cash during the ensuing fiscal period. For example, furniture, fixtures, land, and buildings are all fixed assets. However, accounts receivable and inventory are not.

Fixed Cost: Fixed costs are operating expenses that are incurred by facilities and organizations which are kept in readiness to do business without regard to actual volumes of production and sales. Fixed costs remain relatively constant until changed by managerial decision. Within general limits they do not vary with business volume. Examples of fixed costs consist of rent, property taxes, and interest expense.

Full Cost Accounting: A method of financial and management accounting that allocates all direct and indirect historical costs to a product or process.

Full Cost Recovery: Full cost recovery means charging fees to completely cover costs incurred by a particular activity or service. Some state and local governments, as well as local utilities, are beginning to practice full cost recovery by legislatively requiring that fees be set to cover the complete cost of services rendered.

Full Faith and Credit: The pledge of the general taxing power of a government to pay its debt obligations.

Full Payout Lease: A lease in which the total of the lease payments pay back to the leaser the entire cost of the equipment including financing, overhead, and a reasonable rate of return, with little or no dependence on a residual value.

Fund: A fiscal and accounting entity with a self-balancing set of accounts recording cash and other financial resources, together with all related liabilities and residual equities or balances, and changes therein, which are segregated for the purpose of carrying on specific activities or attaining certain objectives in accordance with special regulations, restrictions, or limitations.

General Obligation Bond: A security backed by the full faith and credit of a state or locality. In the event of default, the holders of general obligation bonds have the right to compel a tax levy or legislative appropriation in order to satisfy the debt obligation.

Grant: A monetary sum awarded to a State or local government or non-profit organization that does not need to be repaid. Typically, grants are awarded by the federal government to State or local governments or by States to local governments, to finance a particular activity or facility.

Grant Anticipation Notes (GAN): Notes issued by public agencies to secure temporary financing for projects awaiting the receipt of permanent funding through governmental grants. The GAN is repaid from grant proceeds.

Gross Direct Debt: The total amount of bonded debt of a government (general obligation bonds plus revenue bonds).

Guarantee, loan: Promise to take responsibility for payment of part or all of a debt if the person borrowing the money fails to pay off the loan.

Guaranty or Guaranty Agreement: The agreement of a third party to pay debt service on a debt in the event of default by the issuer.

Impact Fee: A fee assessed against private developers in compensation for the new capacity requirements their projects impose upon public facilities.

Industrial-Revenue Bonds: Bonds issued by governments, the proceeds of which are used to construct facilities for a private business enterprise. Lease payments made by the business enterprise to the government are used to service the bonds. Such bonds may be in the form of general-obligation bonds, combination bonds, or revenue bonds.

Insured Bond: A municipal bond backed both by the credit of the municipal issuer and by commercial insurance policies.

Interest: The charge or cost of borrowing money, measured in terms of a percentage per annum of the principal amount.

Internal Rate of Return: A return on an investment greater than the amount described in a contract or any other investment instrument. The internal rate-of-return is measured by the ability of the investor to reduce internal expenses during the course of managing the investment; which means the investor actually makes more than what is outlined in the contract or other investment instrument.

Lease: A contract through which an owner of equipment (the leaser) conveys the right to use its equipment to another party (the lessee) for a specified period of time (the lease term) for specified periodic payments.

Lease Purchase: Full payout, net leases structured with a term equal to the equipment's estimated useful life. Because many Lease Purchases include a bargain purchase option for the lessee to purchase the equipment for one dollar at the expiration of the lease, these leases are often referred to as dollar buyout or buck-out-leases. Lease purchases are generally considered to be Capital Leases from an accounting perspective and non-tax leases from a tax perspective due to their bargain purchase option and length of lease term.

Lease Rental Bonds: Bonds for which the principal and interest are payable exclusively from rental payments from a lessee. Rental payments are often derived from earnings of an enterprise that may be run by the lessee or the leaser. Rental payments may also come from taxes levied by the lessee.

Lease Schedule: A schedule to a Master Lease agreement describing the leased equipment, rentals and other terms applicable to the equipment.

Lessee: The party to a lease agreement who is obligated to pay the rentals to the leaser and is entitled to use and possess the leased equipment during the lease term.

Leaser: The party to a lease agreement who has legal or tax title to the equipment (in the case of a true tax lease), grants the lessee the right to use the equipment for the lease term and is entitled to receive the rental payments.

Leverage: Debt in relation to equity.

Leveraging: The use of grant or loan funds as reserve funds for the issuance of debt. Leveraging is used by several states participating in the Water Pollution Control State Revolving Fund program to increase the amount of funds available for loans.

Liability: Claim on the assets of a company.

Liability Assignment: Liability assigned through common law or statute, whereby individuals or companies may be held financially responsible for environmental damage resulting from their activities.

Lien: An attachment, voluntary or involuntary. A lender will apply a lien to encumber real or personal property. The lien can be granted by an abstract judgment rendered by a court of law.

Life Cycle Costing (LCC): A systematic process of evaluating the life-cycle costs of a product, product line, process, system, or facility by identifying life-cycle consequences and assigning monetary values to those consequences. Also called Life Cycle Cost Assessment (LCCA).

Life-Cycle Assessment/Analysis (LCA): A holistic approach to identifying the environmental consequences of a product, process, or activity through its entire life cycle and to identifying opportunities for achieving environmental improvements. EPA specifies four major stages in a life-cycle of a product, process, or activity: raw materials acquisition, manufacturing, consumer use/reuse maintenance, and recycle/waste management. LCA focuses on environmental impacts not costs.

Limited-Tax General Obligation Bond: A general obligation bond that is limited as to revenue sources.

Long-Term Debt: Debt that is payable more than one year from the date it was incurred.

Moral Obligation Bond: A state or municipal bond that is not backed by the full faith and credit of the issuer. The issuer of a moral obligation bond asserts the intent of the legislative body to make appropriations sufficient to cure any deficiency in monies required to meet debt service, but the issuer has no legally enforceable obligation to do so.

Municipal Bond: A debt obligation issued by a state, state agency or authority, or a political subdivision, such as county, city, town or village. They may be issued for general governmental needs or special projects. Issuance must be approved by referendum or by an electoral body.

Municipal Bond Insurance: Insurance policies that protect investors if a municipal bond should default—the bonds will be purchased from investors at par. The insurance may either be purchased by the issuer or the investor. Two major insurers of municipal bonds are the Ambac Indemnity Corporation and the Municipal Bond Insurance Association (MBIA). Insured municipal bonds usually have the highest ratings. Subsequently, the bond's marketability increases, which lowers the costs to their issuers. However, the yield on an insured bond is usually lower than similarly rated uninsured bonds—the cost of the insurance is passed on to the investor. To obtain the extra degree of safety, many investors do not care if the yields are slightly lower.

Municipal Improvement Certificates: Certificates issued in lieu of bonds for the financing of special improvements. As a result, these certificates are placed in the contractor's hands for collection from the special assessment payers.

Municipal Lease: A lease designed to meet the special needs of state and local governments. The lease contains a non-appropriation clause which states that the only condition under which the entity may be released from its payment obligations is when the legislature or funding authority fails to appropriate funds. Since the lessee is a municipality or an organization supporting the government, it is exempt from paying federal income taxes. For this reason, the IRS does not charge the leaser income taxes on leases to these customers.

Non-Transient, Non-Community Water System: A water system which supplies water to 25 or more of the same people at least six months per year in places other than their residences. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.

Operating Costs: Costs that are directly related to rendering of services, sale of merchandise, production and disposition of commodities, collection of revenues, and other ongoing activities.

Operating Lease: A lease which is treated as a true lease (as opposed to a loan) for book accounting purposes. As defined in FASB 13, an operating lease must have all of the following characteristics.

- lease term is less than 75% of estimated economic life of the equipment
- present value of lease payment is less than 90% of the equipment's fair market value
- lease cannot contain a bargain purchase option (i.e., less than the fair market value)
- ownership is retained by the leaser during and after the lease term.

An operating lease is accounted for by the lessee without showing an asset (for the equipment) or a liability (for the lease payment obligations) on his balance sheet. Periodic payments are accounted for by the lessee as operating expenses of the period.

Original Issue Discount (OID): When a long-term debt instrument is issued at a price that is lower than its stated redemption value, the difference is called Original Issue Discount (OID).

Payment-in-Kind (PIK) Bond: A bond that gives the issuer an option (during an initial period) either to make coupon payments in cash or to give the bondholder a similar bond.

Prime Rate: The interest rate banks charge their best customers.

Privatization (Public-Private Partnership): Under a public-private partnership, sometimes referred to as a joint venture, a contractual arrangement is formed between public and private-sector partners that can include a variety of activities that involve the private sector in the development, financing, ownership, and operation of a public facility or service. It typically includes infrastructure projects and/or facilities. In such a partnership, public and private resources are pooled and responsibilities divided so that the partners' efforts complement one another. Typically, each partner shares in income resulting from the partnership in direct proportion to the contracting in that the private-sector partner usually makes a substantial cash, at-risk, equity investment in the project, and the public sector gains access to new revenue or service delivery capacity without having to pay the private-sector partner. Leasing arrangements can be used to facilitate public-private partnerships.

Private Placement: The sale of stock in a company directly to a pre-selected buyer, often an institutional investor.

Public-Private Partnership: These partnerships involve a variety of techniques and activities to promote more sector involvement in providing traditional government services. They can include involving a private partner in construction, financing, operation, and/or ownership of a facility.

Public Water System (PWS): Any water system which provides water to at least 25 people for at least 60 days annually. There is more than 170,000 PWSs providing water from wells, rivers and other sources to about 250 million Americans. The others drink water from private wells. There are differing standards for PWSs of different sizes and types.

Ratings: Credit quality evaluation of bonds and notes made by independent rating services and brokerage firm analysts. Generally, a higher bond rating lowers the interest rate expected by debtors for repayment, and therefore overall capital costs. State and local governments can improve their bond ratings by using credit enhancement mechanisms.

Recourse: A type of borrowing in which the borrower (as a leaser funding a lease) is fully at risk to the lender for repayment of the obligation. The recourse borrower (leaser) is required to make payments to the lender whether or not the lessee fulfills its obligation under the lease agreement.

Refunded Bonds: Also called a pre-refunded bond, one that originally may have been issued as a general obligation or revenue bond but that is now secured by an “escrow fund” consisting entirely of direct US Government obligations that are sufficient for paying the bondholders.

Return On Assets (ROA): A common measure of profitability based upon the amount of assets invested; ROA is equal to the ratio of either 1) net income to total assets or 2) net income available to common stockholders to total assets.

Return On Equity (ROE): A measure of profitability related to the amount of invested equity; ROE is equal to the ratio of either 1) net income to owner’s equity or 2) net income available to common stockholders to common equity.

Revenue Anticipation Notes (RANs): Notes issued in anticipation of non-tax revenues, generally from other governmental entities (i.e., state aid to a school district).

Revenue Base: The revenue base is the value of the product, income, property, or the number of population against which a fee or tax is charged. For example, the revenue base for a state tax per ton of fertilizer sold would be the tons of fertilizer sold in the state, while the revenue base for a motor vehicle license fee would be the number of vehicles licensed in the state. The size and characteristics of the revenue base, along with the rate of the fee or tax, determine the revenue potential of fee and tax programs.

Revenue Bonds: Bonds whose principal and interest are payable exclusively from earnings of a public enterprise.

Revenue Potential: A measure of the amount of money that can be raised by a particular financing mechanism. For fee and tax programs, revenue potential is a function of the rate of the fee or tax and the size of the revenue base. State and local governments need to consider the revenue potential of an AFM in their jurisdiction in order to determine if it meets their financing needs.

Revenue Stability: Revenue stability refers to the pattern of revenues from a particular revenue source. Some sources provide revenues in stable amounts annually. Other revenue sources are unstable, providing only one-time or erratic revenues from year to year. State and local governments should match ongoing program costs to stable revenue sources, while non-recurring costs can be matched to less stable revenue sources.

Revolving Fund: A revolving loan fund program may consist of several accounts or revolving funds that make loans or other types of assistance available for various projects. Typically, the fund is initially capitalized by appropriations, grants, or other monies. After the initial loans are made, future loans are supported by repayments, making the fund “revolving.”

Serial Bonds: Bonds whose principal is repaid in periodic installments over the life of the issue. Corporate bonds arranged so that specified principal amounts become due on specified dates. Related: Term Bonds.

Sole Proprietorship: A sole proprietorship is a form of business organization. The distinguishing characteristics of this form are only one owner for the business and the business is unincorporated.

Special Annuity Bonds: Serial bonds in which annual installments of bond principal are arranged so that the combined payments for principal and interest are approximately the same each year.

Special Assessment: A charge imposed against certain properties to defray part or all of the cost of a specific improvement or service deemed to primarily benefit those properties.

Special Assessment Bonds: Bonds payable from the proceeds of assessments imposed against properties which have been specially benefited by the construction of public improvements.

Special Assessment Fund: A fund used to account for the financing of public improvements or services deemed to benefit primarily the properties against which special assessments are levied.

Special Districts: An independent unit of local government organized to perform a single governmental function or a limited number of related functions. A single purpose or local taxing district can be organized for a special purpose such as a road, sewer, irrigation or fire district. Special districts usually have the power to incur debt and levy taxes.

Special District Bonds: Bonds issued by a special district.

Special Tax Bond: A bond that is secured by a special tax, such as a liquor tax.

Straight Line Method: A way to figure depreciation for property that ratably deducts the same amount for each year in the recovery period. The rate (in percentage terms) is determined by dividing 1 by the number of years in the recovery period.

Subordinated Debenture Bond: An unsecured bond that ranks after secured debt, after debenture bonds, and often after some general creditors in its claim on assets and earnings. Related: Debenture Bond, Mortgage Bond, Collateral Trust Bonds.

Sustainable Development: The concept of using resources in an ecologically sound manner so that they will be sustainable over the long term. Put another way by the Executive Secretary of the UN Economic and Social Commission for Asia and the Pacific, it is “an approach to progress that meets the needs of the present without compromising the ability of future generations to meet their needs.”

Tax: A tax is generally a charge against sales, income or property. Unlike fees, most jurisdictions do not require that there be a direct relationship between a tax and the use of funds.

Tax Anticipation Notes (TANs): Short-term debt that will be retired with taxes to be collected at a later date.

Tax Base: *See revenue base.*

Tax Increment Financing: The dedication of incremental increases in real estate taxes to repay an original investment in improved public facilities that created increased real estate values.

Term Bonds: Often referred to as bullet-maturity bonds or simply bullet bonds, bonds whose principal is payable at maturity. *Related: Serial Bonds.*

Term Interest: A life interest in property, an interest in property for a term of years, or an income interest in a trust. It generally refers to a present or future interest in income from property or the right to use property which terminates or fails upon the lapse of time, the occurrence of an event or the failure of an event to occur.

Transient, Non-Community Water System: A system which provides water in a place such as a gas station or campground where people do not remain for long time periods. These systems do not have to test or treat their water for contaminants which pose long-term health risks because fewer than 25 people drink the water over a long period. They still must test for microbes and several chemicals.

Trust Fund: Funds created by State and local governments to receive revenues generated by a tax or other mechanism, and disburse funds for the purposes for which the revenues are collected.

Unadjusted Depreciable Basis: The basis of an item of property for purposes of figuring gain on a sale without taking into account any depreciation taken in earlier years but with adjustments for amortization, the section 179 deduction, any deduction claimed for clean-fuel vehicles or clean-fuel vehicle refueling property, and any electric vehicle credit.

Useful Life: An estimate of how long an item of property can be expected to be usable in trade or business or to produce income. Under MACRS, you recover the cost of property over a set period. The recovery period is based on your property's property class. Your property's class is usually determined by its class life. The class life for most property is set and listed in IRS Appendix B.

User Fees: User fees require those who use a government service to pay some or all of the cost of the service, rather than having the government pay for it through revenues generated by taxes. The fees charged for entry into public parks are an example of a user fee.

Value: A term which defines the worth of an object or item. Value is usually preceded by a word(s), such as Fair or Fair Market, and defined in the document where found. Not all value for an item is the same.

Working Capital: The cash available to a company for the ongoing operations of the business.

Zero-Coupon Bonds: Zero-coupon bonds are bonds priced at a large discount from face value. The bonds mature at full face value so the difference between the original issue price and the face value represents interest income. The issuer of the zero coupon bond saves on cash flow since the interest isn't paid out until the end of the bond holding period.

Glossary of Terms

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For copies of the operator training manuals on the safe operation and maintenance of water and wastewater facilities that are the original source of these definitions, contact the Office of Water Programs, 916-278-6142 or by e-mail at wateroffice@csus.edu.

Abatement: Putting an end to an undesirable or unlawful condition affecting the wastewater collection system. A property owner found to have inflow sources connected to the collection system may be issued a “Notice of Abatement.” Such notices will usually describe the violation, suggest corrective measures, and grant a period of time for compliance.

Absorption: The taking in or soaking up of one substance into the body of another by molecular or chemical action (as tree roots absorb dissolved nutrients in the soil).

Acid: A substance that tends to lose a proton, dissolves in water with the formation of hydrogen ions, contains hydrogen which may be replaced by metals to form salts, and is corrosive.

Activated Carbon: Adsorptive particles or granules of carbon usually obtained by heating carbon (such as wood). These particles or granules have a high capacity to selectively remove certain trace and soluble materials from water.

Activated Sludge: Sludge particles produced in raw or settled wastewater (primary effluent) by the growth of organisms (including zoogeal bacteria) in aeration tanks in the presence of dissolved oxygen. The term “activated” comes from the fact that the particles are teeming with bacteria, fungi, and protozoa. Activated sludge is different from primary sludge in that the sludge particles contain many living organisms that can feed on the incoming wastewater.

Activated Sludge Process: A biological wastewater treatment process that speeds up the decomposition of wastes in the wastewater being treated. Activated sludge is added to wastewater and the mixture (mixed liquid) is aerated and agitated. After some time in the aeration tank, the activated sludge is allowed to settle out by sedimentation and is disposed of (wasted) or reused (returned to the aeration tank) as needed. The remaining wastewater then undergoes more treatment.

Advanced Waste Treatment: Any process of water renovation that upgrades treated wastewater to meet specific reuse requirements. May include general cleanup of water or removal of specific parts of wastes insufficiently removed by conventional treatment processes. Typical processes include chemical treatment and pressure filtration. Also called “tertiary treatment.”

Aeration: The process of adding air to water. Air can be added to water by either passing air through water or passing water through air. In wastewater treatment, air is added to freshen wastewater and to keep solids in suspension. With mixtures of wastewater and activated sludge, adding air provides mixing and oxygen for the microorganisms treating the wastewater.

Aeration Tank: The tank where raw or settled wastewater is mixed with return sludge and aerated. The same as “aeration bay,” “aerator,” or “reactor.”

Aerobic Bacteria: Bacteria which will live and reproduce only in an environment containing oxygen which is available for their respiration (breathing), namely atmospheric oxygen or oxygen dissolved in water. Oxygen combined chemically, such as in water molecules (H₂O), cannot be used for respiration by aerobic bacteria.

Aerobic Digestion: The breakdown of wastes by microorganisms in the presence of dissolved oxygen. This digestion process may be used to treat only waste activated sludge, or trickling filter sludge and primary (raw) sludge, or waste sludge from activated sludge treatment plants designed without primary settling. The sludge to be treated is placed in a large aerated tank where aerobic microorganisms decompose the organic matter in the sludge. This is an extension of the activated sludge process.

Aerobic Process: A waste treatment process conducted under aerobic (in the presence of “free” or dissolved oxygen) conditions.

Air Blower: A device used to ventilate manholes and lift stations.

Algal Bloom: Sudden, massive growths of microscopic and macroscopic plant life, such as green or blue-green algae, which develop in lakes and reservoirs.

Alkaline: The condition of water or soil that contains a sufficient amount of alkali substances to raise the pH above 7.0.

Alkalinity: The capacity of water or wastewater to neutralize acids. This capacity is caused by the water's content of carbonate, bicarbonate, hydroxide, and occasionally borate, silicate, and phosphate. Alkalinity is expressed in milligrams per liter of equivalent calcium carbonate. Alkalinity is not the same as pH because water does not have to be strongly basic (high pH) to have a high alkalinity. Alkalinity is a measure of how much acid must be added to a liquid to lower the pH to 4.5.

Anaerobic: A condition in which atmospheric or dissolved molecular oxygen is not present in the aquatic (water) environment.

Anaerobic Bacteria: Bacteria that live and reproduce in an environment containing no "free" or dissolved oxygen. Anaerobic bacteria obtain their oxygen supply by breaking down chemical compounds which contain oxygen, such as sulfate.

Anaerobic Digester: A wastewater solids treatment device in which the solids and water (about 5 percent solids, 95 percent water) are placed in a large tank where bacteria decompose the solids in the absence of dissolved oxygen.

Anoxic: A condition in which the aquatic (water) environment does not contain enough dissolved molecular oxygen, which is called an oxygen deficient condition. Generally refers to an environment in which chemically bound oxygen, such as in nitrate, is present.

BOD₅: Refers to the five-day biochemical oxygen demand. The total amount of oxygen used by microorganisms decomposing organic matter increases each day until the ultimate BOD is reached, usually in 50 to 70 days. BOD usually refers to the five-day BOD or BOD₅.

Backwashing: The process of reversing the flow of water back through the filter media to remove the entrapped solids.

Bacteria: Living organisms, microscopic in size, which usually consist of a single cell. Most bacteria use organic matter for their food and produce waste products as a result of their life processes.

Bar Rack: A screen composed of parallel bars, either vertical or inclined, placed in a sewer or other waterway to catch debris. The screenings may be raked from it.

Biochemical Oxygen Demand (BOD): The rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. In decomposition, organic matter serves as food for the bacteria and energy results from its oxidation. BOD measurements are used as a measure of the organic strength of wastes in water.

Biological Process: A waste treatment process by which bacteria and other microorganisms break down complex organic materials into simple, nontoxic, more stable substances.

Biomass: A mass or clump of organic material consisting of living organisms feeding on the wastes in wastewater, dead organisms, and other debris.

Biosolids: A primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled. The word "biosolids" is replacing the word "sludge."

Blower: A device used to ventilate manholes and lift stations.

Branch Sewer: A sewer that receives wastewater from a relatively small area and discharges into a main sewer serving more than one branch sewer area.

Break: A fracture or opening in a pipe, manhole or other structure due to structural failure and/or structural defect.

Building Sewer: A gravity-flow pipeline connecting a building wastewater collection system to a lateral or branch sewer. The building sewer may begin at the outside of the building's foundation wall or some distance (such as 2 to 10 feet) from the wall, depending on local sewer ordinances. Also called a "house connection" or a "service connection."

Building Wastewater Collection System: All of the wastewater drains pipes and their hardware that connect plumbing fixtures inside or adjacent to a building to the building sewers. This includes traps, vents, and cleanouts.

Bypass: A pipe, valve, gate, weir, trench or other device designed to permit all or part of a wastewater flow to be diverted from usual channels or flow. Sometimes refers to a special line which carries the flow around a facility or device that needs maintenance or repair. In a wastewater treatment plant, overload flows should be bypassed into a holding pond for future treatment.

CSO-Combined Sewer Overflow: Wastewater that flows out of a sewer (or lift station) as a result of flows exceeding the hydraulic capacity of the sewer. CSOs usually occur during periods of heavy precipitation or high levels of runoff from snow melt or other runoff sources.

Catch Basin: A chamber or well used with storm or combined sewers as a means of removing grit, which might otherwise enter and be deposited in sewers.

Categorical Limits: Industrial wastewater discharge pollutant effluent limits developed by EPA that are applied to the effluent from any industry in any category anywhere in the United States that discharges to a POTW. These are pollutant effluent limits based on the technology available to treat the waste streams from the processes of the specific industrial category and normally are measured at the point of discharge from the regulated process. The pollutant effluent limits are listed in the Code of Federal Regulations.

Cathodic Protection: An electrical system for prevention of rust, corrosion, and pitting of metal surfaces which are in contact with water or soil. A low-voltage current is made to flow through a liquid (water) or a soil in contact with the metal in such a manner that the external electromotive force renders the metal structure cathodic. This concentrates corrosion on auxiliary anodic parts which are deliberately allowed to corrode instead of letting the structure corrode.

Certification Examination: An examination administered by a state or professional association that operators take to indicate a level of professional competence.

Chain of Custody: A record of each person involved in the handling and possession of a sample from the person who collected the sample to the person who analyzed the sample in the laboratory and to the person who witnessed disposal of the sample.

Chlorination: The application of chlorine to water or wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results (aiding coagulation and controlling tastes and odors).

Chlorinator: A metering device which is used to add chlorine to water.

Chlorine Contact Unit: A baffled basin that provides sufficient detention time for disinfection to occur.

Clarification: Any process or combination of processes the main purpose of which is to reduce the concentration of suspended matter in a liquid.

Clarifier: A large circular or rectangular tank or basin in which water is held for a period of time during which the heavier suspended solids settle to the bottom. Clarifiers are also called settling basins and sedimentation basins. May also be a tank or basin in which wastewater is held for a period of time during which the heavier solids settle to the bottom and the lighter materials float to the water surface.

Clean Water Act: An act passed by the US Congress to control water pollution. The Federal Water Pollution Control Act passed in 1972 (Public Law [PL] 92-500). It was amended in 1977 (the Clean Water Act, PL 95-217) and again in 1987 (the Water Quality Act, PL 100-4).

Coagulant: A chemical that causes very fine particles to clump (floc) together into larger particles. This makes it easier to separate the solids from the liquids by settling, skimming, draining or filtering.

Coagulation: The clumping together of very fine particles into larger particles (floc) caused by the use of chemicals (coagulants). The chemicals neutralize the electrical charges of the fine particles, allowing them to come closer and form larger clumps. This clumping together makes it easier to separate the solids from the water by settling, skimming, draining or filtering.

Code of Federal Regulations (CFR): A publication of the United States Government which contains all of the proposed and finalized federal regulations, including environmental regulations.

Coliform: A group of bacteria found in the intestines of warm-blooded animals (including humans) and also in plants, soil, air and water. Fecal coliforms are a specific class of bacteria which only inhabit the intestines of warm-blooded animals. The presence of coliform bacteria is an indication that the water is polluted and may contain pathogenic (disease-causing) organisms.

Collection System: A network of pipes, manholes, cleanouts, traps, siphons, lift stations and other structures used to collect all wastewater and wastewater-carried wastes of an area and transport them to a treatment plant or disposal system. The collection system includes land, wastewater lines and appurtenances, pumping stations and general property.

Combined Sewer: A sewer designed to carry both sanitary wastewaters and storm or surface water runoff.

Combined Wastewater: A mixture of storm or surface runoff and other wastewater such as domestic or industrial wastewater.

Comminutor: A device used to reduce the size of the solid chunks in wastewater by shredding (comminuting). The shredding action is like many scissors cutting or chopping to shreds all the large solids material in the wastewater.

Compliance: The act of meeting specified conditions or requirements.

Composite (Proportional) Sample: A composite sample is a collection of individual samples obtained at regular intervals, usually every one or two hours during a 24-hour time span. Each individual sample is combined with the others in proportion to the rate of flow when the sample was collected. The resulting mixture (composite sample) forms a representative sample and is analyzed to determine the average conditions during the sampling period.

Confined Space: Confined space means a space is threefold, it is large enough and so configured that an employee can bodily enter and perform assigned work; it has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and it is not designed for continuous employee occupancy.

Contamination: The introduction into water of microorganisms, chemicals, toxic substances, wastes, or wastewater in a concentration that makes the water unfit for its next intended use.

Conventional Treatment: The common treatment processes such as preliminary treatment, sedimentation, flotation, trickling filter, rotating biological contactor, activated sludge and chlorination wastewater treatment processes used by POTWs.

Corrosion: The gradual decomposition or destruction of a material by chemical action, often due to an electrochemical reaction. Corrosion may be caused by (1) stray current electrolysis, (2) galvanic corrosion caused by dissimilar metals, or (3) differential-concentration cells. Corrosion starts at the surface of a material and moves inward.

Corrosion Inhibitors: Substances that slow the rate of corrosion.

Corrosive Gases: In water, dissolved oxygen reacts readily with metals at the anode of a corrosion cell, accelerating the rate of corrosion until a film of oxidation products such as rust forms. At the cathode where hydrogen gas may form a coating on the cathode and slow the corrosion rate, oxygen reacts rapidly with hydrogen gas forming water, and again increases the rate of corrosion.

Cross Connection: 1. A connection between a storm drain system and a sanitary collection system. 2. Less frequently used to mean a connection between two sections of a collection system to handle anticipated overloads of one system. 3. A connection between drinking (potable) water and an unapproved water supply.

***Cryptosporidium*:** A waterborne intestinal parasite that causes a disease called cryptosporidiosis in infected humans. Symptoms of the disease include diarrhea, cramps, and weight loss. *Cryptosporidium* contamination is found in most surface waters and some groundwater. Commonly referred to as “crypto.”

Dissolved Oxygen (DO): DO is the molecular (atmospheric) oxygen dissolved in water or wastewater.

Dechlorination: The deliberate removal of chlorine from water. The partial or complete reduction of residual chlorine by any chemical or physical process.

Degradation: The conversion or breakdown of a substance to simpler compounds. For example, the degradation of organic matter to carbon dioxide and water.

Denitrification: An anoxic process that occurs when nitrite or nitrate ions are reduced to nitrogen gas and nitrogen bubbles are formed as a result of this process. The bubbles attach to the biological floc in the activated sludge process and float the floc to the surface of the secondary clarifiers. This condition is often the cause of rising sludge observed in secondary clarifiers or gravity thickeners. *Also see “nitrification.”*

Detention Time: 1. The theoretical (calculated) time required for a small amount of water to pass through a tank at a given rate of flow. 2. The actual time in hours, minutes or seconds that a small amount of water is in a settling basin, flocculating basin or rapid-mix chamber. In storage reservoirs, detention time is the length of time entering water will be held before being drafted for use (several weeks to years, several months being typical).

Dewater: To drain or remove water from an enclosure. A structure may be dewatered so that it can be inspected or repaired. Dewater also means draining or removing water from sludge to increase the solids concentration.

Diffused-Air Aeration: A diffused air activated sludge plant takes air, compresses it, and then discharges the air below the water surface of the aerator through some type of air diffusion device.

Digester: A tank in which sludge is placed to allow decomposition by microorganisms. Digestion may occur under anaerobic (more common) or aerobic conditions.

Direct Discharger: A point source that discharges a pollutant(s) to waters of the United States, such as streams, lakes or oceans. These sources are subject to the National Pollutant Discharge Elimination System (NPDES) program regulations.

Direct Filtration: A method of treating water which consists of the addition of coagulant chemicals, flash mixing, coagulation, minimal flocculation, and filtration. The flocculation facilities may be omitted, but the physical-chemical reactions will occur to some extent. The sedimentation process is omitted. *Also see “conventional filtration” and “in-line filtration.”*

Direct Runoff: Water that flows over the ground surface or through the ground directly into streams, rivers, or lakes.

Disinfection: The process designed to kill or inactivate most microorganisms in wastewater, including essentially all pathogenic (disease-causing) bacteria. There are several ways to disinfect, with chlorination being the most frequently used in water and wastewater treatment plants.

Disinfection By-Product (DBP): A contaminant formed by the reaction of disinfection chemicals (such as chlorine) with other substances in the water being disinfected.

Dissolved Oxygen Molecular (atmospheric): Oxygen dissolved in water or wastewater, usually abbreviated DO.

Distributor: The rotating mechanism that distributes the wastewater evenly over the surface of a trickling filter or other process unit.

Domestic: Residential living facilities. A domestic area will be predominantly residential in occupancy and is sometimes referred to as a “bedroom area” or “bedroom community.”

Downstream: The direction of the flow of water. In the lower part of a sewer or collection system or in that direction.

EPA or United States Environmental Protection Agency: A regulatory agency established by the US Congress to administer the nation’s environmental laws. Also called the US EPA.

Easement: Legal right to use the property of others for a specific purpose. For example, a utility company may have a five-foot easement along the property line of a home. This gives the utility the legal right to install and maintain a sewer line within the easement.

Effluent: Water or other liquid—raw (untreated), partially or completely treated—flowing from a reservoir, basin, treatment process, or treatment plant.

Effluent Limits: Pollutant limitations developed by a POTW for industrial plants discharging to the POTW system. At a minimum, all industrial facilities are required to comply with federal prohibited discharge standards. The industries covered by federal categorical standards must also comply with the appropriate discharge limitations. The POTW may also establish local limits more stringent than or in addition to the federal standards for some or all of its industrial users.

Equalizing Basin: A holding basin in which variations in flow and composition of a liquid are averaged. Such basins are used to provide a flow of reasonably uniform volume and composition to a treatment unit. Also called a balancing reservoir.

Eutrophication: The increase in the nutrient levels of a lake or other body of water; this usually causes an increase in the growth of aquatic animal and plant life.

Explosimeter: An instrument used to detect explosive atmospheres. When the Lower Explosive Limit (LEL) of an atmosphere is exceeded, an alarm signal on the instrument is activated. Also called a combustible gas detector.

Fixed Film Process: Biological process where the microbes are attached to medium such as rock or plastic.

Float (Control): A device used to measure the elevation of the surface of water. The float rests on the surface of the water and rises or falls with it. The elevation of the water surface is measured by a rod, chain, rope, or tape attached to the float.

Flow Recording: A record of a flow measurement past any selected point. Usually consists of time, velocity and amount (in gallons) with maximum and minimum rates as well as the total amount over a given time period.

Force Main: A pipe that carries wastewater under pressure from the discharge side of a pump to a point of gravity flow downstream.

Geographic Information System (GIS): A computer program that combines mapping with detailed information about the physical locations of structures such as pipes, valves, and manholes within geographic areas. The system is used to help operators and maintenance personnel locate utility system features or structures and to assist with the scheduling and performance of maintenance activities.

GPD: Initials standing for “Gallons Per Day.”

GPM: Initials standing for “Gallons Per Minute.”

Giardia: A waterborne intestinal parasite that causes a disease called *giardiasis* in infected humans. Symptoms of the disease include diarrhea, cramps, and weight loss. *Giardia* contamination is found in most surface waters and some groundwater.

Grab Sample: A single sample of water collected at a particular time and place which represents the composition of the water only at that time and place.

Gravity Flow: Water or wastewater flowing from a higher elevation to a lower elevation due to the force of gravity. The water does not flow due to energy provided by a pump. Wherever possible, wastewater collection systems are designed to use the force of gravity to convey waste liquids and solids.

Grease: In a collection system, grease is considered to be the residues of fats, detergents, waxes, free fatty acids, calcium and magnesium soaps, mineral oils, and certain other nonfatty materials which tend to separate from water and coagulate as floatables or scums.

Grease Trap: A receptacle designed to collect and retain grease and fatty substances usually found in kitchens or from similar wastes. It is installed in the drainage system between the kitchen or other point of production of the waste and the building wastewater collection line. Commonly used to control grease from restaurants.

Grit: The heavy material present in wastewater, such as sand, coffee grounds, eggshells, gravel and cinders. Grit tends to settle out at flow velocities below 2 ft/sec and accumulate in the invert or bottoms of the pipelines. Also called “detritus.”

Grit Removal: Grit removal is accomplished by providing an enlarged channel or chamber which causes the flow velocity to be reduced and allows the heavier grit to settle to the bottom of the channel where it can be removed.

Groundwater: Sub surface water in the saturation zone from which wells and springs are fed. In a strict sense the term applies only to water below the water table. Also called “phreatic water” and “plerotic water.”

Hazard Communication: Employee “Right-to-Know” legislation requires employers to inform employees (pretreatment inspectors) of the possible health effects resulting from contact with hazardous substances. At locations where this legislation is in force, employers must provide employees with information regarding any hazardous substances which they might be exposed to under normal work conditions or reasonably foreseeable emergency conditions resulting from workplace conditions. OSHA’s Hazard Communication Standard (HCS) (Title 29 CFR Part 1910.1200) is the federal regulation and state statutes are called Worker Right-to-Know Laws. *Also see “Community Right-to-Know” and “SARA.”*

Headworks: The facilities where wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, comminutors, and a wet well and pumps.

High-Velocity Cleaner: A machine designed to remove grease and debris from the smaller diameter sewer pipes with high-velocity jets of water. Also called a “jet cleaner,” “jet rodder,” “hydraulic cleaner,” “high-pressure cleaner,” or “hydro jet.”

Hydraulic Cleaning: Cleaning pipe with water under enough pressure to produce high water velocities.

- Using a ball, kite, or similar sewer cleaning device
- Using a scooter
- Flushing

Hydraulic Loading: Hydraulic loading refers to the flows (MGD or cu m/day) to a treatment plant or treatment process. Detention times, surface loadings and weir overflow rates are directly influenced by flows.

Hydrogen Ion Concentration [H⁺]: The weight of hydrogen ion in moles per liter of solution. Commonly expressed as the pH value, which is the logarithm of the reciprocal of the hydrogen ion concentration.

Hydrogen Sulfide Gas (H₂S): Hydrogen sulfide is a gas with a rotten egg odor. This gas is produced under anaerobic conditions. Hydrogen sulfide gas is particularly dangerous because it dulls the sense of smell so that you don’t notice it after you have been around it for a while. In high concentrations, hydrogen sulfide gas is only noticeable for a very short time before it dulls the sense of smell. The gas is very poisonous to the respiratory system, explosive, flammable, colorless, and heavier than air.

Hypochlorination: The application of hypochlorite compounds to water or wastewater for the purpose of disinfection.

Hypochlorinators: Chlorine pumps, chemical feed pumps or devices used to dispense chlorine solutions made from hypochlorites such as bleach (sodium hypochlorite) or calcium hypochlorite into the water being treated.

Hypochlorite: Chemical compounds containing available chlorine; used for disinfection. They are available as liquids (bleach) or solids (powder, granules, and pellets) in barrels, drums, and cans. Salts of hypochlorous acid.

Indirect Discharger: A non-domestic discharger introducing pollutants to a POTW. These facilities are subject to the EPA pretreatment regulations.

Industrial Pretreatment (Waste) Inspector: A person who conducts inspections of industrial pretreatment facilities to ensure protection of the environment and compliance with general and categorical pretreatment regulations. Also called an inspector and a pretreatment inspector.

Industrial Waste Survey: A survey of all companies that discharge to a POTW. The survey identifies the magnitude of the wastewater flows and pollutants in the discharge.

Industrial Wastewater: Liquid wastes originating from industrial processing. Because industries have peculiar liquid waste characteristics requiring special consideration, these sources are usually handled and treated separately before being discharged to a wastewater collection system.

Infiltration: The seepage of groundwater into a sewer system, including service connections. Seepage frequently occurs through defective or cracked pipes, pipe joints and connections, interceptor access risers and covers, or manhole walls.

Infiltration/Inflow: The total quantity of water from both infiltration and inflow without distinguishing the source. Abbreviated I & I or I/I.

Inflow: Water discharged into a sewer system and service connections from such sources as, but not limited to, roof leaders, cellars, yard and area drains, foundation drains, cooling water discharges, drains from springs and swampy areas, around manhole covers or through holes in the covers, cross connections from storm and combined sewer systems, catch basins, storm waters, surface runoff, street wash waters or drainage. Inflow differs from infiltration in that it is a direct discharge into the sewer rather than a leak in the sewer itself. *See “internal inflow.”*

Influent: Water, wastewater, or other liquid—raw (untreated) or partially treated—flowing into an interceptor, reservoir, basin, treatment process, or treatment plant.

Inlet: 1. A surface connection to a drain pipe. 2. A chamber for collecting storm water with no well below the outlet pipe for collecting grit. Often connected to a catch basin or a “basin manhole” (“cleanout manhole”) with a grit chamber.

Inorganic: Material such as sand, salt, iron, calcium salts and other mineral materials. Inorganic substances are of mineral origin, whereas organic substances are usually of animal or plant origin. *Also see “organic.”*

Inorganic Waste: Waste material such as sand, salt, iron, calcium, and other mineral materials which are only slightly affected by the action of organisms. Inorganic wastes are chemical substances of mineral origin; whereas organic wastes are chemical substances of an animal or plant origin.

Interceptor Sewer: A large sewer that receives flow from a number of sewers and conducts the wastewater to a treatment plant. Often called an interceptor. The term interceptor is sometimes used in small communities to describe a septic tank or other holding tank which serves as a temporary wastewater storage reservoir for a Septic Tank Effluent Pump (STEP) system.

Lateral Sewer: A sewer that discharges into a branch or other sewer and has no other common sewer tributary to it. Sometimes called a “street sewer” because it collects wastewater from individual homes.

Lift Station: A wastewater pumping station that lifts the wastewater to a higher elevation when continuing the sewer at reasonable slopes would involve excessive depths of trench. Also, an installation of pumps that raise wastewater from areas too low to drain into available sewers. These stations may be equipped with air-operated ejectors or centrifugal pumps. Sometimes called a “pump station,” but this term is usually reserved for a similar type of facility that is discharging into a long force main, while a lift station has a discharge line or force main only up to the downstream gravity sewer. Throughout this manual when we refer to lift stations, we intend to include pump stations.

Loading: Quantity of material applied to a device at one time.

Lower Explosive Limit (LEL): The lowest concentration of gas or vapor (percent by volume in air) that explodes if an ignition source is present at ambient temperature. At temperatures above 250°F the LEL decreases because explosibility increases with higher temperature.

Lower Flammable Limit (LFL): The lowest concentration of a gas or vapor (percent by volume in air) that burns if an ignition source is present.

MG: Initials for “Million Gallons.”

MGD: Initials for “Million Gallons Per Day.”

mg/L: *See “milligrams per liter,” mg/L.*

MPN: MPN is the Most Probable Number of coliform-group organisms per unit volume of sample water. Expressed as a density or population of organisms per 100 mL of sample water.

Main Line: Branch or lateral sewers that collect wastewater from building sewers and service lines.

Main Sewer: A sewer line that receives wastewater from many tributary branches and sewer lines and serves as an outlet for a large territory or is used to feed an intercepting sewer.

Manhole: An opening in a sewer provided for the purpose of permitting operators or equipment to enter or leave a sewer. Sometimes called an “access hole” or a “maintenance hole.”

Masking Agents: Substances used to cover up or disguise unpleasant odors. Liquid masking agents are dripped into the wastewater, sprayed into the air, or evaporated (using heat) with the unpleasant fumes or odors and then discharged into the air by blowers to make an undesirable odor less noticeable.

Material Safety Data Sheet (MSDS): A document which provides pertinent information and a profile of a particular hazardous substance or mixture. An MSDS is normally developed by the manufacturer or formulator of the hazardous substance or mixture. The MSDS is required to be made available to employees and operators whenever there is the likelihood of the hazardous substance or mixture being introduced into the workplace. Some manufacturers are preparing MSDSs for products that are not considered to be hazardous to show that the product or substance is not hazardous.

Measured Flow: A flow which has been physically measured.

Media: The material in a trickling filter on which slime accumulates and organisms grow. As settled wastewater trickles over the media, organisms in the slime remove certain types of wastes thereby partially treating the wastewater. Also the material in a rotating biological contactor or in a gravity or pressure filter.

Microorganisms: Very small organisms that can be seen only through a microscope. Some microorganisms use the wastes in wastewater for food and thus remove or alter much of the undesirable matter.

Milligrams Per Liter, mg/L: A measure of the concentration by weight of a substance per unit volume in water or wastewater. In reporting the results of water and wastewater analysis, mg/L is preferred to the unit parts per million (ppm), to which it is approximately equivalent.

Million Gallons: A unit of measurement used in wastewater treatment plant design and collection system capacities or performances.

Motor Efficiency: The ratio of energy delivered by a motor to the energy supplied to it during a fixed period or cycle. Motor efficiency ratings will vary depending upon motor manufacturer and usually will be near 90.0 percent.

NIOSH: The National Institute of Occupational Safety and Health is an organization that tests and approves safety equipment for particular applications. NIOSH is the primary federal agency engaged in research in the national effort to eliminate on-the-job hazards to the health and safety of working people. The NIOSH Publications Catalog contains a listing of NIOSH publications concerning industrial hygiene and occupational health. To obtain a copy of the catalog, write to National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. NTIS Stock No. PB-86-116-787.

NPDES Permit: National Pollutant Discharge Elimination System permit is the regulatory agency document issued by either a federal or state agency which is designed to control all discharges of pollutants from point sources and storm water runoff into US waterways. NPDES permits regulate discharges into navigable waters from all point sources of pollution, including industries, municipal wastewater treatment plants, sanitary landfills, large agricultural feedlots, and return irrigation flows.

Neutralization: Addition of an acid or alkali (base) to a liquid to cause the pH of the liquid to move toward a neutral pH of 7.0.

Nitrification Stage: A stage of decomposition that occurs in biological treatment processes when aerobic bacteria, using dissolved oxygen, change nitrogen compounds (ammonia and organic nitrogen) into oxidized nitrogen (usually nitrate). The second-stage BOD is sometimes referred to as the “nitrification stage” (first-stage BOD is called the “carbonaceous stage”).

Nitrifying Bacteria: Bacteria that change the ammonia and organic nitrogen in wastewater into oxidized nitrogen (usually nitrate).

Nitrogenous: A term used to describe chemical compounds (usually organic) containing nitrogen in combined forms. Proteins and nitrate are nitrogenous compounds.

Noncompatible Pollutants: Those pollutants which are normally not removed by the POTW treatment system. These pollutants may be a toxic waste and may pass through the POTW untreated or interfere with the treatment system. Examples of noncompatible pollutants include heavy metals such as copper, nickel, lead, and zinc; organics such as methylene chloride, 1,1,1-trichloroethylene, methyl ethyl ketone, acetone, and gasoline; or sludges containing toxic organics or metals.

Nonpotable: Water that may contain objectionable pollution, contamination, minerals, or infective agents and is considered unsafe and/or unpalatable for drinking.

Nutrient: Any substance that is assimilated (taken in) by organisms and promotes growth. Nitrogen and phosphorus are nutrients which promote the growth of algae. There are other essential and trace elements which are also considered nutrients.

O&M Manual: Operation and Maintenance Manual. A manual that describes detailed procedures for operators to follow to operate and maintain specific water or wastewater treatment or pretreatment plants and the equipment of the plants.

OSHA: The Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) is a federal law designed to protect the health and safety of industrial workers, including the operators of water supply and treatment systems and wastewater treatment plants. The Act regulates the design, construction, operation, and maintenance of water supply systems, water treatment plants, wastewater collection systems, and wastewater treatment plants. OSHA also refers to the federal and state agencies which administer the OSHA regulations.

Organic: Substances that come from animal or plant sources. Organic substances always contain carbon. (Inorganic materials are chemical substances of mineral origin.) *Also see "inorganic."*

Organics: 1. A term used to refer to chemical compounds made from carbon molecules. These compounds may be natural materials (such as animal or plant sources) or manmade materials (such as synthetic organics). *Also see "organic."* 2. Any form of animal or plant life. *Also see "bacteria."*

Organism: Any form of animal or plant life. *Also see "bacteria."*

Outfall: 1. The point, location or structure where wastewater or drainage discharges from a sewer, drain, or other conduit. 2. The conduit leading to the final disposal point or area.

Outfall Sewer: A sewer that receives wastewater from a collection system or from a wastewater treatment plant and carries it to a point of ultimate or final discharge in the environment. *See "outfall."*

Outlet: Downstream opening or discharge end of a pipe, culvert, or canal.

Oxidation: Oxidation is the addition of oxygen, removal of hydrogen, or the removal of electrons from an element or compound. In the environment, organic matter is oxidized to more stable substances. The opposite of reduction.

Oxidation Ditch: The oxidation ditch is a modified form of the activated sludge process. The ditch consists of two channels placed side by side and connected at the ends to produce one continuous loop of wastewater flow and a brush rotator assembly placed across the channel to provide aeration and circulation.

Oxidizing Agent: Any substance, such as oxygen (O₂) or chlorine (Cl₂), that will readily add (take on) electrons. The opposite is a reducing agent.

POTW—Publicly Owned Treatment Works: A treatment works which is owned by a state, municipality, city, town, special sewer district or other publicly owned and financed entity as opposed to a privately (industrial) owned treatment facility. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage (wastewater) or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they carry wastewater to a POTW treatment plant. The term also means the municipality (public entity) which has jurisdiction over the indirect discharges to and the discharges from such a treatment works.

Pounds per Square Inch Gage pressure (PSIG): The pressure within a closed container or pipe measured with a gage in pounds per square inch.

Package Treatment Plant: A small wastewater treatment plant often fabricated at the manufacturer's factory, hauled to the site, and installed as one facility. The package may be either a small primary or a secondary wastewater treatment plant.

Parts Per Million (PPM): A measurement of concentration on a weight or volume basis. This term is equivalent to milligrams per liter (mg/L) which is the preferred term.

Pass-Through: The passage of untreated pollutants through a publicly owned treatment works (POTW) which could violate applicable water quality standards or National Pollutant Discharge Elimination System (NPDES) effluent limitations.

Pathogenic Organisms: Organisms, including bacteria, viruses or cysts, capable of causing diseases (*giardiasis*, *cryptosporidiosis*, typhoid, cholera, dysentery) in a host (such as a person). There are many types of organisms which do not cause disease. These organisms are called non-pathogenic.

Peak Demand: The maximum momentary load placed on a water treatment plant, pumping station or distribution system. This demand is usually the maximum average load in one hour or less, but may be specified as the instantaneous load or the load during some other short time period.

Peaking Factor: Ratio of a maximum flow to the average flow, such as maximum hourly flow or maximum daily flow to the average daily flow.

Permissible Exposure Limit (PEL): The maximum 8-hour time weighted average of any airborne contaminant (such as dust, mist, vapor, gas, noise) to which an operator may be exposed. At no time may the exposure level exceed the ceiling concentration for that contaminant. Ceiling levels of regulated contaminants are listed in the Code of Federal Regulations (CFR) Title 29 Part 1910, Subparts G and Z. *Also see "Time Weighted Average (TWA)."*

pH: pH is an expression of the intensity of the basic or acidic condition of a liquid. The pH may range from 0 to 14, where 0 is most acidic, 14 most basic, and 7 neutral. Natural waters usually have a pH between 6.5 and 8.5.

Physical Waste Treatment Process: Physical waste treatment processes include use of racks, screens, comminutors, clarifiers (sedimentation and flotation) and filtration. Chemical or biological reactions are important treatment processes, but not part of a physical treatment process.

Pig: Refers to a poly pig which is a bullet-shaped device made of hard rubber or similar material. This device is used to clean pipes. It is inserted in one end of a pipe, moves through the pipe under pressure, and is removed from the other end of the pipe.

Pilot Scale Study: A method of studying different ways of treating wastewater and solids or to obtain design criteria on a small scale in the field.

Pipe Capacity: In a gravity-flow sewer system, pipe capacity is the total amount in gallons a pipe is able to pass in a specific time period.

Pipe Cleaning: Removing grease, grit, roots and other debris from a pipe run by means of one of the hydraulic cleaning methods. *See "balling," "hydraulic cleaning," and "kite."*

Pipe Diameter: The nominal or commercially designated inside diameter of a pipe, unless otherwise stated.

Pipe Joint: A place where two sections of pipe are coupled or joined together.

Pipe Section: A single length of pipe between two joints or couplers.

Plan View: A diagram or photo showing a facility as it would appear when looking down on top of it.

Plant Hydraulic Capacity: The flow or load, in millions of gallons per day (or portion thereof), that a treatment plant is designed to handle.

Pollutant: Any substance which causes impairment (reduction) of water quality to a degree that has an adverse effect on any beneficial use of the water.

Pollution: The impairment (reduction) of water quality by agricultural, domestic or industrial wastes (including thermal and radioactive wastes) to a degree that the natural water quality is changed to hinder any beneficial use of the water or render it offensive to the senses of sight, taste, or smell or when sufficient amounts of wastes create or pose a potential threat to human health or the environment.

Polyelectrolyte: A high-molecular-weight (relatively heavy) substance having points of positive or negative electrical charges that is formed by either natural or manmade processes. Natural polyelectrolytes may be of biological origin or derived from starch products and cellulose derivatives. Manmade polyelectrolytes consist of simple substances that have been made into complex, high-molecular-weight substances. Used with other chemical coagulants to aid in binding small suspended particles to larger chemical flocs for their removal from water. Often called a “polymer.”

Polymer: A long chain molecule formed by the union of many monomers (molecules of lower molecular weight). Polymers are used with other chemical coagulants to aid in binding small suspended particles to larger chemical flocs for their removal from water.

Ponding: A condition occurring on trickling filters when the hollow spaces (voids) become plugged to the extent that water passage through the filter is inadequate. Ponding may be the result of excessive slime growths, trash, or media breakdown.

Postchlorination: The addition of chlorine to the plant effluent, following plant treatment, for disinfection purposes.

Potable Water: Water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for drinking.

Pre-Aeration: The addition of air at the initial stages of treatment to freshen the wastewater, removes gases, add oxygen, and promote flotation of grease, and aid coagulation.

Prechlorination (wastewater): The addition of chlorine in the collection system serving the plant or at the headworks of the plant prior to other treatment processes mainly for odor and corrosion control. Also applied to aid disinfection, to reduce plant BOD load, to aid in settling, to control foaming in Imhoff units and to help remove oil.

Precursor, THM: Natural organic compounds found in all surface and groundwater. These compounds may react with halogens (such as chlorine) to form trihalomethanes (THMs); they must be present in order for THMs to form.

Preliminary Treatment: The removal of metal, rocks, rags, sand, eggshells, and similar materials which may hinder the operation of a wastewater treatment plant. Preliminary treatment is accomplished by using equipment such as racks, bar screens, comminutors, and grit removal systems.

Pretreatment Facility: Industrial wastewater treatment plant consisting of one or more treatment devices designed to remove sufficient pollutants from wastewaters to allow an industry to comply with effluent limits established by the US EPA General and Categorical Pretreatment Regulations or locally derived prohibited discharge requirements and local effluent limits. Compliance with effluent limits allows for a legal discharge to a POTW.

Pretreatment Inspector: A person who conducts inspections of industrial pretreatment facilities to ensure protection of the environment and compliance with general and categorical pretreatment regulations. Also called an “industrial pretreatment (waste) inspector” and an “inspector.”

Preventive Maintenance: Regularly scheduled servicing of machinery or other equipment using appropriate tools, tests and lubricants. This type of maintenance can prolong the useful life of equipment and machinery and increase its efficiency by detecting and correcting problems before they cause a breakdown of the equipment.

Primary Clarifier: A wastewater treatment device which consists of a rectangular or circular tank that allows those substances in wastewater that readily settle or float to be separated from the wastewater being treated.

Primary Treatment: A wastewater treatment process that takes place in a rectangular or circular tank and allows those substances in wastewater that readily settle or float to be separated from the water being treated.

Priority Pollutants: The EPA has proposed a list of 126 priority toxic pollutants. These substances are an environmental hazard and may be present in water. Because of the known or suspected hazards of these pollutants, industrial users of the substances are subject to regulation. The toxicity to humans may be substantiated by human epidemiological studies or based on effects on laboratory animals related to carcinogenicity, mutagenicity, teratogenicity, or reproduction. Toxicity to fish and wildlife may be related to either acute or chronic effects on the organisms themselves or to humans by bioaccumulation in food fish. Persistence (including mobility and degradability) and treatability are also important factors.

Pump: A mechanical device for causing flow, for raising or lifting water or other fluid, or for applying pressure to fluids.

Pump Station: Installation of pumps to lift wastewater to a higher elevation in places where flat land would require excessively deep sewer trenches. Also used to raise wastewater from areas too low to drain into available collection lines. These stations may be equipped with air-operated ejectors or centrifugal pumps. *See "lift station."*

Rack: Evenly spaced parallel metal bars or rods located in the influent channel to remove rags, rocks, and cans from wastewater.

Raw Wastewater: Plant influent or wastewater before any treatment.

Receiving Water: A stream, river, lake, ocean, or other surface or groundwater into which treated or untreated wastewater is discharged.

Regulator: A device used in combined sewers to control or regulate the diversion of flow.

Representative Sample: A sample portion of material, water, or waste stream that is as nearly identical in content and consistency as possible to that in the larger body of material or water being sampled.

Residual Chlorine: The amount of free and/or available chlorine remaining after a given contact time under specified conditions.

Respiration: The process in which an organism uses oxygen for its life processes and gives off carbon dioxide.

Retention Time: The time water, sludge or solids are retained or held in a clarifier or sedimentation tank. *See "detention time."*

Return Sludge: The recycled sludge in a POTW that is pumped from a secondary clarifier sludge hopper to the aeration tank.

Reuse: The use of water or wastewater after it has been discharged and then withdrawn by another user. *Also see "recycle."*

Right-to-Know Laws: Employee "Right-to-Know" legislation requires employers to inform employees (operators) of the possible health effects resulting from contact with hazardous substances. At locations where this legislation is in force, employers must provide employees with information regarding any hazardous substances which they might be exposed to under normal work conditions or reasonably foreseeable emergency conditions resulting from workplace conditions. OSHA's Hazard Communication Standard (HCS) (Title 29 CFR Part 1910.1200) is the federal regulation and state statutes are called Worker Right-to-Know Laws.

Rising Sludge: Rising sludge occurs in the secondary clarifiers of activated sludge plants when the sludge settles to the bottom of the clarifier, is compacted, and then starts to rise to the surface, usually as a result of denitrification.

Rotary Pump: A type of displacement pump consisting essentially of elements rotating in a pump case which they closely fit. The rotation of these elements alternately draws in and discharges the water being pumped. Such pumps act with neither suction nor discharge valves, operate at almost any speed, and do not depend on centrifugal forces to lift the water.

Runoff: That part of rain or other precipitation that runs off the surface of a drainage area and does not enter the soil or the sewer system as inflow.

SARA: Superfund Amendments and Reauthorization Act of 1986. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, has enacted in 1980. The Superfund Amendments increase Superfund revenues to \$8.5 billion and strengthen the EPA's authority to conduct short-term (removal), long-term (remedial) and enforcement actions. The Amendments also strengthen state involvements in the cleanup process and the Agency's commitments to research and development, training, health assessments, and public participation. A number of new statutory authorities, such as Community Right-to-Know, are also established.

SCADA System: Supervisory Control and Data Acquisition System. Computer-monitored alarms, response, control and data acquisition systems used by operators to monitor and adjust their treatment processes and monitor their operations.

SIC Code: Standard Industrial Classification Code. A code number system used to identify various types of industries. In 1997, the United States and Canada replaced the SIC code system with the North American Industry Classification System (NAICS); Mexico adopted the NAICS in 1998.

Sanitary Collection System: The pipe system for collecting and carrying liquid and liquid-carried wastes from domestic sources to a wastewater treatment plant. *Also see "wastewater collection system."*

Sanitary Sewer: A pipe or conduit (sewer) intended to carry wastewater or waterborne wastes from homes, businesses, and industries to the POTW (Publicly Owned Treatment Works). Storm water runoff or unpolluted water should be collected and transported in a separate system of pipes or conduits (storm sewers) to natural watercourses.

Scale: A combination of mineral salts and bacterial accumulation that sticks to the inside of a collection pipe under certain conditions. Scale, in extreme growth circumstances, creates additional friction loss to the flow of water. Scale may also accumulate on surfaces other than pipes.

Schedule, (pipe): A sizing system of numbers that specifies the ID (inside diameter) and OD (outside diameter) for each diameter pipe. The schedule number is the ratio of internal pressure in psi divided by the allowable fiber stress multiplied by 1,000. Typical schedules of iron and steel pipe are schedules 40, 80, and 160. Other forms of piping are divided into various classes with their own schedule schemes.

Schmutzdecke: A layer of trapped matter at the surface of a slow sand filter in which a dense population of microorganisms develops. These microorganisms within the film or mat feed on and break down incoming organic material trapped in the mat. In doing so the microorganisms both remove organic matter and add mass to the mat, further developing the mat and increasing the physical straining action of the mat.

Scooter: A sewer cleaning tool whose cleansing action depends on the development of high water velocity around the outside edge of a circular shield. The metal shield is rimmed with a rubber coating and is attached to a framework on wheels (like a child's scooter). The angle of the shield is controlled by a chain-spring system which regulates the head of water behind the scooter and thus the cleansing velocity of the water flowing around the shield.

Screen: A device used to retain or remove suspended or floating objects in wastewater. The screen has openings that are generally uniform in size. It retains or removes objects larger than the openings. A screen may consist of bars, rods, wires, gratings, wire mesh, or perforated plates.

Scum: A layer or film of foreign matter (such as grease, oil) that has risen to the surface of water or wastewater; a residue deposited on the ledge of a sewer, channel, or wet well at the water surface; a mass of solid matter that floats on the surface.

Secondary Clarifier: A wastewater treatment device which consists of a rectangular or circular tank that allows those substances not removed by previous treatment processes that settle or float to be separated from the wastewater being treated.

Secondary Element: The secondary measuring device or flow meter used with a primary measuring device (element) to measure the rate of liquid flow. In open channels bubblers and floats are secondary elements. Differential pressure measuring devices are the secondary elements in pipes or pressure conduits. The purpose of the secondary measuring device is to (1) measure the liquid level in open channels or the differential pressure in pipes, and (2) convert this measurement into an appropriate flow rate according to the known liquid level or differential pressure and flow rate relationship of the primary measuring device. This flow rate may be integrated (added up) to obtain a totalized volume, transmitted to a recording device, and/or used to pace an automatic sampler.

Secondary Treatment: A wastewater treatment process used to convert dissolved or suspended materials into a form more readily separated from the water being treated. Usually the process follows primary treatment by sedimentation. The process commonly is a type of biological treatment process followed by secondary clarifiers that allow the solids to settle out from the water being treated.

Sedimentation (wastewater): The process of settling and depositing of suspended matter carried by wastewater. Sedimentation usually occurs by gravity when the velocity of the wastewater is reduced below the point at which it can transport the suspended material.

Sedimentation Basin: Clarifier, Settling Tank. A tank or basin in which wastewater is held for a period of time during which the heavier solids settle to the bottom and the lighter materials float to the water surface.

Seed Sludge: In wastewater treatment, seed, seed culture or seed sludge refers to a mass of sludge which contains populations of microorganisms. When a seed sludge is mixed with wastewater or sludge being treated, the process of biological decomposition takes place more rapidly.

Septage: The sludge produced in septic tanks.

Septic (wastewater): A condition produced by anaerobic bacteria. If severe, the wastewater produces hydrogen sulfide, turns black, gives off foul odors, contains little or no dissolved oxygen, and the wastewater has a high oxygen demand.

Septic Tank: A system sometimes used where wastewater collection systems and treatment plants are not available. The system is a settling tank in which settled sludge and floatable scum are in intimate contact with the wastewater flowing through the tank and the organic solids are decomposed by anaerobic bacterial action. Used to treat wastewater and produce an effluent that flows into a subsurface leaching (filtering and disposal) system where additional treatment takes place. Also referred to as an “interceptor;” however, the preferred term is “septic tank.”

Septic Tank Effluent Pump (STEP) System: A facility where effluent is pumped from a septic tank into a pressurized collection system which may flow into a gravity sewer, treatment plant, or subsurface leaching system.

Septicity: The condition in which organic matter decomposes to form foul-smelling products associated with the absence of free oxygen. If severe, the wastewater produces hydrogen sulfide, turns black, gives off foul odors, contains little or no dissolved oxygen, and the wastewater has a high oxygen demand.

Series Operation: Wastewater being treated flows through one treatment unit and then flows through another similar treatment unit.

Service: Any individual person, group of persons, thing, or groups of things served with water through a single pipe, gate, valve, or similar means of transfer from a main distribution system.

Service Pipe: The pipeline extending from the water main to the building served or to the consumer’s system.

Sewage: The used household water and water-carried solids that flow in sewers to a wastewater treatment plant. The preferred term is “wastewater.”

Sewer: A pipe or conduit that carries wastewater or drainage water. The term “collection line” is often used also.

Sewer Gas: Gas in collection lines (sewers) that result from the decomposition of organic matter in the wastewater. When testing for gases found in sewers, test for lack of oxygen and also for explosive and toxic gases. Any gas present in the wastewater collection system, even though it is from such sources as gas mains, gasoline, and cleaning fluid.

Sewer Main: A sewer pipe to which building laterals are connected. Also called a “collection main.”

Sewerage: System of piping with appurtenances for collecting, moving and treating wastewater from source to discharge.

Shock Load (wastewater): The arrival at a plant of a waste which is toxic to organisms in sufficient quantity or strength to cause operating problems. Possible problems include odors and sloughing off of the growth or slime on the trickling filters media. Organic or hydraulic overloads also can cause a shock load.

Short-Circuiting: A condition that occurs in tanks or basins when some of the water travels faster than the rest of the flowing water. This is usually undesirable since it may result in shorter contact, reaction, or settling times in comparison with the theoretical (calculated) or presumed detention times.

Side Stream: Wastewater flows that develop from other storage or treatment facilities. This wastewater may or may not need additional treatment.

Significant Industrial User (SIU): A Significant Industrial User (SIU) includes: all categorical industrial users, and any non categorical industrial user that discharges 25,000 gallons per day or more of process wastewater (“process wastewater” excludes sanitary, noncontact cooling and boiler blow down wastewaters), or contributes a process waste stream which makes up five percent or more of the average dry weather hydraulic or organic (BOD, TSS) capacity of a treatment plant, or has a reasonable potential, in the opinion of the Control or Approval Authority, to adversely affect the POTW treatment plant (inhibition, pass-through of pollutants, sludge contamination, or endangerment of POTW workers).

Significant Noncompliance: An industrial user is in significant noncompliance if its violation meets one or more of the following criteria:

- Chronic violation of wastewater discharge limits, defined here as those in which 66 percent or more of all of the measurements taken during a six-month period exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter
- Technical Review Criteria (TRC) violations, defined here as those in which 33 percent or more of all of the measurements for each pollutant parameter taken during a six-month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, oil and grease, and 1.2 for all other pollutants except pH)
- Any other violation of a pretreatment effluent limit (daily maximum or longer-term average) that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass through (including endangering the health of POTW personnel or the general public)
- Any discharge of a pollutant that has caused imminent endangerment to human health, welfare or to the environment or has resulted in the POTW’s exercise of its emergency authority to halt or prevent such a discharge
- Failure to meet, within 90 days after the schedule date, a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance
- Failure to provide, within 30 days after the due date, required reports such as baseline monitoring reports, 90-day compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules
- Failure to accurately report noncompliance
- Any other violation which the Control Authority determines will adversely affect the operation or implementation of the local pretreatment program

Sludge: The settleable solids separated from liquids during processing or the deposits of foreign materials on the bottoms of streams or other bodies of water.

Sludge Digestion: The process of changing organic matter in sludge into a gas or a liquid or a more stable solid form. These changes take place as microorganisms feed on sludge in anaerobic (more common) or aerobic digesters.

Slugs: Intermittent releases or discharges of wastewater.

Smoke Test: A method of blowing smoke into a closed-off section of a sewer system to locate sources of surface inflow.

Software Programs: Computer programs; the list of instructions that tell a computer how to perform a given task or tasks. Some software programs are designed and written to monitor and control municipal water and wastewater treatment processes.

Solids Concentration: The solids in the aeration tank which carry microorganisms that feed on wastewater.

Soluble BOD: Soluble BOD is the BOD of water that has been filtered in the standard suspended solids test.

Stabilization: Processes that convert organic materials to a form that resists change. Organic material is stabilized by bacteria which convert the material to gases and other relatively inert substances. Stabilized organic material generally will not give off obnoxious odors.

Stabilized Waste: A waste that has been treated or decomposed to the extent that, if discharged or released, its rate and state of decomposition would be such that the waste would not cause a nuisance or odors.

Sterilization: The removal or destruction of all microorganisms, including pathogenic and other bacteria, vegetative forms and spores. Compare with “disinfection.”

Storm Collection System: A system of gutters, catch basins, yard drains, culverts and pipes for the purpose of conducting storm waters from an area, but intended to exclude domestic and industrial wastes.

Storm Runoff: The amount of runoff that reaches the point of measurement within a relatively short period of time after the occurrence of a storm or other form of precipitation. Also called “direct runoff.”

Storm Sewer: A separate pipe, conduit or open channel (sewer) that carries runoff from storms, surface drainage, and street wash, but does not include domestic and industrial wastes. Storm sewers are often the recipients of hazardous or toxic substances due to the illegal dumping of hazardous wastes or spills created by accidents involving vehicles and trains transporting these substances. *Also see “sanitary sewer.”*

Sump: The term “sump” refers to a structure which connects an industrial discharger to a public sewer. The structure (sump) could be a sample box, a clarifier or an intercepting sewer.

Supernatant (wastewater): Liquid removed from settled sludge. Supernatant commonly refers to the liquid between the sludge on the bottom and the scum on the surface of an anaerobic digester. This liquid is usually returned to the influent wet well or to the primary clarifier.

Surcharge: Sewers are surcharged when the supply of water to be carried is greater than the capacity of the pipes to carry the flow. The surface of the wastewater in manholes rises above the top of the sewer pipe, and the sewer is under pressure or a head, rather than at atmospheric pressure.

Surface Runoff: The precipitation that cannot be absorbed by the soil and flows across the surface by gravity. The water that reaches a stream by traveling over the soil surface or falls directly into the stream channels, including not only the large permanent streams but also the tiny rills and rivulets. Water that remains after infiltration, interception, and surface storage has been deducted from total precipitation.

Surfactant: Abbreviation for surface-active agent. The active agent in detergents that possesses a high cleaning ability.

Suspended Growth Processes: Wastewater treatment processes in which the microorganisms and bacteria treating the wastes are suspended in the wastewater being treated. The wastes flow around and through the suspended growths. The various modes of the activated sludge process make use of suspended growth reactors. These reactors can be used for BOD removal, nitrification and denitrification.

Suspended Solids: 1. Solids that either float on the surface or are suspended in water, wastewater, or other liquids, and which are largely removable by laboratory filtering. 2. The quantity of material removed from water in a laboratory test, as prescribed in Standard Methods for the Examination of Water and Wastewater, and referred to as Total Suspended Solids Dried at 103° to 105°C.

Temperature Sensor: A device that opens and closes a switch in response to changes in the temperature. This device might be a metal contact, or a thermocouple that generates minute electric current proportional to the difference in heat, or a variable resistor whose value changes in response to changes in temperature. Also called a “heat sensor.”

Tertiary Treatment: Any process of water renovation that upgrades treated wastewater to meet specific reuse requirements. May include general cleanup of water or removal of specific parts of wastes insufficiently removed by conventional treatment processes. Typical processes include chemical treatment and pressure filtration. Also called “advanced waste treatment.”

Thickening: Treatment to remove water from the sludge mass to reduce the volume that must be handled.

Total Flow: The total flow passing a selected point of measurement in the collection system during a specified period of time.

Total Residual Chlorine: The amount of available chlorine remaining after a given contact time. The sum of the combined available residual chlorine and the free available residual chlorine. *Also see "residual chlorine."*

Toxic: A substance which is poisonous to a living organism.

Trap: 1. In the wastewater collection system of a building, plumbing codes require every drain connection from an appliance or fixture to have a trap. The trap in this case is a gooseneck that holds water to prevent vapors or gases in a collection system from entering the building. 2. Various other types of special traps are used in collection systems such as a grit trap or sand trap.

Trickling Filter: A treatment process in which the wastewater trickles over media that provide the opportunity for the formation of slimes or biomass which contain organisms that feed upon and remove wastes from the water being treated.

Trickling Filter Media: Rocks or other durable materials that make up the body of the filter. Synthetic (manufactured) media have been used successfully.

Trihalomethanes (THMs): Derivatives of methane, CH₄, in which three halogen atoms (chlorine or bromine) are substituted for three of the hydrogen atoms. Often formed during chlorination by reactions with natural organic materials in the water. The resulting compounds (THMs) are suspected of causing cancer.

Turbidity: The cloudy appearance of water caused by the presence of suspended and colloidal matter. In the waterworks field, a turbidity measurement is used to indicate the clarity of water. Technically, turbidity is an optical property of the water based on the amount of light reflected by suspended particles. Turbidity cannot be directly equated to suspended solids because white particles reflect more light than dark-colored particles and many small particles will reflect more light than an equivalent large particle.

Turbidity Meter: An instrument for measuring and comparing the turbidity of liquids by passing light through them and determining how much light is reflected by the particles in the liquid. The normal measuring range is 0 to 100 and is expressed as Nephelometric Turbidity Units (NTUs).

Turbidity Units (TU): Turbidity units are a measure of the cloudiness of water. If measured by a nephelometric (deflected light) instrumental procedure, turbidity units are expressed in nephelometric turbidity units (NTU) or simply TU. Those turbidity units obtained by visual methods are expressed in Jackson Turbidity Units (JTU) which is a measure of the cloudiness of water; they are used to indicate the clarity of water. There is no real connection between NTUs and JTUs. The Jackson turbidimeter is a visual method and the nephelometer is an instrumental method based on deflected light.

Turbulent Mixers: Devices that mix air bubbles and water and cause turbulence to dissolve oxygen in the water.

US EPA: United States Environmental Protection Agency.

Ultra filtration: A membrane filters process used for the removal of some organic compounds in an aqueous (watery) solution.

Upstream: The direction against the flow of water; or, toward or in the higher part of a sewer or collection system.

Variable Costs (wastewater): Costs that a utility must cover or pay that are associated with the actual collection, treatment, and disposal of wastewater. The costs vary or fluctuate. *Also see "fixed costs."*

Vulnerability Assessment (water): An evaluation of drinking water source quality and its vulnerability to contamination by pathogens and toxic chemicals.

Waste Activated Sludge (WAS), mg/L: The excess growth of microorganisms which must be removed from the process to keep the biological system in balance.

Wastewater: A community's used water and water-carried solids (including used water from industrial processes) that flow to a treatment plant. Storm water, surface water, and groundwater infiltration also may be included in the wastewater that enters a wastewater treatment plant. The term "sewage" usually refers to household wastes, but this word is being replaced by the term "wastewater."

Wastewater Collection System: The pipe system for collecting and carrying water and water-carried wastes from domestic and industrial sources to a wastewater treatment plant.

Wastewater Facilities: The pipes, conduits, structures, equipment, and processes required to collect, convey, and treat domestic and industrial wastes, and dispose of the effluent and sludge.

Wastewater Ordinance: The basic document granting authority to administer a pretreatment inspection program. This ordinance must contain certain basic elements to provide a legal framework for effective enforcement.

Wastewater Treatment Plant: An arrangement of pipes, equipment, devices, tanks and structures for treating wastewater and industrial wastes. A water pollution control plant.

Water Cycle: The process of evaporation of water into the air and its return to earth by precipitation (rain or snow). This process also includes transpiration from plants, groundwater movement, and runoff into rivers, streams and the ocean. Also called the "hydrologic cycle."

Watershed: The region or land area that contributes to the drainage or catchments area above a specific point on a stream or river.

Weir: A wall or plate placed in an open channel and used to measure the flow of water. The depth of the flow over the weir can be used to calculate the flow rate, or a chart or conversion table may be used to convert depth to flow. A wall or obstruction used to control flow (from settling tanks and clarifiers) to ensure a uniform flow rate and avoid short-circuiting.

A number of terms were taken from the US EPA Office of Water, Office of Groundwater and Drinking Water, Drinking Water Glossary.